



<https://www.sciencedaily.com/releases/2016/06/160627125304.htm>

Science News

from research organizations

Print Email Share

Metabolic flexibility and immune defenses may influence species spread

Date: June 27, 2016

Source: University of Plymouth

Summary: Why most species are rare has long interested biologists, but until recently our understanding of the factors driving differences in range size has been limited. New research suggests metabolic flexibility and the immune response may both influence how rare or common a species is.

Share:



RELATED TOPICS

Plants & Animals

- New Species
- Nature
- Endangered Animals

Earth & Climate

- Exotic Species
- Environmental Awareness
- Ecology

RELATED TERMS

- Evolution
- Origin of life
- Seahorse
- Narwhal
- Goldfish
- Seedbank

FULL STORY



Deronectes Latus, the most wide-ranging of the Deronectes species.

Credit: Plymouth University

Wide-ranging species may have different levels of bacterial immunity than their rarer relatives, new research suggests.

The study, conducted by Plymouth University PhD student Rebekah Cioffi and supervised by the University's Dr John Moody, Professor David Bilton and Dr Richard Billington, examined the physiological and immune properties of *Deronectes* diving beetles, species of which are found living across Europe.

Scientists collected samples of widespread and restricted species and then assessed temperature tolerance, metabolic flexibility and immunity.

The results showed that while variation in how widespread a species was, and how northerly it was distributed, were explained in part by temperature tolerance, aspects of metabolic plasticity and immunocompetence also appeared important.

"The distribution of many animals is likely to be set by physiological parameters, and thermal tolerance relies on an organism's ability to maintain cellular function under stress," said Rebekah, who has previously completed both undergraduate and Masters courses at the University. "But by investigating their metabolism and immune systems as well, we can see whether more thermally tolerant species also have higher metabolic plasticity and defence capabilities.

"This may be vital in widespread, more northerly distributed species, but no work to date has explored whether this differs between widespread and restricted species. Our paper points to factors which should be considered in future work."

For the study, scientists in Plymouth and at the Department of Ecology and Hydrology at the University of Murcia in Spain, compared metabolic plasticity and immunocompetence across closely related species of *Deronectes* which differ in geographical range size and position.

They then combined these data with thermal tolerance, dispersal ability and phylogenetic history, to explore their relative importance in shaping distribution.

The paper adds: "As species distributions respond to climate change it is vital we understand the mechanisms shaping geographical ranges. Despite the



Related Stories

Accurate Timing of Migration Prolongs Life Expectancy in Pike

Oct. 1, 2015 — Animal migration is a spectacular phenomenon that has fascinated humans for long. It is widely assumed that appropriate timing of migratory events is crucial for survival, but the causes and ... [read more »](#)



Invasive Sparrows Immune Cells Sharpen as They Spread

Nov. 20, 2013 — Researchers find the immune systems of house sparrows at the edge of the species' range in Kenya were more attuned to finding dangerous parasites than birds from older sites in the same country. ... [read more »](#)

Bird Vaccine for West Nile Virus

July 9, 2013 — Researchers have developed a vaccine to halt the spread of West Nile Virus among common and endangered bird ... [read more »](#)

Rare Species Perform Unique Roles, Even in Diverse Ecosystems

May 28, 2013 — A new study reveals the potential importance of rare species in the functioning of highly diverse ecosystems. Using data from three different ecosystems -- coral reefs, tropical forests and alpine ... [read more »](#)

Osmometer
made in Germany
Fast and effective measuring - competent after sales service!



clusion of additional variables, thermal physiology was still clearly related to biogeography. However, other aspects of an organism's physiological niche may be related and although widespread species have broader thermal tolerances to cope with more variable climates, they also appear to have different energetic strategies and immune trade-offs to endemic species."

Story Source:

The above post is reprinted from materials provided by **University of Plymouth**. *Note: Materials may be edited for content and length.*

Journal Reference:

1. Rebekah Cioffi, A. John Moody, Andrés Millán, Richard A. Billington, David T. Bilton. **Physiological niche and geographical range in European diving beetles (Coleoptera: Dytiscidae)**. *Biology Letters*, 2016; 12 (6): 20160130 DOI: 10.1098/rsbl.2016.0130

Cite This Page:

MLA

APA

Chicago

University of Plymouth. "Metabolic flexibility and immune defenses may influence species spread." ScienceDaily. ScienceDaily, 27 June 2016. <www.sciencedaily.com/releases/2016/06/160627125304.htm>.

Share This Page:



Powered by Google



JYC Shafts Supplier

Ad jyc.com.tw



Giant Ape Lived Alongside Humans

sciencedaily.com



TCKW- stainless-steel products

Ad tckw.com.tw



World's Oldest Living Tree -- 9550 years old --...

sciencedaily.com

NEXT >

Recommended Articles

Bird decline shows that climate change is more than just hot air

Oxford University Press (OUP), ScienceDaily, 2015

Tolerance to daily versus seasonal temperature changes may dictate fitness

American Association for the Advancement of Science, ScienceDaily, 2016

Climate change: Tropical species are most vulnerable to rising temperatures

Senckenberg Research Institute and Natural History Museum, ScienceDaily, 2014

Predicting Impact Of Climate Change On Organisms: Latitude's Not Enough

Ecological Society of America, ScienceDaily, 2006

Climate change will speed spread of invasive fish to northern Europe

FECYT - Spanish Foundation for Science and Technology, ScienceDaily, 2010

Hoarding rainwater could dramatically expand range of dengue-fever mosquito

MyVMC

What is bacteria? What are bacteria?

Medical News Today, 2014

Lyme Disease Rates Are Rising In Northern U.S.

Medical News Today, 2013

Exercise in early life affects gut flora, promoting better health

Marie Ellis, Medical News Today

The Gravity of It All

IEEE Pulse, 2014

111-733D
Stainless Steel Manufacturer

Strange & Offbeat

PLANTS & ANIMALS



The Martian Becomes Reality: At Least Four Crops Grown on Simulated Mars Soil Are Edible



Insects Were Already Using Camouflage 100 Million Years Ago



Small Brain, Astounding Performance: How Elephantnose Fish Switch Between Electrical, Visual Sense



Evolutionary Biologists Show That Sexual Selection Increases the Number of Species and Impacts Global Diversity

EARTH & CLIMATE



Opal Discovered in Antarctic Meteorite



Whistling Wormholes Discovered in the Caribbean



Giant Blobs of Rock, Deep Inside the Earth, Hold Important Clues About Our Planet



The World's Oldest Farmers Were Insects

FOSSILS & RUINS



Ancient 'Deep Skull' from Borneo Full of Surprises



Massive Vertebrae Sheds New Light on Alamosaurus Sanjuanensis



One Snake's Prey Is Another's Poison: Scientists Pinpoint Genetics of Extreme Resistance



Sea Snakes Have Extra Sense for Water Living

See fewer ads and support this site.

Contributor works on millions of sites and all of your devices.

Contributor
by Google

Print Email Share

Powered by Trend MD

Free Subscriptions

Get the latest science news with ScienceDaily's free email newsletters, updated daily and weekly. Or view hourly updated newsfeeds in your RSS reader:

Email Newsletters

RSS Feeds

Follow Us

Keep up to date with the latest news from ScienceDaily via social networks:

Facebook

Twitter

Google+

Mobile Apps

Get the latest news from ScienceDaily via our free mobile apps, available for download on the following platforms:

iPhone/iPad

Android

Have Feedback?

Tell us what you think of ScienceDaily -- we welcome both positive and negative comments. Have any problems using the site? Questions?

Leave Feedback

Contact Us

