## NEW TECHNIQUE FOR ESTIMATING LIZARD BODY MASS FROM MEASUREMENTS.

Lizards are an important indicator species for understanding the condition of specific ecosystems. Their body weight is a crucial index for evaluating species health, but lizards are seldom weighed, perhaps due in part to the recurring problem of spontaneous tail loss when lizards are in stress.

Now ecological researchers have a better way of evaluating these lizards. Dr. Shai Meiri has developed an improved tool for translating lizard body lengths to weights. Dr. Meiri's new equations calculate this valuable morphological feature to estimate the weight of a lizard species in a variety of different ecosystems.

Dr. Meiri evaluated hundreds of lizard species: long-bodied, legless species as well as stout, long-legged species; some that sit and wait for prey, others that are active foragers. Based on empirical evidence, such as well-established behavioral traits, he built a statistical model that could predict weights of lizards in a reliable, standardized manner, for use in the field or at the lab.

Based on a large (>900 species in 28 families) dataset of lizard and amphisbaenian weights, equations were generated to estimate weights from the common size index used in lizard morphometrics (snout-vent length). Species level phylogenetic hypotheses were then used to examine the ecological factors that affect the variation in weight-length relationships. Legless and leg-reduced lizards are characterised by shallower allometric slopes and thus long-bodied legless species are lighter than legged lizards of comparable length. Among legged species, the foraging strategy strongly influences the weights, with sit-and-wait species being bulkier at comparable lengths than active foraging species. Environmental productivity and activity times are only significant when using non-phylogenetic models. The need for effective locomotion is a major factor affecting lizard shape and thus previously used allometric equations are inaccurate in their estimates.

In the future, zoologists will be able to use Dr. Meiri's method to better predict which communities of animals will shrink, grow or adapt to changing conditions.

Meiri, S. (2010). Length-weight allometries in lizards. *J. Zool.* **281**, 218–226.

## SNAKE FANGS EVOLVED FROM GROOVED TEETH

Venom delivery systems occur in a wide range of extant and fossil vertebrates and are primarily based on oral adaptations. Teeth range from unmodified to highly specialized fangs similar to hypodermic needles (proteroglyphous and solenoglyphous snakes). Developmental biologists have documented evidence for an infolding pathway of fang evolution, where the groove folds over to create the more derived condition. However, the oldest known members of venomous clades retain the same condition as their extant relatives, resulting in no fossil evidence for the transition.

The late Triassic reptile Uatchitodon is known only from its teeth, that are tall and serrated . Several have been found, and the two youngest examples date from 220 mya possess venom canals. An older set has grooves of different depths but no canals. Until now it was unknown whether the variations reflected evolutionary changes or different stages of tooth development, or teeth from different positions in the mouth.

Jon Mitchell and colleagues from the University of Chicago discovered 26 Uatchitodon teeth in North Carolina. Their age places them between the other two sets, and examining all the teeth showed how grooves that initially formed at the surface gradually lengthened and deepened until they became enclosed canals. Mitchell's work suggests that snake fangs probably evolved independently of Uatchitodon but the sequence of events was most likely similar.

Mitchell, J.S., Heckert, A.B. & Sues, H.D. (2010). Grooves to tubes: evolution of the venom delivery system in a Late Triassic "reptile". *Naturwissenschaften* **97** (12), 1117-1121.

## TURTLE POISONING IN MURILO ATOLL, CHUUK STATE, FEDERATED STATES OF MICRONESIA.

On Sunday, October 17 2010, the Federated States of Micronesia (FSM) Department of Health and Social Affairs (DHSA) and the World Health Organization (WHO) were notified of the sudden death of three children and the sickening of approximately 20 other persons on Murilo Island, Chuuk State. The illness was suspected to be the result of mass consumption of a hawksbill turtle (*Eretmochelys imbricata*) which had been prepared and served on the afternoon of Friday, October 15. Upon receipt of the reports of sudden illness, an emergency response team was dispatched to Murilo to set up a field hospital for treatment of victims. Concurrently, an investigation team was assembled to confirm the cause of the outbreak, describe the epidemiology of cases, and provide recommendations for control.

The investigative team conducted interviews with key members of the community in order to determine the cause of the outbreak, undertook environmental investigation, and questioned all sick persons and a large proportion of healthy community members.

Four children and two adults died in the outbreak, and a number of others were sickened; approximately 80% of those who ate turtle became ill. A variety of samples were collected for analysis, though no autopsies were performed. No laboratory results are available at this time.

The investigators concluded that turtle poisoning (also called chelonitoxism) was the cause of the mass illness on Murilo; there does not appear to be any other likely explanation for the mass illness. Persons from Murilo affected by the illness are not a risk to others. Because all of the tissue from the turtle has been consumed or otherwise disposed of, there is no remaining turtle meat which could lead to further illness. There is no reason to suspect that reef fish around Murilo are toxic.

The range of illness described in the investigation is consistent with previously reported cases of chelonitoxism. There is no antidote or other medicine that can specifically treat chelonitoxism. Children are expected to be more severely affected. It is not clear why the two adult males developed serious disease and died, though they may have consumed a larger amount of turtle than other victims.

All turtles, but particularly hawksbill turtles, are known to be capable of being poisonous. There is no way to determine which individual turtles are or are not poisonous. Because there is nothing unique about Murilo that would result in only Murilo turtles being toxic, there is no justification for continuing to single out Murilo (or the Hall Islands) as being at increased risk for chelonitoxism. Instead, it should be emphasised that any turtles or their eggs, anywhere, may be toxic.

Since all turtles and their eggs are capable of being toxic, the only way to insure public health is to avoid consuming any turtles or their eggs. The FSM DHSA therefore recommends a complete ban on the consumption of all species of turtles and their eggs in Chuuk and the rest of FSM. The health sector will be working with lawmakers and other relevant stakeholders to update turtle management policies.

Though this incident has come to an end, future incidents are certain to occur unless action is taken to alter turtle-eating behavior in Chuuk and the rest of FSM.

This has been posted on behalf of Dr. Vita A. Skilling, Secretary of the Department of Health and Social Affairs, FSM National Government, Palikir Pohnpei.

## DYNAMICS OF *RANAVIRUS* DISEASE UK FROG POPULATIONS

Common frog (*Rana temporaria*) populations across the UK are suffering declines from a number of causes. One such is infection from the emerging disease *Ranavirus*. Using data collected from the public by the Frog Mortality Project and Froglife, scientists from the Zoological Society of London found that, where disease outbreaks were recurrent, populations experienced an 81% decline in adult frogs over a 12 year period from 1996-2008.

There is a preliminary indication that common frog populations can respond differently to the emergence of disease: emergence may be transient, catastrophic, or persistent with recurrent mortality events. Despite a number of populations suffering from infection year-on-year, other populations bounced-back from mass-mortality events. This suggests that some populations of frogs may have some form of immunity to ranaviral infection.

In the 1980s and 1990s, the disease was particularly associated with the southeast of England. In recent years new 'pockets' of diseases have turned up in Lancashire, Yorkshire and along the south coast.

Comparable uninfected populations (n=16) showed no change in population size over the same time period. Regressions showed that larger frog populations may be more likely to experience larger declines than smaller populations, and linear models show that percentage population size changes were significantly correlated with disease status, but that habitat age had no significant effect on population size change. The results are the first evidence of long-term localized population declines of an amphibian species which appear to be best explained by the presence of *Ranavirus* infection.

Teacher, A.G.F., Cunningham, A.A., Garner, T.W.J. (2010). Assessing the long-term impact of *Ranavirus* infection in wild common frog *Rana temporaria* populations. *Anim. Cons.* **13** (5), 514-522.

## ACKNOWLEDGEMENTS

On behalf of the British Herpetological Society the Editor wishes to thank the following reviewers, authors and observers who have greatly enhanced the content of the 2010 volume;

Tim Aplin
Colin Bailey
John Baker
Bill Belzer
Charles R. Bursey
Micheal S. Caldwell
Stuart Chapman
Miles D. Davis
Vladimir Dinets
S.R. Ganesh
Chris Gleed-Owen
Stephen R. Goldberg
Paul B.C. Grant
Rowland Griffin
Richard A. Griffiths
Michelle Haines
Rahbet Haskane
Anne Leonard
Owen J.J. Lewis
Alex Ramsay
Chris Reading
Mario Garcia
Trevor Rose
Allen Salzberg
Sue Seibert
Mark O’Shea
Emanuel Teixeira da Silva
Ben Tapley
Farhang Torki
Simon Townsend
Laurie J. Vitt
Mark Wright