

THE AMERICAN BIOLOGY TEACHER



About Our Cover

The land iguana on the cover, *Conolophus subcristatus*, was photographed on Plaza Sur, one of the many islands making up the Galapagos archipelago. It is one of the smallest of three species (including *C. rodada* and *C. pallidus*) found on the Galapagos, growing to a length of 3 to 5 feet and weighing up to 25 pounds. They can live to 60 years of age.

The Galapagos Islands are located 600 miles off the coast of Ecuador. They began as sterile lava fields, but the convergence of oceanic currents brought a variety of marine life to each. Evolution took over from there.

Both land and marine iguanas from the Galapagos are descended from a common ancestor that floated out to the islands from South America on rafts of vegetation. Based on analysis of blood proteins, immunologists agree that these two iguanas have been diverging for over 15 million years. The colonization and divergence took place on islands that are no longer visible because they have eroded away and are now submerged.

Land iguanas are poikilotherms, regulating body temperature by absorbing heat from the sun while basking on volcanic rocks. They can live a year or more without fresh water; they obtain moisture from the pads of cactus such as *Opuntia*. The famous Darwin finches also play a role in the life of the iguanas. These two animals have evolved into a mutualistic relationship. The iguanas raise themselves up so that the finches can remove parasites from their bodies, providing relief, while the finches eat the parasites for food.

Charles Darwin described the land iguana as an "ugly animal ... with a stupid appearance." Another opinion is that it actually appears a bit devilish and quite regal, with its menacing spiny crests along its back! A highlight of this visit to the Galapagos was when one of these noble creatures ambled right next to the photographer's ankle. On the Galapagos, the animals always have the right of way!

The photographer is Jane Weaver, a retired biology teacher from Norristown Area High School, Norristown, PA (cellmates@aol.com). The photo was taken with a Canon Power Shot SX170.

Contents

Feature Articles

- A Model of the Use of Evolutionary Trees (MUET) to Inform K-14 Biology Education**
Evolutionary trees are powerful tools used in modern biological research
Yi Kong, Ankita Thawani, Trevor Anderson, Nancy Pelaez 81
- Using Natural Selection Concept Inventories in College Biology Classrooms to Improve Teaching and Learning**
Using assessment instruments to build in-class activities and labs, assess student knowledge, and confront student misconceptions
Morgan L. Presley, Rebecca Gehringer, Deborah L. Hanuscin. 91
- How Does Evolution Explain Blindness in Cavefish?**
*Explaining the evolution of blindness in Mexican tetras (*Astyanax mexicanus*)*
Mike U. Smith 95
Available online at <http://www.nabt.org/websites/institution/index.php?p=771>

Research on Learning

- Impact of a Short Evolution Module on Students' Perceived Conflict between Religion and Evolution**
How instructors present a module on evolution has an impact on student perceptions of compatibility between religion and evolution
M. Elizabeth Barnes, James Elser, Sara E. Brownell 104
- Valuing Evidence over Authority: The Impact of a Short Course for Middle-Level Students Exploring the Evidence for Evolution**
Increasing student knowledge and acceptance of evolution
William L. Romine, Amber N. Todd 112
- The Impact of the Chukwin Mini-Unit on Students' Understanding of Natural Selection**
Maximizing student learning of natural selection & retention through simulation-based games
Sarah Bauer 120



Inquiry & Investigation

- Modeling Evolution in the Classroom: An Interactive LEGO Simulation**
Using LEGO bricks to simulate how mutation, migration, genetic drift, and natural selection can affect the evolution of a population
Abby Hongsermeier, Nealy F. Grandgenett, Dawn M. Simon 128
- Sexual Selection: A Short Review on Its Causes and Outcomes, and Activities to Teach Evolution and the Nature of Science**
Promoting active learning about evolution, the nature of science & methods used to construct scientific knowledge
Xana Sá-Pinto, Pedro Cardia, Rita Campos 135
- Evaluating an Open-Exam Approach to Engaging Students in Evolutionary Paradoxes: Cheating to Learn**
A guide to employing this provocative and educational classroom exercise
Kenneth James Chapin, Peter Nonacs, Loren D. Hayes 144



Tips, Tricks & Techniques

- Traveling with Charlie: The Voyage of the Beagle as an Introduction to the Natural History of South America**
Helping students gain an appreciation for the diversity of terrestrial habitats & organisms in South America
Janice Voltzow 151

Departments

- Guest Editorial** • The Quest to Understand Human Evolution: A Magical Mystery Tour • Brianna Pobner 77
- From the Editor's Desk** • *The Natural Selection Song* 78
- Book Reviews** • Elizabeth Cowles, Department Editor 158
- Classroom Materials & Media Reviews** • Remy Dou, Department Editor 162