CSUN Department of Biology

BIOSPHERE

The Weekly Bulletin of Biology

Biology Colloquium: Friday, 3 April 2015, 2:00 pm in CR 5125

"Primordial Germ Cell Evolution: Mechanisms, Genes, and Macroevolution"

Brian Crother, Ph.D.
Department of Biological Sciences
Southeastern Louisiana University

Next Week Spring Break

No classes! Also, no *Biosphere*.

Snake Talk by Dr. Crother

This week's Colloquium speaker will give an additional talk titled, "Snakes in Film: Fact and Fiction," at noon on Thursday, 2 April in EH 2131 (Dean's Conference Room).

New Prestigious Publication

Nature has published, "Multi-omics of permafrost, active layer and thermokarst bog soil microbiomes," by Dr. **Rachel Mackelprang** and colleagues.

MS Thesis Defense

Barbara Sanchez (**Steele** Lab) will defend her thesis, "The effects of organic pollutants on the growth, condition, and reproduction of *Paralabrax nebulifer* (Barred Sand Bass) in Southern California," at 10 am Friday, 3 April in MH 4111.

Fruits, Fruits, Fruits

—Paul Wilson

The word *fruit* is ambiguous.

To a biologist, a fruit is the structure that develops from a carpel or set of carpels after the ovules inside have been fertilized. When the ovules become immature seeds, the carpels become an immature fruit, or perhaps a set of fruits. This is true regardless of whether the fruit is fleshy or not. The outer coating of a dandelion seed is a fruit.

When one speaks of *fruits and vegetables*, one is not dealing with anything so defined. I guess they are all more or less fleshy, and the fruits are the sweeter ones, while the vegetables are not particularly sweet.

A strawberry's fruits are the little brown pips (often mistaken for seeds) slightly embedded in the oversized fleshy red receptacle, which itself is not

the fruit. Eggplants, avocados, Persian cucumbers, spaghetti squash, and bell peppers are fruits, to a biologist.

Fruits and the other parts of flowers are defined as evolutionary innovations. Other structures that end up aiding in dispersal are not fruits in this sense. The flesh around a seed of a gingko is not a fruit because the gingko does not have flowers. The flesh around the seed of a magnolia is a part of its seed coat; the fruit of a magnolia is a dry follicle.

In biology, some structures are defined as unique evolutionary innovations, like the fruits of angiosperms, the peristomes of mosses, and the feathers of the clade of dinosaurs that includes birds. Other structures are defined functionally, the optic lenses of vertebrates and cephalopods, the leaves of mosses and ferns, the male versus female sexual functions of plants and animals. These latter types of definitions leave open the possibility that the similarity of the traits in the category might not be because of inheritance from a common ancestor, rather the result of selection for analogous functions. One should ask, for each category of trait, whether it is being defined based on homology or analogy?

The answer is not always clear. Within living memory, one would have assumed that the segmentation of a fly and a mouse were analogous—and perhaps they are at some level—but we now know that they are both orchestrated by the same cascade of (nearly) the same genes of developmental expression. This metronome of development is shared because the common ancestor of flies and mice had it. It is a deep homology.

An analogous cascade of genes of developmental expression is found in plants: the ABC genes orchestrate which organs become sepals, petals, anthers, or carpels. Cascades of genetic expression that result in homeotic repetition are a deep analogy, an analogy of logic, evolutionarily "discovered" by these two lineages of complex multicellular organisms.

If you must, you may refer to fleshy diaspores as *"fruits"*—ecologists are prone to do so—and then the "fruit" of gingkos might well have attracted hungry dinosaurs that thereby dispersed gingko seeds.

Speaking to the Next Generation of Scientists

Dr. **Steven Oppenheimer** gave the keynote address for Cleveland Charter High School's recent STEM Symposium.

Alumni News

Elizabeth Aquije (B.S. Cell and Molecular Biology, '14) has been accepted into UCLA's Medical School program. Congratulations!

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Department of Biology
California State University, Northridge
Editors: Paul Wilson and Robert Espinoza
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