KAS BULLETIN

NEWSLETTER OF THE KANSAS ACADEMY OF SCIENCE

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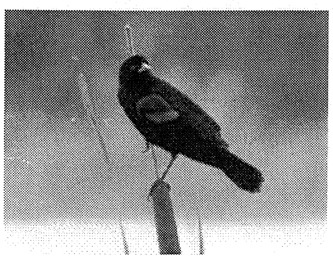
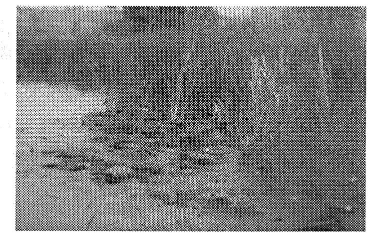


146Th ANNUAL MEETING OF THE KANSAS ACADEMY OF SCIENCE

April 4th - 5th, 2014
Emporia State University
Emporia, Kansas



This year's meeting will be held jointly with the 90th Annual Meeting of the Kansas Entomological Society!

The registration deadline is Friday, March 14th, 2014. Conference details and the downloadable registration form can be found at:
http://www.kansasacademyscience.org/meeting.html

Friday's Events:

- **1:30-5 PM** Field Trip: Hamilton Quarry – Meet in ESU Science Hall
- **6:30-7:30 PM** Banquet – Colonial Ballroom, ESU Memorial Union
- **8:00-9:30 PM** KAS Board Meeting – ESU Memorial Union

Saturday's Events:

- All Day Paleontology Symposium
- All Day Poster and Oral Presentations
- **12-1 PM** Luncheon & Symposium – Webb Hall, ESU Memorial Union
- **1-2 PM** Keynote Speaker Dr. Quentin D. Wheeler - Webb Hall, ESU Memorial Union
  Keynote Topic: "Sustain What? Avoiding Biodiversity Losses of Cosmic Proportion."
- Afternoon Award Presentation

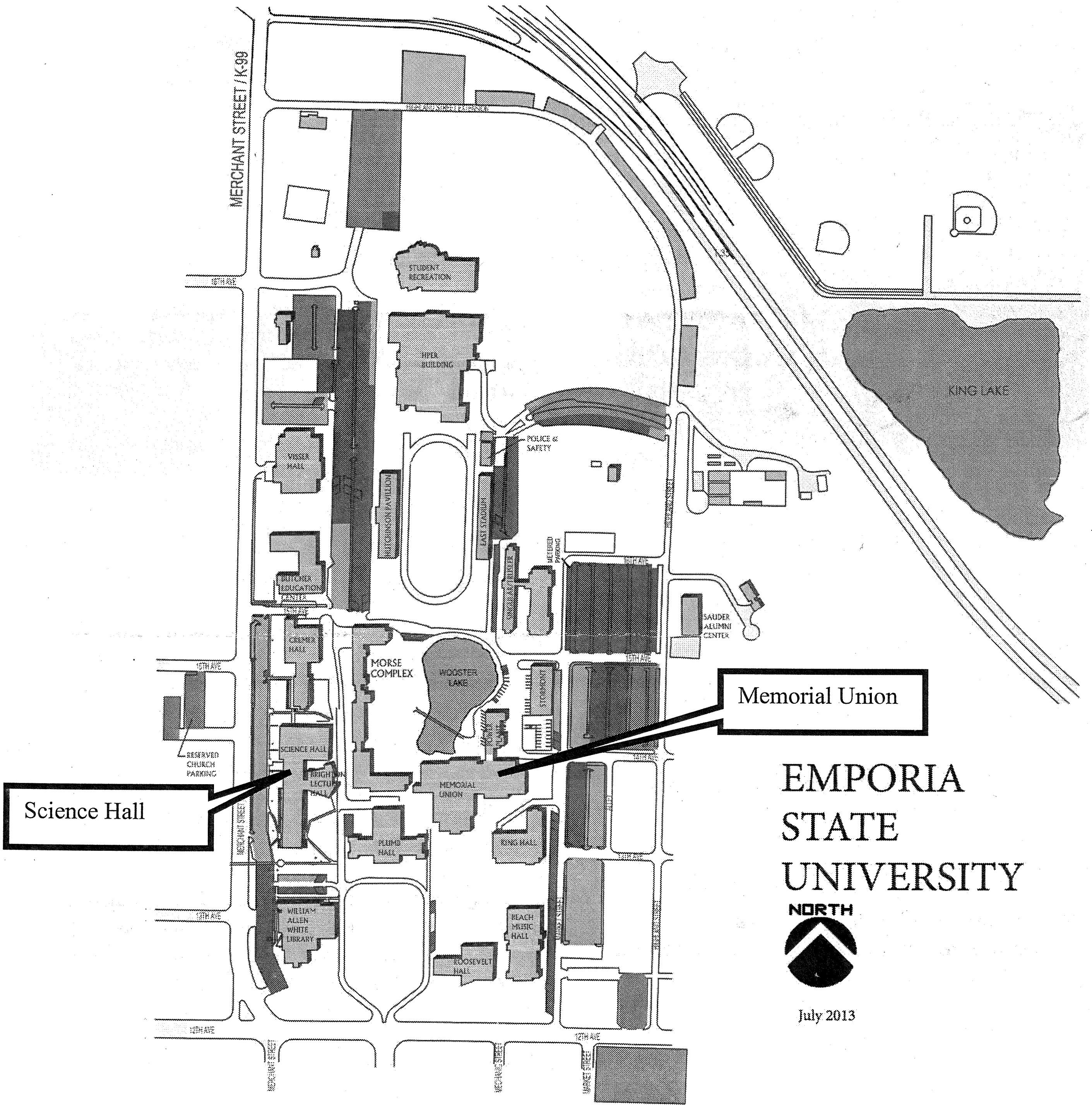
SYMPOSIUM ON ECOHYDROLOGY AND CLIMATE CHANGE AT KANSAS NATURAL AREA RESEARCH STATIONS

In 1987 the symposium "Natural Areas of Kansas" was held during the 119th Annual Meeting of the Kansas Academy of Science (KAS). The symposium provided an overview of Kansas natural areas, with a focus on locations used for research and higher education. The proceedings were published as a special issue of the KAS Transactions in 1988. Twenty-two years earlier, the KAS published "A Plan for Natural Areas in Kansas" (Trans. vol. 69, 1966). This article resulted from work of the KAS Committee on Conservation that met during the 1960s. The Committee also drafted legislation adopted in 1974 known as the "Natural and Scientific Areas Preservation Act", which was passed by the Kansas legislature.

Mail Annual Meeting Registration Form to:

ESU Conference/Scheduling
Memorial Union, Campus Box 4066
Emporia State University
Emporia, KS 66801-5087

Or Fax to: (620) 341-5844



PERMIT	FOR USE BY	PERMIT	FOR USE BY	PERMIT	FOR USE BY
GOLD	AUTHORIZED BY PRESIDENT	GREEN	STUDENTS	RED	METERED PARKING
ORANGE	FACULTY & STAFF	GRAY	FACULTY, STAFF & STUDENTS	YELLOW	SPECIAL PARKING
VIOLET	FACULTY, STAFF & STUDENTS	BROWN	SPECIAL USE DESIGNATION	PINK	FREE PARKING

WHAT IS IT?

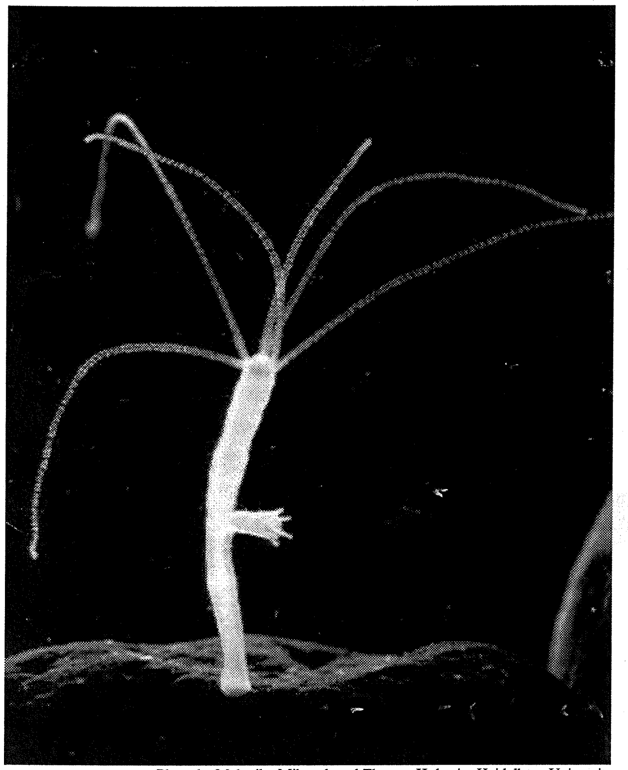


Photo by Melanike Mikosch and Thomas Holstein, Heidelberg University

by Rachel Feltman, SC IENCE Vol. 343, February, 2014

Some of us age more gracefully than others, but perhaps no animal group does it better than the tiny freshwater polyps known as hydras. In 1998 one biologist ventured that the tentacled creatures, by continually renewing their own cells, may stave off aging altogether to achieve a kind of biological immortality

More recently, the species *Hydra magnipapillata* was one of a few dozen organisms included in a study of aging diversity. Whereas female fertility in humans spikes early, then tapers off, and mortality rises sharply as we age, plenty of organisms follow a different path. The water flea, for example, experiences fluctuations in fertility throughout its lifespan and a more gradual rise in mortality. By the hydra takes the prize for life-cycle oddity. The polyp's mortality appears to remain low for an indefinite period, the researchers reported in *Nature*. In a controlled laboratory setting, they estimated that 5 percent of a hydra population would still be alive after 1,400 years.

UNDERWATER SPORE DISPERSAL

Excerpted from Jonathan L. Frank, FUNGI Vol. 6, No. 4, 2013

In 2005 Robert Coffan, a hydrologist in southern Oregon, made what is believed to be the first discovery of an underwater mushroom. While several ascomycetes are known to fruit underwater, no gilled mushroom had previously been known to do so.

A few years later, based on morphological and molecular study, the underwater little brown mushroom was described as a new species, *Psathyrella aquatica*.

Insects are known to consume a wide range of basidiomycete fungi and have been implicated as spore dispersal vectors.

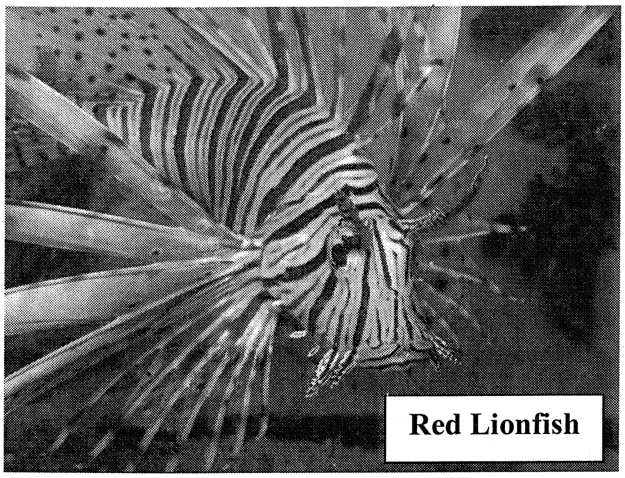
As with truffles that fruit underground and require animals to dig them up and eat them to spread their spores, some dispersal vector is likely required to counter the constant flow of water downstream.

I first observed aquatic insect larvae associating with *P. aquatica* in 2009 when I collected three fruiting bodies and later inspected them under a microscope. To my surprise, two black fly larvae emerged from the cap on one specimen, and a mayfly naiad from another.

I brought specimens of the mayfly, caddisfly, black fly larvae, and a red spider mite, back to the laboratory to examine for the presence of any *P. aquatica* spores within or adhering to the exterior of their bodies.

Distinctive ellipsoid smooth brown spores of *P. aquatica* were observed from slides made of the guts of the caddisfly and the mayfly, and from mounts of the entire black flies.

These observations suggest that aquatic insects are involved in spore dispersal, either as mycophagists, grazers, or filter feeders collecting spores as they move along the mushrooms underwater.



Red Lionfish

AS LIONFISH INVADE, DIVERS DEFEND THREATENED ECOSYSTEMS

Excerpted from Christopher Pala, SCIENCE, February 7, 2014

The red lionfish, with its striking stripes and huge outrigger f ins, wasn't hard to spot. Nor to spear: It simply studied me, utterly fearless until I killed it.

For ecosystems in the southwestern Atlantic Ocean, however, the lionfish is a curse. Marine scientists say that the voracious predator, a Pacific native believed to have been released into the Atlantic by aquarium lovers in the mid-1980s, is spreading rapidly and wiping out native fish, especially on vulnerable Caribbean coral reefs.

In the Bahamas, where *Pterois volitans* was first spotted in 1985, "they're everywhere," says Pericles Maillias, a Bahamian conservationist who has led local efforts to battle the invader.

Late last year, however, Maillis and other lionfish opponents got some good news. Using ecological models to plan surgical 18-month offensive, divers killed enough lionfish for native fish populations to rebound at 24 coral reefs near the Bahamian island of Eleuthera, researchers reported.

The study shows that "we don't have to catch every lionfish" to allow native species to recover, says Green, the lead author, although the culling must be repeated regularly.

Such targeted tactics could help beat back an invasion that has spread to some 3.3 million square kilometers of the Atlantic, ranging from Rhode Island to the Panama Canal, according to Pam Schofield of the U.S. Geological Survey in Gainesville, Florida.

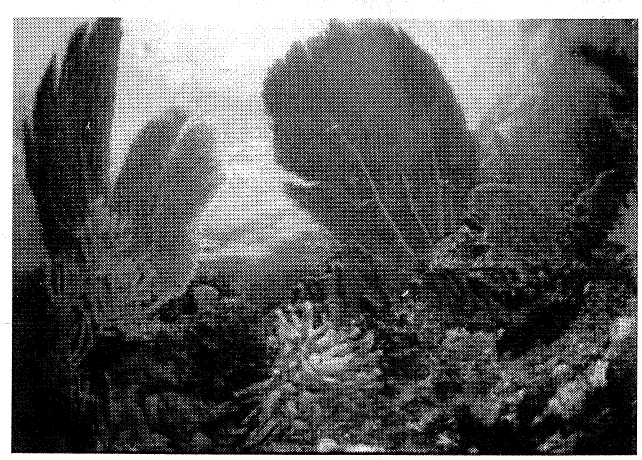
Lionfish invaders can snap up one-half of resident fish within just a year after arriving on a reef, recent research shows.

To reduce lionfish numbers, policymakers in the Bahamas and elsewhere have tried to promote commercial fishing of the tasty species.

One problem facing any fishery, however, is that handling lionfish requires special care: their venomous spines can make the slightest puncture extremely painful. And their unusual appearance can make consumers skittish.

Still, in Florida, the commercial catch quintupled from 1.1 tons in 2011 to 6.1 tons in 2012, according to the U.S. National Marine Fisheries Service.

"If we can get divers to take the lionfish out of the shallow reefs and the mangroves where the juveniles are, "Green says, "we may be able to keep some reefs relatively intact."



BUILT TO LAST
HOW ROMAN HARBORS HAVE STOOD THE TEST OF TIME

Excerpted from Nikhil Swaminathan, Archiology 67(2):45-47 March/April 2014

The circular harbor at Caesarea, which sites on the coast of Israel, was constructed in less than 10 years, from roughly 23 to 15 B.C., on the order of King Herod, ruler of the Roman province of Judaea. The site chosen was an unobstructed length of coastline with no natural geographic features to break the waves rolling into shore or protect ships. The port's construction was nothing short of a Roman engineering marvel, comparable to the Colosseum or the aqueducts.

Much of the vast structure, which includes two breakwaters, three underwater piers that once held large statues, and a 60-foot-wide entrance for ships, stands today. The scholar Josephus' description, written nearly 2,000 years ago, still rings true: "Herod contended with the difficulties so well that the sea could not overcome the solidity of the construction." The trick to Caesarea's longevity was the concrete used to build the harbor.

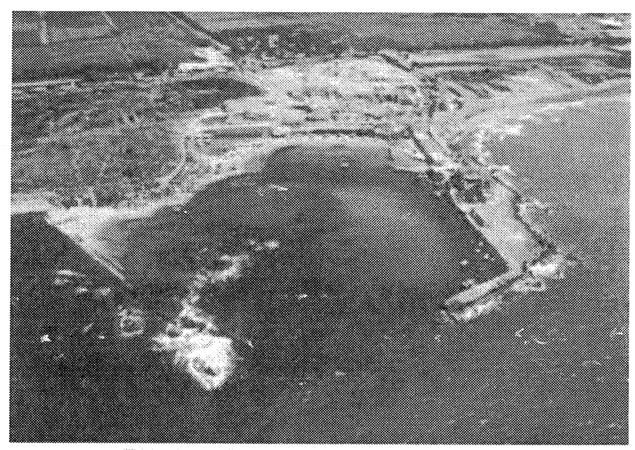
The Romans started building with concrete regularly beginning in the third century B.C., but the earliest uses go back roughly a thousand years further, to ancient Greece. Concrete is made of chunks of rubble held together by mortar. Today, mortar is typically made by mixing gravel, sand, and binders such as lime and cement. According to Marie Jackson, a research engineer at the University of California, Berkeley, and ROMACONS collaborator, modern concrete begins to break apart underwater. The material used by the Romans for maritime construction, however, actually gets stronger over time.

In the first century B.C., the architect and engineer Vitruvius wrote an expansive work on Roman building methods called De Architectura. In it, he describes a substance found near Baia, a resort town on the Bay of Naples, and around Mount Vesuvius, that "when mixed with lime and rubble, not only lends strength to buildings of other kinds,but even when piers of it are constructed in the sea, they set hard under water."

She found that its compressive strength, meaning the weight it can bear, was much lower than that of modern concrete, so it wasn't suitable for tall aboveground architecture. When she compared the trace elemental composition of the mortars in the cores, however, she confirmed Vitruvius' assertion. All the samples contained volcanic ash that came either from Mount Vesuvius or Campi Flegrei, volcanoes located east and west of Naples, respectively.

The specific type of ash is known as pozzolana after Pozzuoli, the town near Campi Flegrei where it was originally used.

Jackson credits the Romans with noticing that, over time, the ash consolidated into a volcanic rock called tuff. With that insight they



Remains of Harbor at Caesarea Maritima

formulated their unique mortar recipe: pozzolana, lime and seawater. Because seawater is part of the reaction, placing this mortar in the Mediterranean promotes greater adhesion rather than causing the concrete to crack.