

RESEARCH HIGHLIGHTS

Selections from the scientific literature

INFORMATION TECHNOLOGY

Long-term data storage in DNA

A DNA-based system could safely store data for millennia.

Today's digital systems can store information for only around 50 years, but encoding it in DNA could greatly extend its lifetime. Robert Grass at the Swiss Federal Institute of Technology in Zurich and his colleagues have devised a system that encapsulates and protects DNA strands in silica glass. The team also included redundancy codes to correct errors that arise when writing, storing and reading the data.

Using the technique, the authors recovered 83 kilobytes of data — including the full Swiss Federal Charter from 1291 — by sequencing nearly 5,000 pieces of DNA that were kept under conditions simulating storage at around 10°C for 2,000 years.

Angew. Chem. Int. Edn <http://doi.org/f23gmf> (2015)

EVOLUTION

Fern hybrid does not mind the gap

Two ferns that last shared an ancestor more than 60 million years ago have interbred — showing that this can still happen even after a long evolutionary gap.

As populations separate and evolve over time, they lose the



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PALAEONTOLOGY

Ancient mammals displayed diversity

Two fossils show that early mammals had a more varied anatomy and behaviour than was thought.

A team led by Zhe-Xi Luo at the University of Chicago, Illinois, and Qing-Jin Meng at the Beijing Museum of Natural History analysed a 160-million-year-old fossil from China.

The creature, *Docofossor brachydactylus*, had short, wide digits for burrowing underground, similar to those seen in moles. Some of the team

members studied another fossilized mammal of about 165 million years old, *Agilodocon scansorius* (pictured; US cent shown for scale). It seems to have been adapted to tree-climbing, and its teeth bear hallmarks of a diet of tree gum and sap.

The two species, which belong to an extinct group called docodonts, show that the earliest mammals lived in diverse habitats, the team says.

Science 347, 760–764; 764–768 (2015)

ability to cross-breed. So Carl Rothfels, now at the University of California, Berkeley, and his team were surprised to find a fern (*Cystocarpium roskamianum*; pictured) from the French Pyrenees that is a hybrid of *Gymnocarpium* and *Cystopteris*, two dissimilar genera. DNA analysis showed that its two parents diverged roughly 60 million years ago, the biggest known evolutionary gap in a plant or animal hybridization. This is comparable to a human interbreeding with a lemur. The findings suggest that

new species of fern evolve more slowly than many other plants, in part because they rely on wind and water for fertilization, making it harder for eggs and sperm of different species to remain separate.

Am. Nat. 185, 433–442 (2015)

AGRICULTURAL ECONOMICS

Trade disruptions hit the poor

Countries that cut back on food trade to protect against domestic price fluctuations can disrupt the global food system

— a sign of the increasing connectedness of the market.

Michael Puma of Columbia University in New York and his team used data on wheat and rice agriculture from 1992 to 2009 to analyse how price shocks resulting from large-scale weather anomalies, crop diseases or war affect worldwide trade in staple foods. They found that the global market has become more vulnerable to temporary trade restrictions as international connections have doubled and the volume of traded goods has increased since 1992.

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