RESEARCH HIGHLIGHTS

Selections from the scientific literature

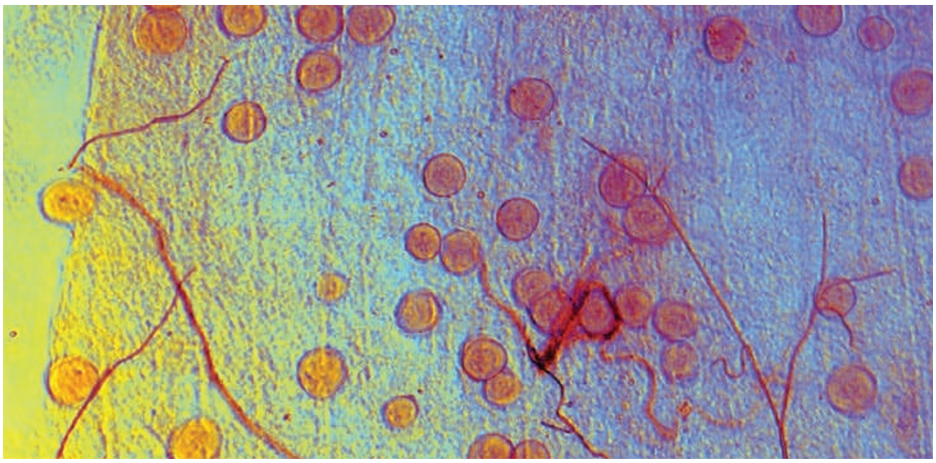
GEOSCIENCE

Hard rains and stormy winds

North Atlantic hurricanes and their atmospheric remnants are the dominant cause of extremely heavy rainfall across vast swathes of the United States — as far north as Maine, and as far inland as Illinois.

Mathew Barlow of the University of Massachusetts at Lowell compared a data set of storm tracks and size with daily observations made between 1975 and 1999 at almost 9,500 weather stations in Central and North America. Over large areas of the northeastern United States, more than two-thirds of extreme precipitation events — rainfall exceeding 100 millimetres per day — were meteorologically related to hurricane activity occurring as far away as 500 kilometres. The strength and range of the storms' effects varied according to factors such as maximum wind speed.

Geophys. Res. Lett. **doi:10.1029/2010GL046258 (2011)**



K. VERNICK

PUBLIC HEALTH

Malaria mosquito lurks outdoors

The discovery of a new subgroup of malaria-carrying mosquito may explain why malaria eradication efforts have had limited success.

Malaria is caused by *Plasmodium* parasites (**pictured**, in red), which are transmitted by mosquitoes, mainly of the species *Anopheles gambiae*. Kenneth Vernick at the Pasteur Institute in Paris and his colleagues discovered the new subgroup of *A. gambiae* — dubbed Goundry for the village in the African country of Burkina Faso, where it was found — after collecting mosquito larvae from puddles, raising them to adulthood in the lab and genetically analysing them.

Not only do the Goundry mosquitoes live primarily outdoors, where they avoid indoor insecticide sprays, they also acquire the parasite more easily than their indoor relatives. When fed with malaria-infected blood, 58% of Goundry mosquitoes picked up the disease, compared with just 35% of indoor mosquitoes.

Science 331, **596–598 (2011)**

For a longer story on this research, see go.nature.com/7kzztq

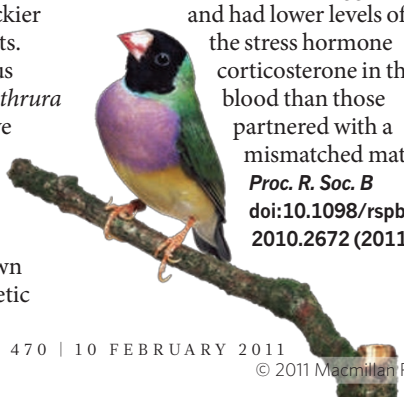
ZOOLOGY

Mate mismatch causes stress

Female Gouldian finches that fail to land their ideal mate seem to have higher levels of stress than their luckier counterparts.

The monogamous Australian finches (*Erythrura gouldiae*, **pictured**) have either black or red heads, and females prefer to mate with partners whose head colour matches their own — an indication of genetic compatibility. Simon Griffith of Macquarie University in Sydney, Australia, and his colleagues monitored the birds as they either chose their mates or were placed in a mating pair.

In both conditions, females that ended up with compatible males laid their first egg earlier and had lower levels of the stress hormone corticosterone in their blood than those partnered with a mismatched mate.



Proc. R. Soc. B **doi:10.1098/rspb.2010.2672 (2011)**

NANOSCIENCE

Glimpses of crystal growth

One downside of electron microscopy is that the electron beam can damage the materials being imaged by breaking bonds and changing molecular structures. But Jamie Warner and his colleagues at the University of Oxford, UK, used this to their advantage, and obtained unprecedented pictures of crystals forming at the atomic level.

They directed an 80-kilovolt electron beam through a thin film of 'peapods' — carbon nanotubes containing spheres of carbon atoms called buckyballs. Each buckyball contained two atoms of praseodymium. Prolonged exposure to the beam caused the buckyballs to coalesce, forming an inner nanotube. The praseodymium atoms were released into this inner nanotube, allowing them to form praseodymium carbide crystals.

The images reveal that the crystals formed as a result of atoms coalescing into clusters, which, in turn, clumped together, rather than by atoms being added one at a time to a single growing crystal.

ACS Nano **doi:10.1021/nn1031802 (2011)**

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