

ECOLOGY

Plant patterns predict collapse

Analysing patterns of vegetation cover after natural disturbances, such as nutrient or water shortages, could provide advanced warning of collapses in plant populations.

Richard Bailey at the University of Oxford, UK, used a computer model to look for signatures of population fragility in spatial and temporal patterns of semi-arid vegetation cover, which change as populations decline. He found that if a plant population's recovery rate reaches a 'critical slowdown' after a perturbation event, this provides an early warning of a fragile state from which it may never fully recover — it may either stabilize at a lower level or disappear.

Proc. R. Soc. B doi:10.1098/rspb.2010.1750 (2010)

DRUG DEVELOPMENT

Worm surgery on a chip

By introducing nematode worms into tiny microfluidic chips, researchers have achieved rapid screening of a chemical library for nerve-regenerating drugs.

Mehmet Fatih Yanik at the Massachusetts Institute of Technology in Cambridge

and his colleagues developed a way to load *Caenorhabditis elegans* worms onto the chip (pictured), which is just a few millimetres long. An individual worm is isolated and immobilized in a chamber, where it is imaged and undergoes laser surgery that severs key nerves. With the help of software, the researchers performed the surgery at a rate of three animals per minute.

The team then treated the worms with about 100 different chemicals. Several drugs stymied nerve regeneration, and further tests showed that one of the most potent suppressors, staurosporine, blocks a family of proteins that

includes one called PKC. A drug that activates the pathway in which these proteins act boosted nerve regrowth.

Proc. Natl Acad. Sci. USA doi:10.1073/pnas.1005372107 (2010)

ENERGY

Plenty of energy, not well shared

The world currently produces more than enough energy to provide a high standard of living for all of its human inhabitants, researchers say.

Julia Steinberger at the Institute of Social Ecology in Vienna and Timmons Roberts of Brown University in Providence, Rhode Island,

analysed energy and human-development trends such as literacy, wealth and life expectancy for the period between 1975 and 2005.

They found that, because of increasing efficiencies, the amount of energy required to meet basic human needs has steadily declined over time. The duo projects that this trend will persist until 2030, enabling a reduction in cumulative energy consumption, despite continued population growth.

Their analysis suggests that high energy poverty and carbon emissions are driven by economic and political structures that maintain inequity among peoples. *Ecol. Econ.* doi:10.1016/j.ecolecon.2010.09.014 (2010)



OCEANOGRAPHY

Cold water rising in the Pacific

The depth of the tropical Pacific Ocean's warm surface layer shrank during the last three decades of the twentieth century — an effect of climate change that has been predicted by climate models.

Branwen Williams, now at the University of Toronto in Canada, and Andréa Grottoli at Ohio State University in Columbus collected soft and black corals from three different depths in the top 105 metres of the western tropical Pacific Ocean, off an island in Palau. They analysed the

ratio of nitrogen and carbon isotopes in the coral skeletons, which indicate nutrient levels in the water. Nutrients do not mix much between warm shallow waters and colder, deeper layers, so water temperature at a given point can be inferred from nutrient levels. And by measuring from the corals' outer surfaces inwards, the researchers reconstructed the ocean's temperature profile stretching back over more than a century.

Geophys. Res. Lett. doi:10.1029/2010GL044867 (2010)

