Wind farms easy prey for hurricane

GONE with the wind? Hurricanes could destroy the offshore wind farms the US is planning to build in the Atlantic and the Gulf of Mexico.

The US Department of Energy set a goal for the country to generate 20 per cent of its electricity from wind by 2030. One-sixth is to come from shallow offshore turbines that sit in the path of hurricanes.

Stephen Rose and colleagues from Carnegie Mellon University in Pittsburgh, Pennsylvania, modelled the risk hurricanes might pose to turbines at four proposed wind farm sites. They found that nearly half of the planned turbines are likely to be destroyed over the 20-year life of the farms. Turbines shut down in high winds, but hurricane-force winds can topple them.

In 2007, Texas granted a multimillion-dollar lease for a wind farm site near Galveston, Texas. Rose found it was "the riskiest location to build a wind farm of the four locations examined" (*Proceedings of the National Academy of Sciences*, DOI: 10.1073/pnas.1111769109).

Each turbine costs $175 million. "We want these risks to be known now before we start putting these wind turbines offshore," says team member Paulina Jaramillo. "We don't want any backlash when the first one goes down and it costs a lot to replace."

MIGUEL NAVARRO/GETTY

Flowering shrub's secrets could fight ageing

A FLOWERING Tibetan shrub that tricks cells into thinking they are starving could become a weapon against multiple sclerosis and even old age.

The roots of the blue evergreen hydrangea (*Dichroa febrifuga*) have been used in traditional Chinese medicine to treat malaria. Now Tracy Keller and colleagues at the Harvard School of Dental Medicine in Boston have found that halofuginone – a chemical based on the roots' active ingredient – blocks immune reactions that can cause disease.

Cells stop the synthesis of non-vital proteins when amino acids are in short supply. Keller's team discovered that halofuginone mimics such a shortage by blocking an enzyme that feeds one amino acid to the protein-making machinery.

Keller found that the drug triggers a chemical cascade that responds to amino acid scarcity. This inhibited the growth of malaria parasites, stopped blood cells from making proteins that cause inflammation and stopped the development of specific white blood cells that trigger conditions such as inflammatory bowel disease and multiple sclerosis (*Nature Chemical Biology*, DOI: 10.1038/nchembio.790).

This could make the drug effective against autoimmune disease. But as halofuginone mimics nutrient deprivation, there is another possible use. Animals that receive only just adequate nutrition live longer because diseases which involve inflammation are prevented. That, says Keller, means halofuginone might work as an anti-ageing drug.

Zebra stripes mess with bugs' heads

HOW did zebras get their stripes? Charles Darwin couldn't figure it out – as he noted, the stripes are no good for camouflage. Now it seems zebras evolved stripes to protect themselves from blood-sucking insects.

That's the answer coming from Adam Egri at Eötvös University in Budapest, Hungary, and his colleagues. Egri picked up on a theory proposed in 1930 and backed up in 1981, when it was demonstrated that biting tsetse flies were least attracted to striped animal models, compared with black or white models. Egri has now shown that horseflies, or tabanids, also avoid the stripes (*The Journal of Experimental Biology*, DOI: 10.1242/jeb.065540).

The team painted trays with black-and-white patterns, and filled them with salad oil to trap the horseflies. Trays coated with horizontal stripes attracted fewer flies than diagonal lines, or criss-crosses. Stripes mimicking those of the zebra attracted fewest flies.

"The stripes are messing with their heads," says Justin Marshall, a neurobiologist at the University of Queensland, Australia. "It confuses them and provides an unattractive surface to land on."

PATRICK LANDMANN/SCIENCE PHOTO LIBRARY

Not just a pretty wing

MOVE over spider silk. Butterfly wings are the new "it" material of the animal kingdom, doubling up as ultra-sensitive heat sensors.

Morpho butterfly wings are iridescent thanks to rows of tiny tree-like structures on their surfaces. Light reflecting off each micrometre-long branch and trunk interferes, producing shimmering colours.

Now Andrew Pris at General Electric's Global Research Center in Niskayuna, New York, and colleagues say those same "Christmas trees" make excellent heat sensors. When infrared radiation hits the trees, the chitin they are made from expands. This increases the distance between the branches and trunks, perceptibly shifting the wavelength of light they reflect.

To boost the wings' sensitivity, the researchers coated samples with a layer of heat-absorbing carbon nanotubes. The coated wings could reveal temperature differences of just 0.018 °C (*Nature Photonics*, DOI: 10.1038/nphoton.2011.355).

One day, *Morpho*-inspired sensors could detect inflamed areas in people, or points of friction in machines, the team say.