TIMOTHÉE BONNET

into new habitats can invade and disrupt ecosystems. Brad Ochocki and Tom Miller at Rice University in Houston, Texas, studied how evolution can affect the distance and speed at which bean beetles (*Callosobruchus maculatus*) spread across an experimental landscape. The researchers slowed evolution in some of the beetles by collecting and redistributing the insects after each generation had been allowed to disperse. This prevented the insects that had spread the farthest from mating with each other. After ten generations, the authors compared the beetles' distributions. In the population allowed to evolve freely, descendants of beetles from the leading edge of the invasion had travelled almost 9% further than had descendants of the shuffled beetles.

A second study, by Christopher Weiss-Lehman at the University of Colorado Boulder and his colleagues, observed red flour beetles (*Tribolium castaneum*) in a similar experiment and found that the freely evolving group expanded its range 6% faster.

The authors suggest that dispersal traits are inherited and that rapid evolution should be accounted for in forecasts of biological invasions.

Nature Commun. 8, **14315; 14303 (2017)**

CHEMISTRY

The promise of 1D boron chains

One-dimensional boron is likely to have unusual properties that would make it useful for nanometre-scale electronics.

Boron does not exist naturally in 1D form, but it may soon be possible to make it, thanks to recent developments in creating sophisticated structures from the element and in crafting carbon into 1D chains.

Vasilii Artyukhov, Boris Yakobson and Mingjie Liu at Rice University in Houston, Texas, calculated the likely properties of 1D boron using a computing technique called density functional theory. They predict that boron would be more stable as a 2-atom-wide metallic ribbon than as a single-atom chain, but that stretching the ribbon should switch it to the chain form, which would be a semiconductor.

Releasing the tension on the chain would flip it back into ribbon form. This reversibility could make 1D boron suitable for nanoscale devices that convert movement into electrical signals, the authors say.

J. Am. Chem. Soc. **http://doi.org/bx8j (2017)**

BIOTECHNOLOGY

Gene therapy restores hearing

Delivering a functional gene to the ears of mice with a genetic hearing disorder allows them to detect sound.

People with Usher syndrome type I have genetic mutations that cause deafness in childhood, progressive blindness and balance disorders. Gwenaëlle Géléoc at Boston Children's Hospital in Massachusetts and her colleagues studied newborn mice with a form of Usher syndrome type I. They injected a synthetic virus that carried a healthy version of the gene for a protein called harmonin into the animals' ears. The protein resides in sound-sensitive 'hair' cells of the inner ear and helps to transmit auditory signals to the brain. The team found that mice given the gene responded to sounds as quiet as whispers, similarly to normal mice. The treated mice also performed as well in balance tests as normal mice.

In another study, Luk Vandenberghe at the Schepens Eye Research Institute of Massachusetts Eye and Ear in Boston and his colleagues found that the same virus delivered genes to a large number of the target hair cells in the mouse ear.

Nature Biotechnol. **http://dx.doi.org/10.1038/nbt.3801; http://dx.doi.org/10.1038/nbt.3781 (2017)**

ECOLOGY

Parrotfish loss drives reef decline

Fishing may have contributed to slowed Caribbean coral growth as far back as 1,000 years ago.

Many Caribbean locations have seen coral declines and excessive algal growth in past decades, but reef fish such as parrotfish (**pictured**) can help by eating the algae. Katie Cramer at the Scripps Institution of Oceanography in La Jolla, California, and her colleagues analysed remains of fish teeth, sea-urchin spines and coral fragments in reef cores from three sites off the coast of Panama. They found that over the past 3,000 years, the growth of reefs was driven by parrotfish abundance. A decline in fish numbers and a slowdown in coral growth were seen at all three sites, beginning around 500 to 1,000 years ago.

Caribbean reefs have not recovered from these ecosystem declines, and if the reefs are to improve, there will need to be immediate decreases in parrotfish catches, the authors say.

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PETE OXFORD/NPL

EVOLUTION

In selection, size isn't everything

The biology of snow voles seems to contradict scientists' assumption that natural selection favours big animal bodies over small ones. A study of the voles suggests that selection has favoured genetic changes that promote smaller body size.

Larger snow voles (*Chionomys nivalis*; **pictured**) produce more offspring than smaller ones. To work out why this hasn't resulted in a general increase in body size, Timothée Bonnet and his colleagues at the University of Zurich in Switzerland followed a population of snow voles in the Swiss Alps for ten years and analysed the animals' genomes. They found that although large snow voles did have a reproductive advantage, this was affected more strongly by environmental factors such as food abundance than by genetics.

Genetically, selection favours voles that complete their growth earlier in the season — perhaps because food is scarce later in the season — resulting in smaller adult sizes.

PLoS. Biol. 15, **e1002592 (2017)**

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