

reward size the monkeys preferred to go for that target, rather than be surprised by a randomly sized reward.

The scientists recorded from single neurons in the brain's 'reward' circuitry and found that they fired when the monkeys learned information about the future. This suggests that the act of prediction may be intrinsically rewarding.

EVOLUTION

Safe sex for primroses

Proc. Natl Acad. Sci. USA doi:10.1073/pnas.0904695106 (2009)

Does sex promote pest resistance? Marc Johnson of North Carolina State University in Raleigh and his team tested the susceptibility of 32 species of evening primrose (*Onagraceae*) to a selection of herbivores. This plant group contains both sexually reproducing species and functionally asexual species.

In the lab, the researchers found that generalist caterpillars, which eat a variety of plants, ate 32% more leaf tissue on asexual than on sexual plants. And in a field experiment, generalist herbivores consumed 64% more leaf tissue on asexual species. However, reduced sexual reproduction seemed to help protect against specialist herbivores.

This, the researchers say, supports the previously untested 'recombination-mating system hypothesis', which holds that sexually reproducing species should have greater resistance to arthropod herbivores.

BIOENERGETICS

Winter wrecked

J. Exp. Biol. 212, 2483–2490 (2009)

Seabirds wintering off the shores of Newfoundland and Greenland often fall victim to 'winter wrecks', vast die-offs that can cast corpses ashore by the thousand. With the harsh North Atlantic winter, it is difficult to study the mechanisms of these wrecks directly. So Jérôme Fort of the CNRS in Montpellier, France, and his colleagues used a program called Niche Mapper to predict the energy and food requirements of two species from 1 September to 1 March.

They integrated microclimate data with the physiological and behavioural qualities of Brünnich's guillemots (*Uria lomvia*) and little auks (*Alle alle*). The model predicted a sharp increase in energy requirements for both species between November and December that was influenced most by falling air temperatures. Although a preliminary estimate, this energetic bottleneck fits well with the observed timing of winter wrecks in the northwest Atlantic.

PHYSICS

Jet stream

Phys. Rev. Lett. 103, 024501 (2009)

A millimetre-sized water droplet sitting on a vibrating crystal surface can be forced to form a narrow column more than a centimetre long.

Leslie Yeo and his colleagues at Monash University in Clayton, Australia, created controllable, nozzle-free liquid jets by focusing energy into the water from surface acoustic waves (SAWs): earthquake-like vibrations generated electrically in the underlying crystal.

SAW devices are powerful — a wave 10 nanometres in amplitude can generate surface accelerations 10 million times that of gravity — and inexpensive, already inhabiting most mobile phones. Researchers hope to use them to manipulate fluids at the microscale. They can make liquid drops wobble, slide sideways and break up into a fine mist.



A. DELUCA/CORBIS

PALAEONTOLOGICAL GENETICS

Untraceable Etruscans

Mol. Biol. Evol. doi:10.1093/molbev/msp126 (2009)

Since the time of Herodotus, speculation has surrounded the origins and fate of the Etruscans (responsible for the artwork pictured above), an ancient culture based in central Italy that was strikingly different from its neighbours at the time. Although eventually absorbed by the Roman Empire, the Etruscans' genes survived into the Middle Ages, say Guido Barbujani of the University of Ferrara, Italy, and his colleagues. But between then and now, the line of descent has become much more complicated.

The researchers compared mitochondrial DNA taken from Etruscan remains, from Tuscan bones dating from the tenth to fifteenth centuries, and from modern Tuscans. The same markers were detectable in the two older groups, but not in today's Tuscans, probably owing to migration.

JOURNAL CLUB

Rex Cocroft

University of Missouri

An ecologist marvels at animals that learn to eavesdrop.

All through college I resisted getting glasses, but I finally succumbed for my first field trip to Peru; I was determined to see everything. Upon arrival, however, I realized that good vision was scarcely enough. One morning, I walked through the forest with an ornithologist, the late Ted Parker, famed for having learned the songs of thousands of birds. Although we saw few of the singers, he knew the source of each fluted phrase, monotonous chant and raucous outburst.

Attending to the signals of other species — visual, auditory and so on — is useful not only to ecologists, but also to the predators that eavesdrop on their prey. In some cases, such behaviour is hard-wired; however, this seems unlikely for species that exploit a wide range of prey.

Recent research has revealed a more flexible strategy. Martinus Huigens of Wageningen University in the Netherlands and his colleagues studied a tiny wasp that parasitizes butterfly eggs (*M. E. Huigens et al. Proc. Natl Acad. Sci. USA* 106, 820–825; 2009). The wasp, *Trichogramma evanescens*, learns, after a single experience, to exploit the hosts' chemical-communication system to find and hitchhike on a mated female, disembarking when the butterfly lays her eggs.

Prior research had revealed only one other such case, in the bat *Trachops cirrhosus*, which learns the calls of poisonous and edible frogs (*R. A. Page and M. J. Ryan Curr. Biol.* 16, 1201–1205; 2006).

These examples suggest that learning which communicative signals to follow may be a common feature of the evolutionary race between predator and prey. It is doubtful that any bat or wasp can retain as many signals as a legendary ornithologist, but it seems that the drive to learn them has a long history.

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