Ultrasonic love song.....

Male Asian corn borer moths serenade females with extremely quiet ultrasonic songs. As they are only audible within a few centimetres, they can stay out of earshot of nearby rivals and predators.

Darwin's tortoise lives.....

Different Galápagos giant tortoise species look so similar that a form believed extinct for 150 years was merely 'hiding' unnoticed in another population. The long-lost species was found by DNA analysis of the tortoises.

Mark Moffett/Minden/FLPA

IN BRIEF

SYNCHRONISED SONAR

Big brown bats *Eptesicus fuscus* fall silent when flying together to avoid jamming each other's sonar. If flying solo, the bats echolocate almost continuously. But when two airborne bats get within a metre of each other, one stops calling, using its neighbour's echoes to navigate (PNAS, vol 105, pp13116–21).

WEB WISE

Orb spiders can detect the vibrations of hovering insect predators, and those that aren't caught go on to expand the 'hub decoration' at the centre of their webs – even those made days later. This is the first evidence that spiders use airborne cues to assess the risk of predation and can remember encounters, suggesting web decorations have an anti-predator role (Ethology, vol 114, pp686–92).

TADPOLE INSURANCE

Female Bibron's toadlets *Pseudophryne bibronii* from Australia don't put all their eggs in one basket, but divide them among the nests of up to eight males. This 'sequential polyandry' – the most extreme known in any vertebrate – insures against nest failure in an unpredictable environment (Proc. Biol. Sciences; doi:10.1098/rspb.2008.0794).

Evan Pickett

The South African dwarf chameleon puts less effort into its energy-sapping camouflage when it can afford to.

Adnan Moussalli and Devi Stuart-Fox

Calculating chameleons

Scientists discover a new twist to chameleon camouflage.

Chameleons are famous for their colour-changing abilities, but a new study has found that South African dwarf chameleons *Bradypodion taeniabronchum* carefully tailor their camouflage to match the visual systems of different predators.

Devi Stuart-Fox and colleagues at Johannesburg's University of the Witwatersrand studied wild dwarf chameleons in their natural habitat, presenting them with realistic models of two major predators – either a stuffed shrike or a rubber boomslang snake. Then they watched how the chameleons responded.

In the presence of the model snake, the chameleons made only half-hearted attempts to blend into their surroundings. As a result, though they were virtually invisible to snake eyes, a shrike would have spotted them easily. But when the same individuals were presented with a model of the more visually acute bird, they consistently improved their camouflage to match their environment much more closely.

The findings suggest that these lizards take a pragmatic approach to camouflage, doing just enough to get by for the situation they're in. Snakes have poorer colour discrimination than birds, and also typically view their prey from below, so they tend to see the chameleons' shaded, less flamboyant undersides. All in all, there would be little point in changing colour. The chameleons thus save precious energy by putting less effort into camouflage when they can get away with it.

KNOW YOUR ENEMY

» Cuttlefish burst into startling colour patterns if they come across predatory fish that hunt by sight, but not in the presence of visually-challenged crabs and sharks, which hunt using chemical reception.

» When the California ground squirrel encounters a threatening mammal, it produces ear-piercing vocalisations to scare off the potential predator. But when it is near gopher snakes, which are deaf, the squirrel skips the chatter and instead puffs up and waves its tail over its head. If a rattlesnake appears, it does the same – but also flushes its tail with blood to boost its temperature, as these snakes 'see' heat as infra-red light. (Discoveries, November 2004)

SOURCE: Biology Letters, vol 4, no 4, pp326–9, doi:10.1098/rsbl.2008.0173 LINK: http://tinyurl.com/5gc624

DAVID BRIAN BUTVILL, ZOOLOGIST
Our new *Discoveries* sleuth, David writes about science and nature for magazines, radio and TV. He lives in Costa Rica, where he eagerly assists his marine-biologist wife in the field.

DISCOVERIES

Chewing the fat

Rare bone-eating bearded vultures prefer greasy scraps.

The bearded vulture (also known as the lammergeier) *Gypaetus barbatus* eats almost exclusively the bones of dead mammals. But this doesn't mean that the bird isn't picky about its food. Researchers have found that it selects body parts with the most fat.

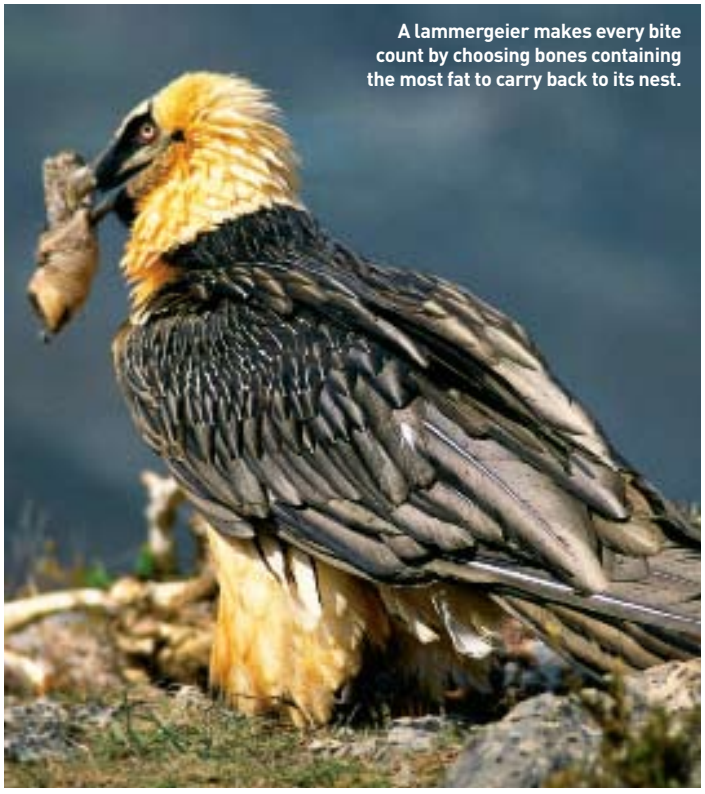
Foraging can be exhausting for a lammergeier. It lives on remote mountain peaks, and must range across huge areas to locate animal skeletons, which are usually widely scattered. When it finds one, it typically has to airlift parts too big to swallow to special bone-breaking sites, where it repeatedly drops them onto rocky outcrops. Then it hauls the resulting fragments back to its cliff to eat. But is the nutritional prize worth the effort?

To find out, Antoni Margalida, from Spain's Bearded Vulture Study and Protection Group, quantified the food value of the major sheep bones (based on fatty acid content – the main nutritional component) and placed sheep skeletons in vulture territories in the Spanish Pyrenees. Then he documented the bones that the birds carried off, those left behind at bone-breaking sites, and any that were taken to nests (monitored by cameras).

Margalida found that bones left behind – at both the original location and at breaking sites – had significantly less fat than those taken home. Moreover, back at the nest, the birds consistently sifted through and ate the richest bones, whether a bite-sized toe bone or a large tibia. The birds were clearly choosing food based on quality rather than quantity.

How lammergeiers identify the most nutritious bones remains unknown, but being choosy does pay off. Margalida discovered that the greasiest bones had two to three times more fatty acid than low-fat bones, plus about 15 per cent more energy per gram than muscle tissue. Moreover, the vultures extract about 13,000 calories per bite-sized serving of high-quality bone – providing plenty of fuel for even the longest body-snatching forays.

SOURCE: Behav Ecol & Sociobiology, doi:10.1007/s00265-008-0649-6 LINK: www.gypaetus.com



A lammergeier makes every bite count by choosing bones containing the most fat to carry back to its nest.

Antoni Margalida

BONES AND BIRDS

- The lammergeier is the only bone-eating bird. In fact, it is the sole vertebrate with a diet that is primarily (90 per cent) bone.
- An extremely acidic stomach allows the vulture to digest entire bones overnight.
- In addition to breaking up bones, the practice of bone-dropping helps to remove inedible parts such as horns and teeth, which slow digestion, and it also lightens the load to be transported.
- A lammergeier eats about a tenth of its body weight in food every day: that's like a middle-aged person consuming 60–70 burgers daily.
- The bird's narrow, pointed tongue is an adaptation for extracting highly nutritious bone marrow.

The fall webworm caterpillar can cope with cyanide in its foodplant.

GrayceDillon.com

Death-defying caterpillars

Moth larvae eat cyanide and survive to see adulthood.

During their development, the larvae of fall webworm moths *Hyphantria cunea* feed on the poisonous leaves of black cherry trees. New research reveals that they get away with it thanks to a careful digestive balancing act.

Terrence Fitzgerald of the State University of New York measured the cyanide levels of leaves before they were consumed, during digestion in the larvae, and as post-processed faecal pellets called frass. The cyanide content of frass was up to 200 per cent greater than that of consumed leaves, while the chewed-up vegetation inside the caterpillars' guts contained little or none. Digging deeper, he found that the larvae's foregut maintains an extremely alkaline environment, with a pH of nearly 12 – the highest ever recorded in an insect. But why?

The answer is that cyanide is 'locked' in the molecule prunasin, which does not break down above pH 11. This means that the larvae can extract plenty of nutrients without 'releasing' the deadly cyanide and live to see another day.

SOURCE: Journal of Experimental Biology, vol 211, pp671–7 LINK: www.bugwood.org/factsheets/webworm.html