



NEWS OF THE EARTH

Mark Boulton/Alamy

Head held low

A sauropod dinosaur feeding on treetop foliage would have burned half of its energy intake just getting blood to its brain. Its super-elongated neck may have enabled browsing over a wide horizontal radius, rather than increasing its vertical reach.



Algae acrobatics

Swimming plankton 'spin out' and get trapped between adjacent layers of seawater that flow at different speeds. This explains how they amass into kilometres-long sheets, and could help to manage fisheries, red tides and more.

IN BRIEF

SNAIL LOVE-TRAILS

Littorina saxatilis snails in Sweden are being segregated by slime, and it may split the species in two. Males that prefer cliff habitat to the rocks below are more attuned to the mucous trails of cliff-loving females. Thus, they track down and mate with them more often. This has already led to 50 per cent less gene flow between cliff dwellers and their neighbours (Evolution, vol 62, pp3178–84).

MITE-Y CLEAN

Some mites are essential bedfellows of sweat bees (genus *Megalopta*) in Panama. The bees nest in dead branches prone to fungal growth, but those sharing with mites have cleaner quarters and are healthier than those without. In return for cleaning, the mites get a safe place to live and reproduce (American Naturalist, vol 173, pp841–47).

AVIAN FLASHERS

Eagle owls *Bubo bubo* flash their white neck feathers as they inflate their throats during a hooting session. It turns out that this patch is brightest at twilight when the owls call the most. This audiovisual signal is stronger than a lone call and is the first hard evidence of why these birds (and likely a host of other white-decorated species) sing at dusk and dawn (PLoS ONE, 4(4):e4960).



Arto Juvonen/birdphoto.fi

During its first winter, a baby muskox's massive intestine enables it to pile on weight quickly, but the organ uses up so much energy that it could also threaten the calf's survival.

Stefan Meyers/andrea.com



Baby oxen face an energy crisis

In the Arctic tundra, a big gut can make or break a young muskox.

The biggest threat to a baby muskox *Ovibos moschatus* during its first winter may be its own gut.

Adam Munn and Perry Barboza from the University of Alaska, Fairbanks, studied the effects of food intake on the body condition of semi-wild muskoxen by providing unlimited access to a nutritionally controlled diet. They compared adult females and unrelated young in the depths of winter, during which temperatures dipped to a frigid -50°C.

They found that eight-month-old calves ate just as much as adults that were three times their size, yet they never gained an ounce of weight. That is, their huge meals did nothing to fuel their growth and development – they had to eat like cows simply to stay alive.

So, where did all the calories end up? Apparently, in their gut. It turns out that a calf's intestine is nearly twice the length and five times the weight of an adult's gut (relative to body size). This oversized organ seems to be an evolutionary gamble: it enables a calf to grow and pack on fat as fast as possible before its first winter, but it then becomes an energy-hogging liability during the harshest months when resources are scarce and far more difficult to harvest under ice and snow.

A calf's greatest strength in early development therefore becomes a weakness that could take its life, depending on the weather and availability of grazing habitat.

These findings have immense implications for the conservation of this species, because populations depend largely on young surviving their first year.

MORE TO DIGEST

» Muskoxen face extreme cold (down to -80°C with wind chill) yet can sustain a core body temperature at least 70°C warmer. They're born with a huge reserve of heat-producing brown fat, and one of the warmest wools known to exist.

» Muskoxen calve just before spring, giving their young several months to prepare for winter. During this time, their main foods (sedges and grasses) are abundant and of high quality.

» Newborns weigh about 7kg but grow very quickly, swelling to 10 times their birth weight in eight months, thanks to their huge guts.

» The herbivore gut may be the most 'costly' organ of any animal, since it devours vast amounts of energy for tissue and microbial upkeep.

SOURCE: Zoology, vol 111, pp350–62 LINK: http://animaldiversity.ummz.umich.edu/site/accounts/information/Ovibos_moschatus.html

**DAVID BRIAN BUTVILL, ZOOLOGIST**

Our *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

Geckos interrupted

A sweet plant bets its survival on a single species, but a pest sours the affair – and the plant's future.

For a sugar-loving animal on the island of Mauritius off the east coast of Madagascar, the *Roussea simplex* bush is truly the land of milk and honey. Each cup-like flower on this plant is roughly the size of a bonbon and holds a pool of sweet nectar. The supply is constantly replenished for a full week, after which the flowers become juicy fruits that eventually burst open, serving up a jelly-like pulp packed with seeds.

The treats attract sugar-lovers across the animal kingdom, from a host of insects to the blue-tailed day gecko *Phelsuma cepediana* and a bird, the grey white-eye *Zosterops mauritianus*. However, until now, it was not known which visitors paid the plant back by pollinating its flowers and spreading its seeds.

Dennis Hansen and Christine Müller from the University of Zurich staked out shrubs for days and found that only the gecko and the bird picked up pollen from the male flowers as they shoved their relatively big heads into the blooms

for a drink – and only the lizard passed it to the stigmas of female flowers. (The pollen, exuded in a sticky paste by central anthers, cakes on the bird's feathers as it mixes with dirt and nectar, making its transfer next to impossible.)

Similarly, only the gecko ate seeds and passed them, unharmed, in its faeces. In other words, of all the plant's patrons, this lizard alone serves as pollinator and seed disperser – a rare example of one species playing both roles, and the only known case involving a lizard.

Hinging the future on another species is risky and could in fact seal the fate of *R. simplex*. An alien ant introduced from Indonesia has begun to take over the plant's resources, building camps near it and attacking any 'intruders'. The researchers found that geckos avoided the ants, resulting in fruits with one-sixth the number of seeds than those of ant-free plants; some had no seeds at all.

The findings reveal an indirect but potentially devastating way that invasive species can disrupt ecosystems, especially those on islands whose denizens evolved in relative isolation.



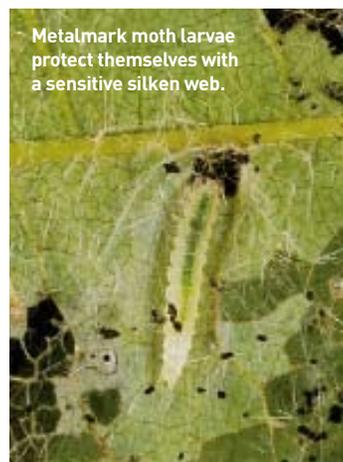
The survival of *Roussea simplex* depends on blue-tailed day geckos coming to feed, but an alien ant species threatens their relationship.

THE SOUR FACTS

- » *Roussea simplex* is found only on Mauritius and is critically endangered. Fewer than 100 known individual plants remain, making the tiny ant a colossal and urgent threat.
- » The ants also tend and protect mealybugs (sap-sucking insects they may transport to the site) that might add further insult to injury for the plant.
- » This is the first report of an ant souring the pollination or seed

- dispersal services of a vertebrate.
- » The ants not only attack other animals that visit the flowers or fruits, but build walls of dirt around these resources to protect them.
- » The handful of known plants that depend entirely on a single animal species for reproduction include some mistletoes in New Zealand served by bellbirds, and three bat-attended cacti in South America.

Dennis Hansen



Metalmark moth larvae protect themselves with a sensitive silken web.

Great escape

A caterpillar uses tripwires and trapdoors to elude predators.

The larva of the metalmark moth (genus *Brenthia*) appears brazen for a caterpillar. It spins a sparse mesh of silk on top of a leaf, crawls into its refuge and then chews a hole in the floor. Inside this meagre shelter it seems open to attack from all directions. So what's going on?

Jadranka Rota and David Wagner from the University of Connecticut, USA, took a close look and discovered that long hairs on the larva's body are in constant contact with the silk threads in the mesh – and that lightly tapping any strand sends the resident darting through the hole to the underside of the leaf (vanishing in as quickly as one-tenth of a second).

That is, the larva's camp is in fact a network of tripwires that warns it of any approaching threats, similar

to a spiderweb. It's the first report of a caterpillar using silk as a sensory tool.

But the disappearing act doesn't stop there. To a larva hiding under its leaf, an intruder is out of sight, but not out of mind. It literally keeps in touch with the silk lines with two exceptionally long feelers that it extends through its escape hole. In this way, the larva monitors both sides of the leaf simultaneously until it is safe to return to the surface.

SOURCE: Animal Behaviour, vol 76, pp1709–13 **LINK:** http://zipcodezoo.com/Key/Animalia/Choreutidae_Family.asp

Jadranka Rota