Oldest insect flier

The oldest full-body fossil imprint of a flying insect has been excavated in the eastern USA. The 312-million-year-old specimen, an early mayfly, provides the first detailed body plan of this group. Fossil ripples suggest it landed near a puddle to drink.

Bear bachelorettes

Increasing numbers of female brown bears *Ursus arctos* may be staying single in parts of Kodiak Island, Alaska: about half as many had a family in 2008–10 as in 1985–2005. Possible links to salmon/berry supply and climate are being studied, but it may be an anomaly: the population remains stable.

Suzi Eszterhas/NPL

IN BRIEF

STILL SENSITIVE

The best way for a zebrafish *Danio rerio* to dodge an attack may be to stay still. A stationary fish is about twice as likely to respond to a predator's strike as a moving one – swimming seems to make the lateral line (a flow-sensing system in fish skin) less effective. This could help to explain why many fish swim in short bursts (J. Exp. Biol., vol 213, pp3131–7).

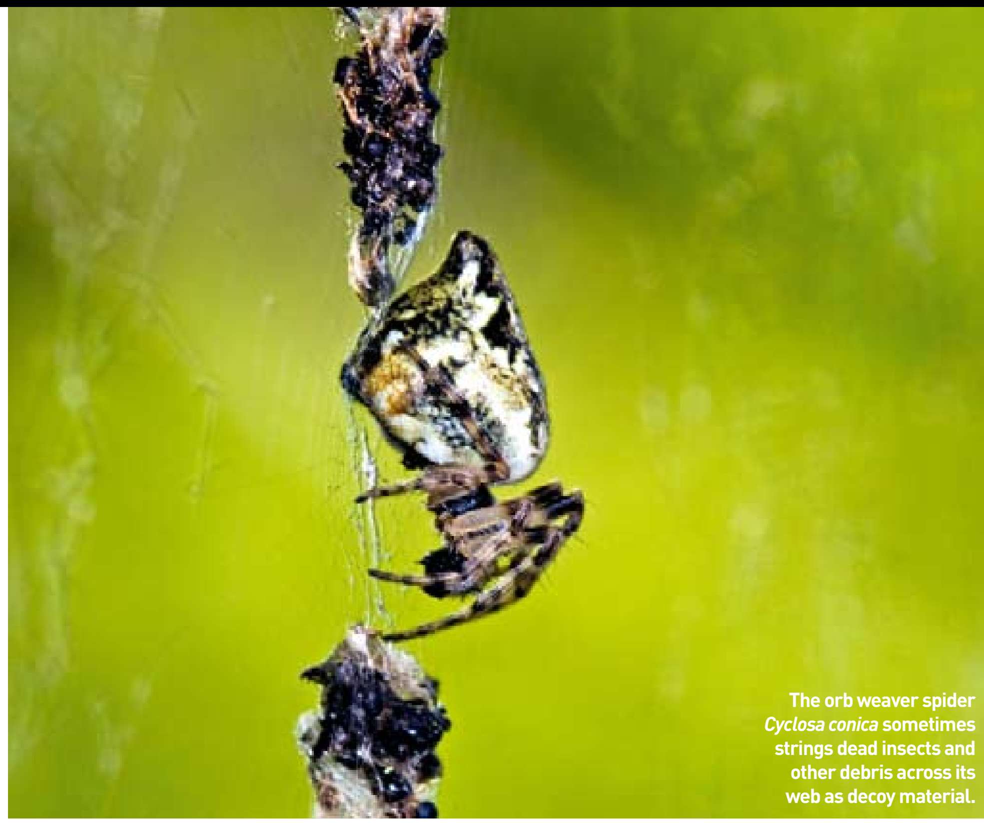
ANCIENT SNIFFERS

It was assumed that ancestral birds' sense of smell declined as their brains evolved for flight. However, new analyses of skull features show that, in fact, the brain region devoted to smell grew over time, at least at first. The ability of early birds to sniff out food and safe habitat may have helped them to survive the events that dinosaurs did not (Proc. R. Soc. B., doi:10.1098/rspb.2011.0238).

ALGA-MANDERS

The salamander *Ambystoma maculatum* has an alga living in it. The alga grows on the salamander's eggs, providing oxygen to embryos, but then it moves in, colonising embryos' tissues. It's the first such case of alga-vertebrate symbiosis. How the alga affects its host is a mystery, but it may spread to the reproductive tract and be passed on to offspring (PNAS doi/10.1073/pnas.1018259108).

Roger Hangarter



H Bellmann/Blickwinkel/SpecialistStock

The orb weaver spider *Cyclosa conica* sometimes strings dead insects and other debris across its web as decoy material.

Spiders target fast food

Biologists reveal how spiders rope in the most convenient meals.

An orb-weaving spider on its web literally looks forward to fast food, according to new research.

Almost all spiders that build circular 'orb webs' face downward while waiting for prey to hit their trap. To find out why, Kensuke Nakata, from the Nagasaki Institute of Applied Science, and Samuel Zschokke, from the University of Basel, Switzerland, looked at the genus *Cyclosa*, which contains exceptions to the rule: most species do face down but some face up or even sideways.

The duo found that downward-facing species had lopsided webs with larger bottom halves, whereas the webs of upward-looking spiders had bigger top halves: they face in the direction in which there is more web and, presumably, more action. Indeed, those with symmetrical webs sat sideways.

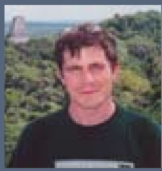
But why do most spiders spin asymmetric webs? The researchers timed each resident's reactions to prey and found that down-lookers ran faster down their webs than up them. That is, they face, and expand their webs, in the direction they run fastest – which for most species is down, with gravity.

Upward facers ran as fast, but not faster, up than down. So why do they spin top-heavy webs? The researchers believe that, for spiders without a speed limit, it pays off. As an insect struggles, it often tumbles down the web. Running toward it results in the fastest food possible. Thus, by extending in a direction they can cover as well as any other, these spiders risk little but may get more quick-and-easy tumblers, and thus obtain more food with less effort.

SIDE DISH

- Orb webs usually hold prey temporarily – so whether a spider eats depends on how fast it can pounce on a catch.
- In *Cyclosa* spp., a spider's size determines its up/down top speed, which affects web design and sitting position. So large species face down, small ones up, intermediate ones sideways.
- An asymmetric web is a smart design. A spider that expands the area in which it runs fast and shrinks that in which it is slow minimises the average time it takes to reach prey anywhere in the web.
- 'Tumblers' are relatively rare. For a spider that runs slower up its web, it's risky to expand the top – it may not reach prey fast enough in a large section of its web, and thus may lose meals and waste precious energy.

SOURCE: Proc. R. Soc. B, vol 277, pp3019–25 LINK: www.eol.org/pages/89198



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.

Parasite becomes a pal

Has a birdie bandit become an important foraging partner?

The African fork-tailed drongo *Dicrurus adsimilis* habitually steals food from other species. But one of its victims, the southern pied babbler *Turdoides bicolor*, may actually get more prey in the process, a new study shows.

Most animals use a special call to warn others when they spot a predator in the vicinity. Species that spend a lot of time together often learn each other's alarm calls and use them to avoid danger.

But in this case there's a twist: the drongo uses alarm calls to trick the babblers. It perches above the ground-foraging birds until one of them catches a particularly large cricket or other invertebrate – then it cries wolf. As the babblers scatter, they fumble their findings, and the deceitful drongo swoops in to steal their abandoned prey.

But the babbler may have found a use for its sometime kleptoparasite. The drongo tends to mutter, making a call known as a 'twank' every few seconds. When a team led by Andrew Radford, from the University of Bristol, recorded these sounds and broadcast them to babblers with no robbers in sight, the birds suddenly stepped up their foraging activity. They moved out from under bushes, expanding their hunting grounds, and ultimately captured about twice as much prey as they usually do.

This may stem from the fact that the drongo emits true warnings when predators are in the vicinity. So when a drongo is around but is not sounding an alarm, its continuous muttering may effectively serve as an 'all-clear' signal. With less need to look out for their own safety, the babblers can keep their heads down and forage more efficiently. In this way, the drongo's presence leads to better-fed babblers.

Indeed, duped babblers may lose prey and waste effort but they're foraging again within a minute or two, and they double their harvest while the drongo waits for the right time to strike, which is often five minutes or more. Hence, when all is said and done, a drongo does a lot of good for babblers – even if its intention is to rob them.

SOURCE: Evolution, vol 65, pp900–6 LINK: www.bbc.co.uk/nature/adaptations/Kleptoparasitism

The calls of the fork-tailed drongo *(main)* benefit the pied babbler *(inset)*, albeit at the cost of stolen food.

Main: Jurgen & Christine Sohns/FLPA; inset: Woody/Stock/Alamy

DECEPTIVE DELIGHTS

- Drongos play this trick on many different bird species and even on some mammals, such as meerkats.
- Babblers trust drongos with their safety – when foraging they look up less often and move into open areas.
- The drongo is considered a parasite of those species from which it steals, since it gains and its victims lose. Its association with pied babblers almost certainly started out that way but appears to be a rare example of an adversary evolving into an ally.
- Babblers have more control over the relationship than may at first be obvious. Large flocks, which have enough members to rely on their own sentries, ignore drongo alarm calls and even chase drongos away.

Black garden ants forage widely, but also 'farm' aphids.

NA Callow/NHPA

Ant autobahn

Chemical trails help ants to travel faster and forage harder.

Many ant species deposit so-called trail pheromones that help to guide foragers to food sources. However, each forager's personal memory is actually more reliable – and when trails and memories conflict, ants tend to choose the latter. So why bother building trails?

Tomer Czaczkes and colleagues, from the University of Sussex, video-recorded black garden ants *Lasius niger* travelling between an artificial nest and a drop of sugar water in their lab. They manipulated the conditions in various ways – for example, allowing ants to memorise the route and lay trails, then covering up the latter for some travellers.

Ants that were able to use trails in addition to route memory travelled 25 per cent faster and 30 per cent straighter than those that relied on memory alone. They also made fewer U-turns, a telltale sign that a forager feels lost.

In other words, when a trail matches a forager's recollection, the ant concludes that it's on the right track: the trail boosts the ant's confidence in its own memory. With its faith in its heading confirmed, the forager shifts into higher gear and makes a beeline toward its goal, increasing its foraging efficiency.

SOURCE: Biol. Lett., doi:10.1098/rsbl.2011.0067 LINK: www.eol.org/pages/462602