



# Fatal attraction

*They lure insects into death traps, then gorge on their flesh. Is that any way for a plant to behave?*

1 A hungry fly darts through the pines in North Carolina. Drawn by what seems like the scent of nectar from a flowerlike patch of scarlet on the ground, the fly lands on the fleshy pad of a ruddy leaf. It takes a sip of the sweet  
5 liquid oozing from the leaf, brushing a leg against one tiny hair on its surface, then another. Suddenly the fly's world has walls around it. The two sides of the leaf are closing against each other, spines along its edges interlocking like the teeth of a jaw trap. As the fly struggles to escape,  
10 the trap squeezes shut. Now, instead of offering sweet nectar, the leaf unleashes enzymes that eat away at the fly's innards, gradually turning them into goo. The fly has suffered the ultimate indignity for an animal: it has been killed by a plant.

## 15 An embrace of sticky tentacles

The swampy pine savannah within a 90-mile radius of Wilmington, North Carolina, is the one place on the planet where Venus flytraps are native. It is also home to a number of other species of carnivorous plants, less famous and  
20 more widespread but no less bizarre. You can find pitcher plants with leaves like champagne flutes, into which insects (and sometimes larger animals) lose themselves and die. Sundews envelop their victims in an embrace of sticky tentacles. In ponds and streams grow bladderworts, which



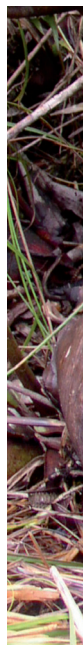
25 slurp up their prey like underwater vacuum cleaners.

There is something wonderfully unsettling about a plant that feasts on animals. Perhaps it is the way it shatters all expectation. Carl Linnaeus, the great 18th-century Swedish naturalist who devised our system for  
30 ordering life, rebelled at the idea. For Venus flytraps to actually eat insects, he declared, would go 'against the order of nature as willed by God'. The plants only catch insects by accident, he reasoned, and once a hapless bug stopped struggling, the plant would surely open its leaves  
35 and let it go free.

## Charles Darwin

Charles Darwin knew better, and the topsy-turvy ways of carnivorous plants enthralled him. In 1860, soon after he encountered his first carnivorous plant – the sundew  
40 Drosera – on an English heath, the author of *On the Origin of Species* wrote, 'I care more about Drosera than the origin of all the species in the world.' He spent months running experiments on the plants. He dropped flies on their leaves and watched them slowly fold their sticky tentacles over  
45 their prey. He excited them with bits of raw meat and egg yolk. He marvelled how the weight of just a human hair was enough to initiate a response.

'It appears to me that hardly any more remarkable fact than this has been observed in the vegetable kingdom,' he  
50 wrote. Yet sundews ignored water drops, even those falling from a great height. To react to the false alarm of a rain shower, he reasoned, would obviously be a 'great evil' to



the plant. This was no accident. This was adaptation.

Darwin expanded his studies from sundews to  
55 other species, eventually recording his observations and  
experiments in 1875 in a book, *Insectivorous Plants*. He  
marvelled at the exquisite quickness and power of the  
Venus flytrap, a plant he called 'one of the most wonderful  
in the world'. He showed that when a leaf snapped shut, it  
60 formed itself into 'a temporary cup or stomach', secreting  
enzymes that could dissolve the prey. He noted that a  
leaf took more than a week to reopen after closing and  
reasoned that the interlocking spines along the margin  
of the leaf allowed undersized insects to escape, saving  
65 the plant the expense of digesting an insufficient meal.  
Darwin likened the hair-trigger speed of the Venus trap's  
movement – it snaps shut in about a tenth of a second – to  
the muscle contraction of animals. But plants don't have  
muscles and nerves. So how could they react like animals?

### 70 Understanding carnivorous plants

Today biologists using 21st-century tools to study cells and  
DNA are beginning to understand how these plants hunt,  
eat, and digest – and how these bizarre adaptations arose  
in the first place. After years of study, Alexander Volkov,  
75 a plant physiologist at Oakwood University in Alabama,  
believes he has figured out the Venus flytrap's secret. 'This,'  
Volkov declares, 'is an electrical plant.'

When an insect brushes against a hair on the leaf of a  
Venus flytrap, the bending triggers a tiny electric charge.  
80 The charge builds up inside the tissue of the leaf but is  
not enough to stimulate the snap, which keeps the Venus  
flytrap from reacting to false alarms like raindrops. A  
moving insect, however, is likely to brush a second hair,  
adding enough charge to trigger the leaf to close.

85 Scientists are also trying to figure out what  
evolutionary forces pushed these plants toward a taste  
for meat. Carnivorous plants clearly benefit from eating  
animals; when the scientists feed pitcher plants extra bugs,  
the plants get bigger. But the benefits of eating flesh are  
90 not the ones you might expect. Carnivorous animals like  
ourselves use the carbon in protein and the fat in meat  
to build muscles and store energy. Carnivorous plants

instead draw nitrogen,  
phosphorus, and other  
95 critical nutrients from their  
prey in order to build light-  
harvesting enzymes. Eating  
animals, in other words,  
lets carnivorous plants do  
100 what all plants do: grow by  
grabbing energy directly  
from the sun.

Alas, they do a lousy  
job of it. Carnivorous  
105 plants turn out to be very  
inefficient at converting  
sunlight into tissue. That's



because they have to use a lot of energy to make the  
equipment they need to catch animals – the enzymes, the  
110 pumps, the sticky tentacles, and so on.

### Good news for flies

Unfortunately, the adaptations that enable carnivorous  
plants to thrive in marginal habitats also make them  
exquisitely sensitive to environmental changes. Agricultural  
115 runoff and pollution from power plants are adding extra  
nitrogen to many bogs in North America. Carnivorous  
plants are so finely tuned to low levels of nitrogen that this  
extra fertiliser is overloading their systems. 'They eventually  
burn themselves out,' says Aaron Ellison, a senior ecologist  
120 at Harvard Forest in Massachusetts.

Humans also threaten carnivorous plants in other  
ways. The black market trade in exotic carnivorous plants  
is so vigorous now that botanists are keeping the location  
of some rare species a secret. Venus flytraps are being  
125 poached from North Carolina by the thousands to be sold  
at roadside stands. The North Carolina Department of  
Agriculture has been dabbling wild Venus flytraps with  
harmless dye that's normally invisible but glows in UV  
light so that inspectors who come across Venus flytraps  
130 for sale can quickly determine if the plants were raised in a  
greenhouse or poached from the wild.

But even if the poaching of carnivorous plants can  
be halted (a very big if), they will continue to suffer  
from other assaults. Their habitat is disappearing, to be  
135 replaced by shopping centres and houses. Other plants  
will grow and outcompete the Venus flytraps. Good news,  
perhaps, for flies. But a loss for all who delight in the sheer  
inventiveness of these plants. ●