Daniel Riskin is a self-confessed bat nut. He’s mesmerised by these remarkable mammals. But it’s not just their ability to fly that intrigues Riskin, ‘there’s so much more to these animals’ he says. Out of the more than 1,100 known species, only a handful have opted for a terrestrial lifestyle, one being the common vampire bat. Riskin explains that these 30 g vampires are incredibly manoeuvrable, capable of leaping several meters from a standing start, but are they as agile on the ground? Riskin, Gerald Carter and John Hermanson headed to the island of Trinidad to test the vampires on terra firma (p. 1725).

Creeping along the ground, these tiny vampires feed on cattle after dark, so Riskin and his colleagues staked out ranches, successfully capturing 5 of the mammals ready for their track tests. Returning to the lab, Riskin introduced the bats to the treadmill and was amazed at how quickly they took to crawling on it. Having filmed the animals as they walked, the team found that the tiny creatures walked the same way as any other quadrupedal creature.

Once the bats were confident on the treadmill, the team turned the speed up and were amazed when the vampires burst into a strange bounding run with a top speed of over 1.1 m s\(^{-1}\). They pushed off from the ground with their mighty forelimbs bringing the hindlimbs foreword while in the air. Returning to the ground on their hindlimbs, the bats reached forward with their forelimbs ready to give the ground another shove. ‘It looks like a running push up’ says Riskin.

The vampires had come up with an unusual approach to terrestrial locomotion, but were they unique? Riskin thought they might be until Bill Schutt suggested he take a look at the endangered New Zealand short tailed bat. Having evolved for millions of years free from predators, these tiny bats are equally at home on the ground and in the air. But how would their walk compare with the vampires’?

Knowing that walkers recover most of the energy from a pendulum-like stride, while the energetics of running are more like a bounce, the team decided to measure the forces exerted by the bats’ feet as they moved across a force plate to see whether the tiny bats really were walking. Amazingly, the energetics were more like those of a bouncing run, even at the lowest speeds. The bats looked as if they were walking, but with a runner’s energetics.

Riskin admits that he is surprised that the bats have solved the same problem in such different ways and adds that he hopes to continue working with these intriguing creatures. ‘There’s a whole lot more out there to do’ he says.

10.1242/jeb.02245

Inside JEB

Lobophyllia corymbosa

Red Sea to investigate the clonal coral

Brickner headed to the warm waters of the
diving equipment, Frank, Oren and
whether siblings still cooperate despite
know if polyp clones still recognise
untied, cooperating so that the injured polyp
acquired its neighbour’s radioactive label.
Frank admits that it was surprising that
the individuals behaved as if they were
still part of a united colony, and he is now
curious to know how the polyps support
their siblings in times of need.
10.1242/jeb.02247

Brickner, I., Oren, U., Frank, U. and Loya, Y.
(2006). Energy integration between the solitary
polyps of the clonal coral Lobophyllia

PROBING PROBOSCIS
LEADS MOTH TO NECTAR

Humans are highly visual creatures, but
other species integrate several senses to
get a sense of their surroundings. When
foraging for nectar, tobacco hornworm
moths appear to rely on their senses of
smell and vision to home in on their
nectar target. But can they employ other
senses to help direct them to their goal?
While hovering above an attractive flower,
Joaquin Goyret explains that the insect
contantly probes the surface with its
proboscis. Working with Robert Raguso,
Goyret was curious to know whether the
moth co-opts mechanosensory information
from the proboscis to help locate a nectar
treat. Scrutinising moths as they probed
fake flowers, the team investigated how
moths fare when presented with real
flowers, in preference to smaller
model flowers, in the centre. Sure
enough, when the grooves converged on
the nectary, the insect’s proboscis tracked
along them leading the insect directly to
its nectar reward. But when the grooves
crossed the flower, avoiding the nectar at
the flower’s centre, the insects rarely
reached their goal. The moth seemed able
to follow topographic features on the
flower’s surface with its proboscis.

Goyret is now keen to find out how the
moths fare when presented with real
flowers, and whether they choose to
forage at large attractive but unwieldy
model flowers, in preference to smaller
model blooms that they handle more
efficiently.
10.1242/jeb.02248

of mechanosensory input in flower handling
efficiency and learning by Manduca sexta. J.
Most cockroaches rely on information gleaned from their sensitive antennae to guide them around. But how do these insects use this information to regulate their lightning fast reactions? A cockroach can execute as many as 25 turns s⁻¹ when scuttling along a wall. Noah Cowan, Jusuk Lee and Bob Full developed a mathematical model of the insect’s dynamics and kinematics integrated with sensory information from the antennae to see if they could predict how the insects control their course with such precision (p. 1617). The team suspected that the insects needed to know both their position relative to the wall, and the speed they were closing in on it, to keep themselves scuttling along. But were both pieces of information essential, or could the insect get by knowing just one; it’s location? Comparing the model’s behaviour with the antics of insects crawling along a wall, the team discovered that cockroaches need to know both their position and the wall approach velocity, to keep them on course.

10.1242/jeb.02246

Kathryn Phillips
kathryn@biologists.com
©The Company of Biologists 2006