

Plucky parasite

Researchers at Montpellier, in France have discovered that some parasites just don't give up, says S.Ananthanarayanan.

When a parasite's own host is eaten by a predator, partly thanks to the parasite, one would think it is the end of the parasite too, and rightly. But the *Gordian*, or the *horsehair worm*, it seems, does not agree and finds a way to 'worm' out!

The Gordian Worm

The horsehair worm, so called because it resembles a horse's hair, lives free in stagnant water, in garden soil and in the body cavity of pests like grasshoppers, crickets, beetles, cockroaches, centipedes, snails, slugs. But they do not harm humans, animals or plants. The horsehair finds others of its kind and they wind themselves, sometimes hundreds together, into a large knot, the legendary *Gordian knot*, and hence it's other name.

The purpose of the horsehair 'knots', in water or mud is mating, and soon after, the female lays several million eggs in fresh water. In a few weeks the larvae, just a hundredth of an inch long, emerge and attach to vegetation near the water's edge. When the water level drops, the vegetation, larvae and all, are eaten by a grasshopper or cricket. The baby worms then bore through the unhappy insect's gut wall and into its body cavity. And from the rich body juices of the host, the worms, which have no alimentary system, absorb nutrients through their own body walls.

In a few months the worm could grow to full size, of four to fourteen inches when stretched out, occupying much of the host's body. Sometimes a smaller host, like a mayfly, may be eaten by a predator, like a grasshopper. Now the worm bores out of the mayfly, and through the grasshopper's gut and resumes its growth in the body cavity of the new host.

Affects hosts' behaviour

There is evidence that a number of parasites influence the needs and motivation of their hosts in a way that suits the parasites' own chances of survival. For instance, some parasites alter the behaviour of their intermediated hosts in such a way that they fall prey to the predator that is the parasites' final host. Several fungal species, known as 'enslaver' parasites, make their insect hosts die perched in such a position that the fungus spores are best dispersed by the wind.

In the case the horsehair worm, the worms often grow to more than the full size of the hosts and then need to escape into fresh water, to collect into 'knots' and reproduce. Researchers at the Centre d'Etude sur le Polymorphisme des Micro-organismes in Montpellier, France report that infection by the horsehair makes crickets significantly more likely to enter ponds or streams than crickets not infected. Once in contact with

water, the horsehair emerges from the host and swims free. The host-insect generally perishes.

If the insect is eaten

Crickets, unless infected, usually do not venture on to the water surface, a vulnerable place to be, at best. The worm-infested cricket, which does take to the water, is thus often found as welcome prey, by frogs and fish, and eaten even while the worm is not out of its body. Is it the end of the worm too, in such a case?

Another group of scientists at the same institute in France have found that the plucky Gordian worm does not give up that easily. It bores its way clear out of the cricket and then out of the frog or fish's gut, and then goes on, to emerge from the frog's mouth or eyes, or the fish's gills! This is the first parasite that has been found to show this ability, say Fleur Ponton and colleagues, in a communication that appeared, with pictures, in last week's *Nature*.
