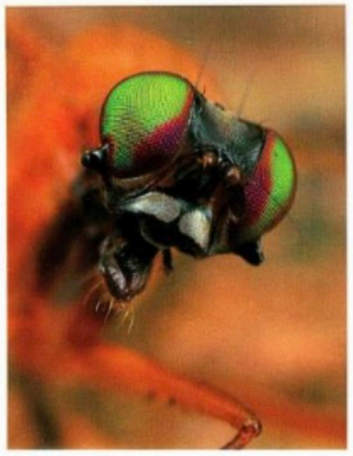
Flies That Fight

Article and photographs by MARK W. MOFFETT

"I see two males, and they're really going at it!" came the shout from Gary Dodson. I crouched down to witness a battle as old as time—a clash of antlers, then jostle and counterjostle. It ended with the panicked departure of the loser. Lost in the drama of the moment, entomologists like Gary and me forget that we are not observing giant elk or deer. These are New Guinea's half-inch-long antlered flies—harmless relatives of the Mediterranean fruit fly and other fruit pests. Astonishing in their similarities to their antlered mammal counterparts, male antlered flies fight over breeding territories and release a special breeding scent from glands, visible on the fly at right as a lump on the underside of his abdomen. With their weird projections and rainbow colors, these are flies worthy of Dr. Seuss.

Love makes war

Fly expert Gary Dodson of Indiana's Ball State University and I were watching Phytalmia cervicornis, *a species we nicknamed the "stag fly" for its deerlike, pronged antlers. Stag flies stake out territories on the recently felled trunks of particular rain forest trees, the wood of which forms the diet of the larvae. The most aggressive males seize prime spots on a log, perhaps distinguished from less desirable locales by an odor of decay.*

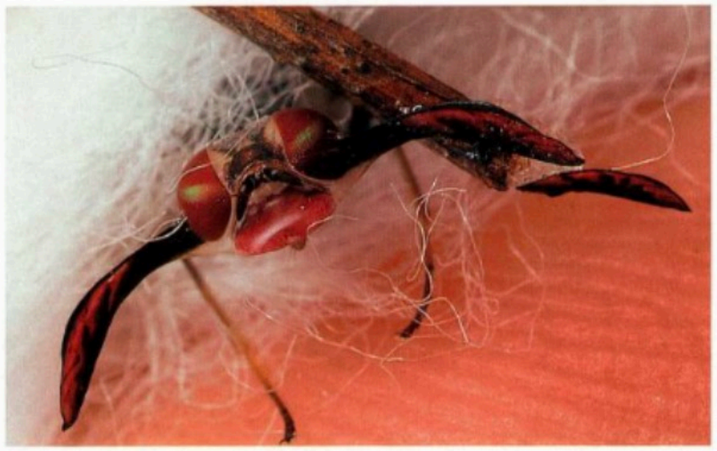


As in deer, fly antlers vary in size (though they are never shed). Small males have small antlers and little chance in battle. The smallest have only knobs beneath their eyes (top) and seem to mate only when larger males are not present.

Disputes on a log may have a female audience (bottom left, at left), and the winner will mate with any females entering his domain. The long stalk connecting a mating pair (right) is the female's oviscape, a casing that protects her egg-laying apparatus, the ovipositor. A mated female unsheathes her ovipositor (bottom right) to lay eggs in the log's bark. The male guards her, keeping adversaries at bay and ensuring that her offspring will be his. If another male mated with her now, his genes would dominate.

Combat ready

As a teenager fascinated by insects, I first learned of antlered flies while reading The Malay Archipelago *by the great 19th-century naturalist Alfred Russel Wallace. It was Wallace's friend Charles Darwin who coined the term "sexual selection" to describe the evolution of ornaments used within a species in love and war. The Irish elk, now extinct, showed one of the most extreme examples. Males had antlers spanning as much as 12 feet. One species of New Guinea antlered fly,* Phytalmia alcicornis, *rivals the Irish elk at a smaller scale. Its elaborate antlers can be so cumbersome that they may hinder the fly's everyday activities. I once saw a male that appeared to be so burdened by its rack that an ant caught it.*



A stormy courtship

In Queensland, Australia, I gave Phytalmia mouldsi *the nickname "goat fly" for its smallish horns. Yet goat flies jostle ferociously, stilting high on their legs (facing page). Although males of most antlered flies mount females without preamble, goat flies have a spread-winged courtship (bottom, viewed from over the female's shoulder). Even after mating, males straddle females to keep contenders away. In a blur of wings (top) one male tries to push another male off an egg-laying female. In an experiment (center), Gary Dodson glues extensions to the antlers of a small male to test whether he would gain advantage in battle.*

Eye to eye

Antlered flies aren't the only extravagant ones: Stalk-eyed flies of the diopsid family go hammerhead sharks one better by carrying their eyes at the tips of needle-thin stalks.

In Malaysia, these females of the genus Teleopsis *gather on rootlets near streams, the harem of a single male (above left, at top). Intruders challenge the resident male with a fly's version of "stare down," approaching until the two are eye to eye. The males of another Southeast Asian species,* Cyrtodiopsis whitei *(above), issue eye-to-eye provocations as well. If the flies are the same size, combat follows. If not, the one with longer eyestalks forces the other to back off. And so, generation after generation, sexual selection picks diopsid winners—and eyestalks evolve to outlandish lengths.* □