

ScienceWatch-Double Your Pleasure-Double Your Fun?

Biologically speaking sex is nothing more than the activity of passing one's DNA on to subsequent generations. Strategies to achieve that end vary greatly among organisms, but sexual reproduction among higher plants and animals always involves the union of two parental cells-egg (seed) and sperm (pollen). Most familiar to us are organisms with separate and distinct sexes, one producing sperm, the other eggs. Since eggs contain more cell material (cytoplasm), they are more costly, i.e., take more energy to produce than sperm. As a result, sexual strategies among males, who can readily afford to frequently disseminate large quantities of sperm, differ from females who tend to husband their more costly genetic investment. Thus, differences in objectives between males and females are a driving force in the evolution of copulatory mechanisms.

How does this apply to hermaphrodites (Hermes + Aphrodite) where each individual contains both sexes? In the classic case of the earthworm, mating consists of a serene exchange of sperm between individuals via their genital pores. This mutually beneficial process known as "double your pleasure, double your fun" is often observed by "early birders", while fisherman catching night crawlers call it "two for the price of one."

However, all is not sweetness and light in the world of hermaphrodites. Others such as leeches, flatworms and sea slugs do not transfer sperm through genital pores but by direct injection (ouch!) under the partner's skin. Lacking separate sexes to drive differing strategies, how do they behave? It appears that individuals weigh the cost of being stabbed against the benefits of stabbing others and act accordingly.

Publishing in the February 12th issue of *Nature*, Nicholas K. Michiels and Leslie J. Newman observed the mating behavior of *Pseudocercus bifurcus*, a hermaphroditic marine flatworm living in the warm waters off the coast of Queensland, Australia. Animals collected and observed in the laboratory, engaged in a behavior the authors termed "penis fencing". Upon encountering each other, most commonly, one animal would rear up, curl back and evert its penis and attempt to stab the other animal. Unilateral attempts were almost always unsuccessful because the nonresponding animal quickly glided away (68 of 72 cases). When both animals reared up, protracted penis fencing contests ensued, lasting on average 20 minutes. During this time each animal would dance around the other, attempting to stab while trying to avoid being stabbed. During the 39 dueling contests observed, 287 strikes led to 46 inseminations in 12 pairs.

As stated by the authors, penis fencing can be best explained by an attempt on the part of each animal to increase the benefit of sperm donation over the cost of sperm receipt. They also speculate that duels, which allow only better "stabbers" to be successful, might also result in more successful offspring. If this is the case, the worms are engaged in an evolutionary arms race between strike and avoidance behavior.

Saul Scheinbach