

You light up my life, *Vargula*

You probably won't see connect-the-dots pictures in sex manuals, but the dot-direct approach seems to work for a tiny crustacean that cruises Caribbean reefs in search of females. Male members of the genus *Vargula* leave behind spots of blue luminescent



Morin/Natl. Geo. Soc.

chemicals as they swim in patterns through the water, hoping to attract a female. But the flashy display isn't just for show. Although the animals can swim 60 body lengths a second, speed isn't enough in this water sport — at least 100 males have to share a single female, according to biologist James G. Morin, who has spent seven years observing the *Vargula* singles scene.

"Males squirt light out and leave behind a trail like a skywriter," says Morin, a professor at the University of California at Los Angeles. "[The female] lines up the dots and swims up to the male." Morin named the species capable of this light display "firefleas" because of their similarity to fireflies: "Both use their lights for sex, but in the fireflies, the females light up for the same reason." Firefleas secrete the light-generating chemicals from glands on their upper lips (above cleft on right side of photo). Morin told SCIENCE NEWS he suspects that other chemical substances also may be involved in the sexual attraction between firefleas, one of the few types of marine animals that copulate.

Not to be outshone, female firefleas also release the distinctive light, but apparently do so for an entirely different reason that comes under the "burglar alarm hypothesis," according to Morin. When attacked by small predators, both sexes can release softball-sized clouds of light, which attract even larger predators to gobble up the smaller fish. Fish, therefore, are a little leery of approaching firefleas. Morin has observed some species that use this protective device but do not use the light to attract mates.

Visible through at least 30 feet of water, dots of light emitted by most types of male firefleas last for 10 to 15 seconds during a nightly hour-long exhibition that starts after sunset. Each of the 39 light-emitting species (Morin has found 35 of those) has its own characteristic pattern of lights, says Morin, who studies both wild and captive firefleas.

Hanging on to the green stuff

Certain species of plankton — those tiny one-celled creatures of the deep — that have a few cilia on their bodies and graze on algae aren't as mindless as they might appear. Researchers at the Woods Hole (Mass.) Oceanographic Institution report in the April 23 NATURE that many plankton called oligotrichs and tintinnids can retain chloroplasts they ingest and use them to their own advantage. Chloroplasts are the chlorophyll storage areas where photosynthesis and starch formation take place in plants.

Diane K. Stoecker, Ann E. Michaels and Linda H. Davis determined the number of these planktonic ciliates, taken from Atlantic coastal waters, that retain chloroplasts. In the spring and summer, about 42 percent of the two plankton combined have chloroplasts; in the autumn and winter, at least 10 percent.

Marine biologists have speculated for years that the retained chloroplasts aren't just ornamental, but functional. Experiments measuring photosynthesis in water containing the plankton support this concept, say the authors. Because chloroplast retention by planktonic ciliates is found in waters around the world, the scientists say the plankton are "important both as producers and consumers" in marine populations, thereby more efficiently providing food for larger animals.

Venereal disease: Cost and treatment

Although other sexually transmitted diseases are more feared and attract more attention from scientists and the public, venereal disease caused by *Chlamydia trachomatis* is the most common such illness in the United States, infecting more than 4 million people annually. According to a new study by the Centers for Disease Control in Atlanta and the University of California at San Francisco, *C. trachomatis* infections cost the United States more than \$1.4 billion per year in direct and indirect costs. However, new approaches to treating gonorrhea might significantly reduce the price tag for *C. trachomatis*, say the researchers in the April 17 JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION.

They recommend that women being treated for gonorrhea be treated for chlamydia at the same time, using a combination therapy of ampicillin and tetracycline. Currently, treatment for gonorrhea is oral doses of either ampicillin or tetracycline, but ampicillin is ineffective against chlamydia and tetracycline is not quite as effective as ampicillin against gonorrhea. A combination dose is warranted, say the authors, because of the frequency with which the two infections coexist in a patient. Between 25 and 50 percent of women with gonorrhea also have a chlamydial infection, often asymptomatic.

Noninvasive transplant-rejection test?

An experimental method using radioactively labeled cells to detect the early stages of transplant rejection may be practical as either a replacement or a supplement to current techniques that require a series of heart-muscle biopsies, according to a report in the April CIRCULATION.

Researchers at Washington University School of Medicine in St. Louis tracked blood lymphocytes labeled with the radioactive compound indium-111 and injected into 16 dogs that had received heart transplants. Infiltration of lymphocytes into a graft is a sign of early rejection, and preliminary work in St. Louis and elsewhere had suggested the protocol might be useful in a clinical setting.

After transplantation, blood was removed periodically from each dog, lymphocytes were separated out using a centrifuge and the cells were radiolabeled with indium-111. The labeled lymphocytes then were injected into the dog from which they had been drawn. Radioactivity in the heart was measured using a procedure called gamma scintigraphy, and biopsies were done at the same time for comparison.

Transplanted animals were divided into two groups: those given the immunosuppressive drugs cyclosporine and prednisone, which are routinely used following transplantation, and those not given drugs to dampen the immune system's rejection of the graft. In dogs not receiving the drugs, infiltration of the graft by indium-111 lymphocytes began about six days after the transplant. No infiltration occurred in drug-treated animals, although labeled cells did appear within two days after the drug treatment was discontinued two weeks after surgery. Accumulation of the lymphocytes increased with time in heart recipients, but did not appear in animals not given transplants.

Although the method offers certain improvements over biopsies, which require catheterization through the jugular vein, it presently requires more technician time and leading-edge technology. Authors of the report say that overexposure to radioactive materials is undesirable, pointing out that under current Food and Drug Administration standards for indium-111-labeled cells, four to five such assays per patient per year may be the allowable maximum. Despite these potential limitations, the scientists suggest that the technique may help monitor responses to immunosuppressive drugs, as well as determine when a biopsy is needed.