

Bio NB 221 - Introduction to Animal Behavior

Hypothesis Testing Paper

For one of the behaviours described below you must:

- 1) Write four functional hypotheses that explain the behaviour -
- 2) For each hypothesis. **make** at least three **predictions** - - -
- 3) Identify critical predictions --
- 4) For two predictions for each, **of** two hypotheses (this totals to 4 predictions) design **an** experiment **to** test the prediction.

A. **Bioluminescence in dinoflagellates.** Dinoflagellates are single-celled organisms that form part of the marine plankton community. When they are disturbed, some dinoflagellates produce light, a phenomenon known as bioluminescence. If you are ever in the Caribbean, you can see this by agitating the water at night time: you will see tiny sparkles of light within the area that you are agitating. Dinoflagellates are near the bottom of the plankton foodchain: they are eaten by shrimp and small fishes which are in turn eaten by animals such as squid and cuttlefish. Some dinoflagellates are predators themselves, eating smaller single-celled organisms such as paramecia. Dinoflagellates reproduce asexually and some species produce potent nerve toxins (these are the organisms responsible for "red tides").

At the functional level of analysis, why might the dinoflagellates emit light when they are disturbed?

B. **Sexual cannibalism in red-spotted spiders.** Male red-spotted spiders will sometimes willingly stick their bodies between the jaws of females during mating, allowing the female to kill and eat them. Not all males end up getting eaten, but those that are eaten keep mating at one end of their bodies while the female eats the other end. The male simply trips himself into the female's 'jaws and so he appears to volunteer to die. After mating the female will lay and care for the eggs-s on her own. Females have their own webs and it is up to the males to approach the female at her web in order to solicit mating. These spiders are poisonous, and their bites are toxic enough to kill a young child.

At the functional level of analysis, why might the male spiders "commit suicide" during mating?