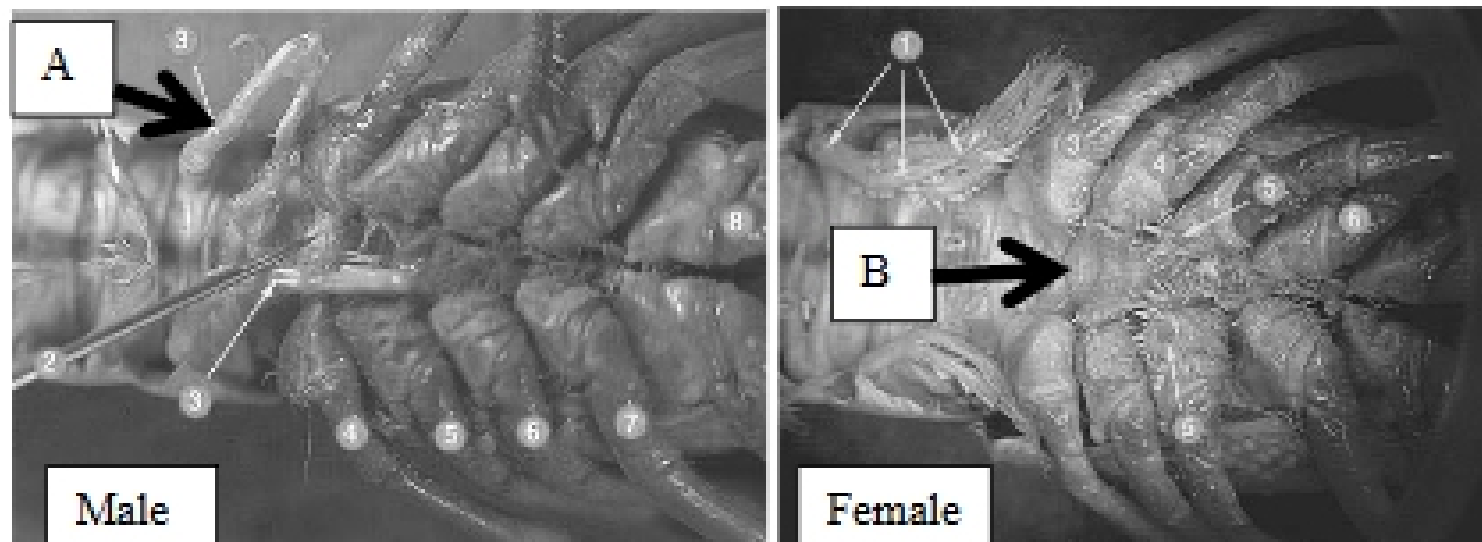


**Lab: Behavioral Interactions of Crayfish**

In this lab we will observe interactive and aggressive behaviors of crayfish (*Procambarus clarkii*). Understanding complex interactions between individuals within a species can be investigated through behavior analyses. We will observe both male and female crayfish as they interact with each other and describe the types of behavior involved in those interactions.

**Background:**

Males and females are sexually dimorphic in this species. In the male, the first two pairs of swimmerets are longer, and prong-shaped (Labeled A in the image below). They serve as a sperm transfer organ during mating. Females have a seminal receptacle. The sperm received from the male is stored here until the female releases her eggs (Labeled B in the image below).

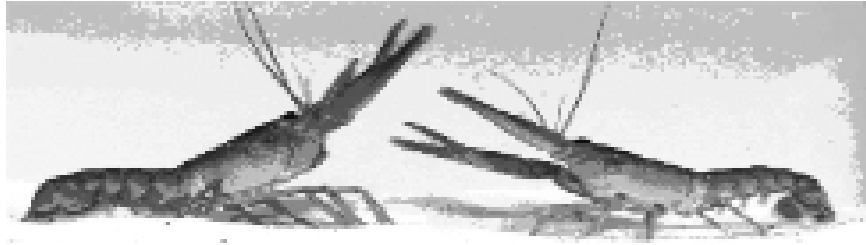


Most crayfish are nocturnal, coming out at night to search for food. During the day they remain either in burrows excavated in soft muddy bottoms, or hidden beneath rocks, logs, or other debris. Crayfish defend their burrows or hiding places vigorously against all intruders, especially other crayfish. Territorial behavior occurs in many species of animals.

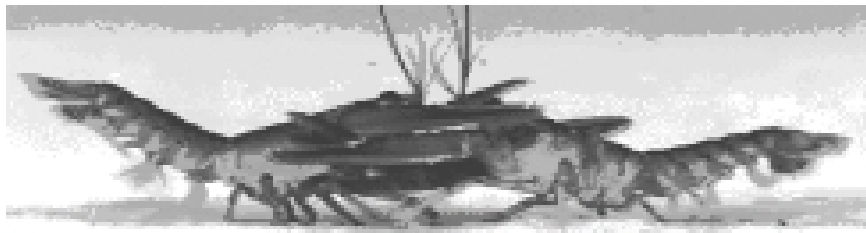
**Why do organisms exhibit territorial behavior? List several possible reasons.**

Agonistic (fighting) behavior of many decapod crustaceans features a variety of distinct, behavior patterns. Interactions start when animals advance to within one body length of another individual and overtly react to its presence. The approaching animal is termed the initiator. As the interaction progresses, animals may use a variety of behaviors in an encounter. Crayfish exhibit the following behaviors when fighting:

1. Meral spread – when individuals exhibit a posture, characterized by raising the anterior portion of the body



2. Wrestling



3. Clawing – an individual actively uses claws in an interaction (pinching or jabbing with claw)

Another behavior you are likely to observe is called retreating, where one individual attempts to move away from the other. This will not be considered an aggressive fight behavior; however you should make note when this behavior occurs.

### **Observation:**

Before biologists begin to analyze behaviors by using experimentation, they must first observe the behaviors and become familiar with those behaviors. Above, we have listed focal behaviors for fight behavior in crayfish. We will do an observation trial prior to conducting our experiments, to familiarize ourselves with the behavior of our study organism.

### **\*\*\*Precautions for handling crayfish\*\*\***

Wash your hands before and after handling the crayfish. Please wear gloves provided in lab.

**To pick up a crayfish, approach from behind and gently grasp the animal by the carapice (never by the extremities). The crayfish will flail its legs when you pick it up, so be prepared!! Do not drop the animal!! It cannot pinch you if you are holding it properly.**

**Procedure: Observation of fight behaviors in crayfish**

**(NOTE: The observation trial will be conducted together with another lab group)**

1. Prepare a test arena: Add water (**Note: Treated tap water, TAs will show you how to prepare water for the experiments**) to the fill line indicated on your test aquarium.
2. When ready, add both individuals simultaneously to the test arena (one on each end of the aquarium). Allow the individuals to acclimate to the tank for 5 minutes. Observe behavioral interactions between the two individuals for approximately **10 minutes**. Discuss the different types of behaviors you observe. Identify the specific aggressive behaviors 1-3 and retreating behavior for individuals. You will likely need to discuss the different behaviors you observe with your group members to make sure everyone identifies specific behaviors the same.

Observation is an important step for animal behavior studies and will provide the basis for further investigation. Once everyone in the group can identify each behavior, then we are ready to conduct the experiments. This procedure allowed us to remove a possible source of error (repeatability between observers).

**Why is repeatability important?**

**Experimentation:**

In this lab we will conduct two different experiments investigating behavioral interactions between individuals.

**Experiment 1: Same Sex Interaction (e.g. Male-Male or Female-Female)**

In this experiment we will observe the interactions between two crayfish of the same sex. Whenever two individuals compete for a territory, there is likely to be a winner and a loser.

**Your null hypothesis for this experiment is that there will be no differences in the number of fighting behaviors observed between the winning individual and the losing individual.**

**Based on the behaviors listed above, write a testable hypothesis for what you expect to see with this interaction.**

**Do you expect to see some behaviors more often than others? Will winners and losers differ in the behaviors they use? Why or why not?**