

## Crayfish

### **Background:**

Over three hundred kinds of crayfish occur in North America. Each crayfish has specific habitat requirements and is thus limited in its range. However, since there are so many species, crayfish can be found in almost every imaginable aquatic or semi-aquatic environment throughout most of southern Canada and the United States.

Crayfish-sometimes called crawdads, mudbugs, or crabs-are freshwater organisms related to marine shrimp, crabs and of course, lobsters, which they closely resemble. All are members of a group called Crustacea, characterized by a hard exoskeleton, numerous legs and the presence of gills. These, in turn, are members of a larger group, the Arthropoda, which includes insects and spiders and is the largest group of animals on earth.

### **Characteristics:**

Although they vary in length from 2 to 5 inches or more, most species of crayfish are so similar in appearance that it is difficult to distinguish between them. Usually reddish to brown or gray-brown in color, their bodies are divided into two parts: a rigid *cephalothorax* (combined head and thorax) and a flexible, segmented abdomen. Two pairs of antennae, one pair of eyes on stalks and the mouth are located near the front of the cephalothorax and five pairs of legs are attached to the midline along the bottom. The first pair of legs terminates in large pincers - the most obvious characteristic of the crayfish. These are used in eating, jousting with other crayfish over territorial matters, defense and burrowing. The four smaller pairs of legs are used primarily for walking but are also tipped with small claws that help cling to the substrate as a crayfish climbs. Most of the internal organs, including the brain, heart, lungs and stomach are in the cephalothorax. The abdomen looks and functions like a tail, but it too, has small leg-like appendages called *swimmerets* and a broad, flat, fanlike projection called the *telson*. Walking is the chief method of locomotion for crayfish. Considering their cumbersome appearance, crayfish are surprisingly agile and can move forward, backward or sideways in water or even on land, where they sometimes wander. They can also swim short distances, but they are awkward swimmers and adopt this way of getting around mostly as a means of escape. They swim by making a series of downward and forward movements of the abdomen, which propels them backwards in a jerky fashion. Most crayfish live among rocks and litter on the bottom of streams, rivers, swamps, marshes, ponds, lakes and muddy backwaters, and in these habitats they often reach high population levels. Other solitary species burrow in fields and meadows, sometimes as deep as 3 feet to create underground chambers just below the water table. The entrances to these burrows are often "chimneys" of mud balls, the remains of the excavation. A few species called cave crayfish, unique because they are colorless and eyeless, inhabit underground streams sometimes hundreds of feet below the earth's surface.

### **Obtaining Food:**

Omnivorous and opportunistic in their feeding habits, crayfish play an important role in many aquatic ecosystems. First, as scavengers, they consume a great deal of dead plant and animal material that would otherwise decay. They also consume living plant material, and as predators, they eat insects and their larvae, worms, snails, fish, frog eggs and tadpoles. When they eat, crayfish hold food against the mouth using one or both pincers, rasp away tiny bits, and then swallow.

In turn, many other animals prey on Crayfish, including various fish, turtles, snakes, minks, raccoons and a number of birds, such as kingfishers and herons.

## Crayfish (cont)

### **Reproduction:**

Reproduction in most species takes place in late summer or fall. A few weeks after mating, each female produces an average of 100-200 (but up to 400) dark –colored eggs. Once laid, the eggs are attached to the swimmerets and carried about by the female. When carrying the eggs, the female is said to be in the “berry stage”.

After hatching, the young crayfish, which resemble miniature adults, remain attached to the swimmerets for one or two weeks. When they are about one-half inch in length, they leave the female and lead an independent existence.

### **Molting**

The young crayfish grow rapidly and molt (shed their exoskeleton) several times before they reach maturity in as little as three to four months. Thereafter, both males and females molt two times each year—once to produce the breeding stage, and once to produce the non-breeding stage. Crayfish can regenerate an appendage that has been severely injured or broken off. The process begins with the next molt and eventually a new leg or pincer appears.

For a few days following each molt, the new exoskeleton- including the greatest defense of the crayfish, the pincers, is soft and flexible. At this time, crayfish are especially vulnerable to predation, so they tend to be reclusive until the exoskeleton hardens. They are sometimes collected during this “soft-craw” stage for use as fish bait.

### **A Delicacy:**

Considering their kinship to lobster, shrimp and crabs it is not surprising that crayfish are edible. They are not widely exploited for food except in certain southern and West Coast states and are becoming increasingly popular in other parts of the country because they can be so easily raised on a commercial basis through aquaculture. Peeled tails (abdomens) fried in butter and whole crayfish boiled like lobsters are reputed to be excellent.

### **Crayfish in the Classroom:**

Crayfish are perhaps one of the most overlooked animals for use in the classroom. They are not only easy to obtain and maintain in the classroom, but they are also interesting to observe and nicely illustrate many aspects of animal behavior. Although they must be handled carefully to avoid the pincers, their size makes it very easy to observe the typical crustacean characteristics.

### **How to Obtain:**

Crayfish for classroom use can often be collected from shallow streams. Place a large net downstream from a rock and gently move the rock. This will alarm any crayfish sheltering under the rock and as they attempt to escape they will be swept into the net by the current. Crayfish can also be caught with practice by raising a rock and grabbing them. Or try fishing for them. Tie a string to a piece of meat or fish and dangle it near a crayfish. When the crayfish grasps the bait with its pincers, gently raise it out of the water and lower it into a pail. No hook is needed as the crayfish will hold on and catch itself.

Crayfish are protected in some areas of the United States, so the propriety of collecting them, if in question, should be determined by contacting your state and wildlife agency. Crayfish can also often be purchased from fish-bait shops or from biological supply companies.

## Crayfish (cont)

### Caring for Crayfish

#### **Housing:**

Crayfish are highly territorial and will fight if crowded. This characteristic can be the source of interesting behavioral studies but it also needs to be considered in maintaining captive specimens. One or two crayfish can be kept in a standard aquarium. If more are kept, they should either be given separate accommodations or placed in a larger container such as a plastic wading pool. One or two inches of coarse aquarium gravel will provide an appropriate substrate, and a few rocks, a brick or clay flower pot will provide essential climbing and hiding places. The addition of a few aquatic plants will make the enclosure look more natural and provide a continuous dietary supplement.

Crayfish have a seemingly uncontrollable urge to alter their surroundings. They will continually rearrange the substrate, and they often burrow under objects. Then they will defend the special area they have created from other crayfish. Crayfish need only 1 to 2 inches of water, but there should always be enough to completely cover specimens.

#### **Diet:**

Crayfish can be fed any of their natural foods. Since, their natural foods are sometimes unavailable and since crayfish are omnivores and scavengers, a variety of substitutes will also be acceptable. Small pieces of lettuce and other vegetables as well as pieces of fresh meat or fish will provide an adequate diet.

Crayfish are messy eaters and it will be easier to keep their cage clean if they are removed to another container (a bowl or pail) for feeding. Otherwise, any uneaten food should be removed from the enclosure after half an hour or so to prevent fouling of the water. Since crayfish normally consume aquatic plants, they can be left over weekends and vacations without any additional attention.

#### **A Note on Handling:**

Although crayfish can be taken out of the water for observation and study, their tolerance to dryness is limited since they breathe through gills. Consequently, they should not be kept out of water for more than five to ten minutes at a time.

Handle crayfish carefully. They will not bite, but they can give a painful pinch with their strong claws. To pick them up safely, grasp them on either side of the cephalothorax above the walking legs with the thumb and forefinger. This technique should be demonstrated to students if they are to be allowed to handle crayfish. Alternatively, crayfish can be picked up with an aquarium dip net.

#### **Observations, Activities and Questions:**

- Observe and describe a crayfish. How many legs does it have? How many antennae? Are all legs alike? Are all the antennae alike? How many body parts are there?
- How does a crayfish walk or swim?
- Observe and describe the use of the antennae, legs and pincers in locating and consuming food, in defense, and in other activities.
- Save any exoskeletons and examine them with a magnifier. This will show details of the original crayfish, and will not pinch.
- Find out how crayfish interact with each other by placing two crayfish of different sizes in an established aquarium. Observe and describe their interactions and behavior. Which dominates the other? How does the submissive one behave? Remove the dominate crayfish and observe the reaction of the submissive one.