

Those Creepy Crawlers Can Be Fun

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Invertebrates are members of the animal kingdom, from the simplest one-celled animals, the Protozoa; to the most complex precursor of the chordates, the Echinodermata. As you may or may not remember from your Biology courses, the predominant difference between the invertebrates and the chordates (up to and including *Mammalia*) is the absence of a spinal cord or notochord, as in the case of the lower vertebrates.

They are considered the lower animals because of their simplistic design as well as their decreased capability to think logically as opposed to instinctively. I should, however, qualify by adding: that this does not mean that they have no capacity for simple stimulus-response type expressions. There has also been shown a form of intelligence much more advanced than previously speculated for invertebrates. An example of this is the octopus, which has the ability to remove food from a closed jar.

Aside from serving as a primary food source for many vertebrates, they serve in many cases to help clean up the water of decaying plant and animal matter. Many invertebrates have been found to have symbiotic relationships with other invertebrates as well as some vertebrates. In the tropical oceans they are the main builders of the reefs, which are the most important structures in the oceans. In freshwater the invertebrates serve nature primarily as scavengers and as a primary source of food in the food chain.

Invertebrates can be found in any aquatic system in the world. Since this paper is basically about those native invertebrates which can be found in North America, I shall confine my present discussion to those invertebrates found within the continental shelves, no further north than the Canadian border nor further south than Mexico.

Whenever you collect in a body of water, whether fresh or salt water, you will find some types of invertebrate. This paper shall be confined to a discussion of freshwater invertebrates. Saltwater invertebrates comprise a very broad topic, and will therefore be covered in a later paper. Even though the species diversity in freshwater is not as great as that of saltwater, it is still possible to collect many interesting animals either for an aquarium or for whatever purpose you might find for them. There are many phyla of invertebrates of which members are suitable for an aquarium. There are also those that can be found only to the misfortune of the aquarium owner. I will go through each representative phylum, discussing; 1) the method of collecting, 2) where to find them, and 3) the possibility of maintaining them in an aquarium.

If you have ever looked at a sample of pond water through the microscope, you would have seen an amazing variety of life. The majority of these microscopic animals are the 'one-celled' animals or protozoans. What significance do these animals play in the aquarium? The protozoans are found in great abundance in the aquarium. Unfortunately, some of these are parasitic. Anyone who has ever had an aquarium is certainly familiar with a malady named *Ichthyophthirius* or more commonly known as 'ich.' This parasite can work its way through many tanks leaving a large percentage of the fish dead within a few days. Although many protozoans are actually beneficial, the damage that can be done by the parasitic protozoans can be devastating.

There are a few species of freshwater sponge, all are suitable for the aquarium. They are mostly green or brown, and they are found encrusted on a rock or twig in flowing water. Some reaching the size of a golf ball or larger. If you found a rock which had a sponge attached, you would have an interesting and beneficial tank-mate since sponges are 'filter-feeders.' This means that they filter particulate matter out of the water. Therefore, by filtering out some of the solids they would, to some extent, help to keep the aquarium clean.

Next, we have the jellyfish and their relatives; best represented by the hydra, a cylindrical tube with venomous tentacles at the top for catching prey. The hydra is found attached to rocks, plants or anything else that is non-motile. They are usually less than 25mm in total length, are whitish-gray, green or sometimes brown in color. Due to their general opaqueness they sometimes seem to assume the color of what they eat. Their size makes them difficult to keep in an aquarium with fishes. Since a large fish can eat them, and a small fish will possibly be harmed by them. If kept in a small tank with other invertebrates or in a container by themselves they can be quite interesting. Both the method for catching and eating their prey, as well as its somersaulting motility are very enjoyable to watch. Feeding could consist of live *Daphnia*. If you feed your fishes live *daphnia*, you might find that you have a problem with an abundance of *Hydra*. The reason being that a major food of the *Hydra* is *Daphnia*. Therefore, where you have *Daphnia* you will have *Hydra*. The freshwater jellyfish is not as common, therefore, not as much can be said about it. If you do happen to find some of these transparent animals, they also could be an interesting addition with other invertebrates.

Now just a few short comments on the Rotifers. They are for the most part microscopic. They would most commonly be found in the water filter of your tank in with the glass wool or polyester fiber. Not only do these minute creatures help to clean the tank, but, they also are a vital part in many water treatment systems.

Worms are not very popular outside the aquarium let alone inside. However, there are several varieties of saltwater worms which are quite popular and beautiful. In going back to freshwater, the most common worms which you might have some rather unpleasant dealings with are your planarians (flatworms). They are found almost anywhere

and sooner or later end up in a tank. These small animals are usually white and no larger than 10mm. They can be hazardous in large numbers to juvenile or very small fish. The most interesting feature of the Planaria is their ability to regenerate new parts. If you cut one of these in half, you would then grow two separate animals.

The other type of worm which you might be familiar with is the tubifex worm. This is a tube building colonial worm in that, when you see a group of these, they are usually living in massive clumps, possibly the size of grapefruits. These worms are not dangerous to fish directly. However, because they generally live in dirty water there is a danger of introducing potentially toxic substances into your tank; as well as the possibility of internal parasites, if the worms are not cleaned thoroughly prior to feeding. The person who uses this as food should be aware of the possible problems associated with this. All in all, it is best to keep worms out of the freshwater aquarium.

The phylum which has the highest number of freshwater representatives is Arthropoda. This includes the insects, shrimp and crayfish. It is the most prevalent phylum on the macroinvertebrate level. The most abundant class in this phylum is *Insecta*. Of course you would not want any of these in your tank, since many are carnivorous. However, if you are not careful you may introduce them into your tank. The larva are commonly found attached under rocks in the water, or under the leaves of aquatic plants. They live in small mud chambers where they go through their metamorphic changes. Therefore, by not washing rocks or plants thoroughly before introduction to the aquarium you might be inviting unwelcome visitors. On the other hand, it might be interesting to watch come of these animals metamorphosize from the larval to the pupal stage. If you have a tank without fish, you can do this, as long as you remember to put them back in the local stream before they reach maturity. Since many of these adult insects fly as well as bite, do not keep them too long, especially stay away from mosquito larva.

The crustaceans (crabs and shrimp) are the most common class found in the aquarium. The most frequent inhabitant being the crayfish (freshwater lobster). Anyone who has ever gone freshwater fishing or collecting has probably at one time or another seen one of these little animals. Some of you no doubt have felt the pinch of this little cutie. A large crayfish can give you a nice bruise, as well as forcing strange four letter emissions out of your mouth, until it decides to release. These little animals can be commonly found under rocks, logs or in burrows. They are definitely not the easiest animals to catch, due to their ability to move backwards faster than forwards by propelling themselves with their tails. They are, however, well worth catching for they can make very good tankmates. That is as long as; 1) the crayfish is not that much larger than the other inhabitants and 2) that the other inhabitants are not that much larger than the crayfish, especially that you have no predaceous fish. If neither of these conditions are violated, a crayfish should be an interesting addition to your aquarium. One of the most

fascinating features of the crayfish is the molting it goes through approximately once a month until it reaches maturity. This is the growing process in which the crayfish literally jumps out of its 'skin.' This skin is actually its skeleton which it wears on the outside. The animal, after molting is now sporting a new slightly larger body. This body is still very soft right after molting, therefore, never pick the animal up right after molting because even light pressure will harm the animal. If you find a female with eggs hanging from under her body, you might want to keep her in her own tank until the eggs hatch. Prior to hatching you will see a pair of small black eyes peering out of each egg. There are usually 50-100 eggs in a spawn. When the crayfish hatch they are virtually miniature replicas of their parents, although they still must go through three stages before being considered adult. Within a week they will be walking all over the mother's body, but will still go back to her swimmerets (under the tail) for protection. In another week there will be many small crayfish each about 10mm long, walking around the tank. These can be raised with fair success if they are fed large amounts of food and kept only a few to a tank, otherwise, they will attack each other with the larger young eating the smaller ones. Once they start growing they can be quite enjoyable. In fact, in my opinion they are the most interesting freshwater invertebrate. For you people on the east coast some species of freshwater prawn can also be found. They are essentially transparent and are usually between 20-40mm in length. Like the crayfish their antics are quite enjoyable. They are frequently found in the grassy sides of rivers or most brackish water systems. They are best caught by scooping a netful of aquatic grasses into a pail of water or by seining for them. In a tank containing fish, you must be careful; since they have no pinchers their only defense is their quick speed of retreat. All in all, the class, *Crustacea* is probably best suited for aquarium life.

The last phylum that is represented to any great extent in freshwater are the mollusks, or shelled animals. They are divided into two categories: 1) the bivalves (clams and mussels) and 2) the univalves (snails). The freshwater bivalves are found fairly commonly in streams and lakes in most of North America. They are found in mud or sand bottoms. They are mostly brown in color. In the aquarium, if they are kept in with a sandy bottom, you can watch as their foot extends to move them swiftly through the sand. Since they are also filter-feeders they can also help to keep the tank clean of particulate matter. Next, we have the freshwater snails, the most interesting being the so-called livebearing snail or 'winkle.' This snail retains the eggs in the body cavity until they hatch. These are found in shallow water and have a shell that is about 40mm in diameter. If you find one containing eggs, you might in a few weeks find about a dozen 5mm in diameter snails. These snails are not filter-feeders, instead they are scavengers eating mostly plant tissue.

In this paper, I have tried to give you an appreciation of these little 'creepy crawlers.' Whether you will now go out and collect some for your aquarium is immaterial. Their purpose is not only for bait or food, but they are quite interesting in their own right. I have collected many

types of invertebrates, and find them fascinating. In my next paper I shall delve into the world of the saltwater invertebrates. I will discuss the many symbiotic relationships so prevalent among the saltwater invertebrates, as well as the overwhelming beauty and grace of these underwater creatures. ‡

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Literature cited:

- Pratt, H. S. : 1935. **A Manual of the Common Invertebrate Animals.** McGraw-Hill Book, Co., Inc.
- Reid, G. & H. S. Zim 1967. **Pond Life.** Golden Press. New York.