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Decapods of Iowa (Part II)

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DECAPODS OF IOWA (PART II)

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Introduction

Since the classic work of T.H. Huxley in 1880 on *The Crayfish*, decapods have been widely used in teaching elementary zoology, as well as for research along more advanced lines. Traditionally decapods have been used to demonstrate various characteristics typical of arthropods in general. Among these are the open circulatory system, ventral nervous system and segmentation. Also, the appendages of the crayfish show many variations of a basic biramous or two-branched structure. These appendages provide an excellent example of adaptation of structure to function. Because of these features, crayfish have long been considered excellent laboratory animals and have been used extensively as teaching aids in the classroom (Meredith and Schwartz, 1960).

However, because of the recent trend in biological instruction toward cellular, molecular or ecological programs, the use of crayfish in biology classes has dropped off strongly. Soaring prices for preserved specimens have caused further deletions of crayfish from biology programs where dissections are performed.

This is not to suggest that crayfish are no longer of value in the classroom. To the contrary, crayfish are frequently well suited for classroom exercises involving the study of animal behavior or ecological problems. For this reason, the following information is presented to aid teachers and students in collecting, caring for and using crayfish in the classroom.

Collecting Specimens

Whenever, possible, it is preferrable to use crayfish you have collected to those which can be bought from supply houses as fresh collected specimens tend to be healthier and more active than those purchased. Because crayfish are common to most parts of the state, collection of specimens is usually not a problem as they are readily available throughout most of the year.

Collecting crayfish is usually best accomplished by seining. This method works well for areas with smooth bottoms. Seining can be profitable in ponds with heavy vegetation where large numbers of crayfish are often encountered, especially in the fall of the year. In the spring, seining flooded roadside ditches can yield good catches.

When collecting in lakes or streams with rocky bottoms, use of a dip net may be more successful than seining. Under these conditions, the dip net is usually placed downstream from a rock which is then overturned. Because crayfish dart backwards when startled, it is necessary to place the dip net behind, rather than in front of the animal.

Collection by hand can also prove successful, especially when done at night with the aid of a flashlight. Crayfish may also be taken using minnow traps baited with fish heads of chicken entrails. When using a minnow trap, it is usually best to leave the trap out over night.

Additional information concerning the collection of decapods can be found in *Collecting and Preserving Kansas Invertebrates* by W.T. Edmonds, 1976. This publication may be obtained free of charge by writing to the State Biological Survey of Kansas, 2045 Ave. C, Campus West, Lawrence, KS 66044.

Classroom Care

Once a crayfish has been collected, it is necessary to take certain steps to ensure its survival. Because crayfish will quickly use up the oxygen in a pail of water, transportation back to the classroom should be as rapid as possible. If more than one hour will elapse during transportation, it is best to place the crayfish in a pail with aquatic plants rather than one filled with water. This will keep the gills moist and will prevent suffication. Despite precautions, some individuals will probably die. These crayfish may be preserved in either 70% ethyl alcohol or 5% formalin solution and used later for dissections or external anatomy studies.

In the classroom, decapods may be kept in almost any type of container which will hold water. Plastic wading pools approximately four feet in diameter work well for behavioral studies. Such pools, when supplied with a gravel bottom and several inches of water will support 10 to 20 specimens (the number depends on size and species used) without any form of aeration. Larger numbers may be maintained by using an air bubbler. When aeration equipment is used, the air hose must be passed through some sort of partial cover to prevent the crayfish from climbing the air hose and escaping.

Aquaria also work well for keeping crayfish. A ten-gallon aquarium will house two to four mature specimens comfortably. More may be kept if the aquarium is aerated. Plastic trays, glass jars and boxes lined with plastic sacks will also house crayfish. Metal containers should be avoided as they will eventually kill specimens.

For most species, a temperature range of from 65°F to 75°F is suitable. However, species found in ponds may withstand higher temperatures while those from trout streams need cooler conditions. Aquaria should not be placed in direct sunlight. This will prevent heating of the water and will also reduce the growth of algae on the sides of the aquarium which obscures observation.

Overcrowding should be avoided. Besides causing problems with keeping a sufficient amount of oxygen in the water, specimens may fight and kill each other, especially if specimens of different sizes are placed together.

Feeding crayfish is not a problem for they will eat almost anything. Ground meat, fresh fish, earthworms, insect larvae, aquatic plants, lettuce, and bits of meat are all satisfactory. Rabbit food in the pellet form has been found to work well. Because contamination of the aquarium may result from overfeeding, it is best to feed crayfish only once or twice a week. After feeding, all uneaten material should be removed from the aquarium. This problem may also be avoided by removing the crayfish to a separate container for feeding after which it can be returned to the permanent holding structure.

Classroom Use

Suggestions for the use of crayfish in the classroom may be found in a variety of sources. The *Teacher's Guide for Crayfish*, McGraw-Hill Book Co. Elementary Science Study (ESS) series represents an excellent guide to possible uses of crayfish. While designed for use at the elementary school level, projects discussed in this study guide can easily be modified for use in junior high or high school biology courses. This study guide describes classroom exercises involving feeding habits, social hierarchies and habitat requirements as well as providing additional information concerning the observation of mating, egg laying and moulting. Information concerning buying, collecting and caring for crayfish is also included in this publication.

Many studies which have been conducted with decapods may be readily adapted to class use. Field studies dealing with territorialism, home range and population dynamics are described by Henry (1951), Camougis and Hechar (1959) and Black (1963). Ecological studies dealing with the effects of various environmental factors have been conducted by Park *et. al.* (1940), Park (1945), Burbanch *et. al.* (1948) and Wiens and Armitage (1968) and also have classroom application.

For classroom problems dealing with water pollution or other environmental studies, extensive information concerning the effects of various pollutants and environmental factors on crayfish is provided in Hobbs and Hall (1974). This particular article discusses a wide array of studies which might be utilized in classroom situations.

A particularily interesting behavioral study is reported by Bovbjerg (1970) dealing with the ecological isolation and competitive exculsion of two species of Iowa crayfish. Portions of this study dealing with response to substratum and aggressive behavior could easily be conducted by a biology class and represents an excellent application of current research to the teaching of biology.

Conclusion

This article highlights just a few of the publications available to the biology teacher on decapods. By bringing decapods into the classroom, many more ideas are sure to arise as both the teacher and students become more familiar with these common, yet intriging animals. The next article will deal with crayfish identification.

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Solar Energy Packets

DOE Solar energy Curriculum for Grades 7-12. This program consists of 43 solar energy activities arranged in five packets. Supportive materials include: Solar Energy Text, Reader, and Teacher's Guide. For further information contact U.S. Government Printing Office, Washington, D.C. 20402.

Geologic Field Trips

For those interested in geologic field trips for elementary students in Black Hawk County, contact Frank Starr, 319-233-5281. Fossil keys, stratigraphic maps and discussion questions have been developed for specific exploration sites in Black Hawk County.