

A STUDY OF THE ANATOMY OF THE NAIAD  
PLEUROBEMA CORDATUM (RAFINESQUE, 1820)  
(MOLLUSCA: BIVALVIA: UNIONOIDA)

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The Ohio State University, 1968

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A comprehensive study of certain aspects of the biology of the freshwater mussel Pleurobema cordatum (Rafinesque, 1820) was made at the Muscle Shoals area of the Tennessee River near Florence, Alabama, during the period 1964-1968. It included a general study of the habitat distribution, growth, reproduction, and mortality of the species. A more detailed study was made of the gross and histological anatomy. Additional observations on other aspects of its life history were recorded where possible.

This species is characteristic of large rivers and occurs in the largest streams of the Ohio River drainage system. Other closely related species (P. coccineum, P. pyramidatum, P. sp.) occur in smaller streams where P. cordatum is absent.

Growth has been studied by measuring the shells of naiads from the same populations at yearly intervals. Juveniles were sought by using a variety of sieve sizes and sorting the bottom contents in areas where adults occur. However, very few Ohio Pigtoes less than one inch in length have been found and none were found less than 4 years old.

The Ohio Pigtoe is ovoviviparous, utilizing primarily the outer gills as brood chambers. It has a variety of closely related species in the same complex but this study is restricted to P. cordatum. A concerted effort has been made to determine whether sexual dimorphism exists in the shell of mature individuals.

Spermatogenesis and oogenesis were discovered to occur at cyclic intervals throughout the year with certain stages appearing at certain seasons. These have been described in detail. This species is a short term breeder or tachytictic.

Collecting of specimens at the outset of the study involved the use of equipment consisting of a brail with crowfoot hooks attached and variously called a "Brail," "dredge," or "crow-foot dredge" by those engaged in the commercial gathering of naiads. This device was slowly drawn along the river bottom in areas known to contain this species. However, use of SCUBA and skin diving equipment proved to be a more efficient method of collecting. Seeing the exact position of each specimen in its natural environment and collecting many more small specimens were definite advantages experienced by the collector using diving equipment.

Specimens were collected, pegged, and preserved in a ten percent formalin solution containing a buffering agent. The soft parts were later separated from the shells, sectioned through the gonadal region to determine the sex and numbered to correlate with the shell. Dimensions in millimeters were recorded of each shell including length, width, and height.

The anatomy was studied on both the gross and microscopic levels. Transverse sections were taken at regular intervals throughout the length. Similarly, sagittal and frontal sections were taken throughout the width and height respectively. Also, serial sections of organ systems have been made to best describe histological detail. Histological detail has not previously been described in this naiad. Special attention has been given to the histology of each organ and its parts.

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