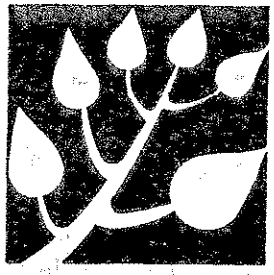

# Biology Section

## Comparisons of Shell Dimensions and Viscera Mass Weights in *Lampsilis radiata luteola* (Lamark, 1819)*

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**Abstract**

Relationships of shell weight, size and wet and dry viscera weights were computed for *Lampsilis radiata luteola*. The highest coefficient of correlation for males was recorded for wet vs. dry viscera weight (0.9664) and the lowest for shell weight vs. viscera wet weight (0.4998). The highest coefficient of correlation for females was recorded for shell weight vs. wet viscera weight (0.8453) and the lowest for shell weight vs. dry viscera weight (0.5510). Regression analyses were calculated for each of eight shell and viscera comparisons.

### Introduction

The Northern Fat Mucket, *Lampsilis radiata luteola* (Lamark, 1819), is a relatively common freshwater bivalve species whose range extends from the Mohawk Valley of north central New York west and south to the northern Ozark Plateau of Missouri (Stansbery, 1960). This mussel may be collected from large rivers with all types of bottoms except boulders and clay (Van der Schalie, 1938; Paramalee, 1967). While once an important part of the pearling industry (Wilson and Clark, 1914), the importance of *Lampsilis* species is now relegated to serving as a food source for mammals such as muskrat and raccoon.

*Lampsilis radiata* has been studied for its possible role as an environmental indicator (Green, 1972). Moreover, it may indicate types of fish

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present since at least eight species of fish are known to serve as hosts for the glochidia (Baker, 1928).

The present paper is an attempt to determine whether data relating to selected length-weight relationships of *L. r. luteola* would be useful in estimating the biomass of natural or cultivated populations of the Northern Mucket.

## Materials and Methods

Thirty *Lampsilis radiata luteola* individuals (15 males and 15 females) were collected from Beech Fork of Twelve Pole Creek, Wayne County, West Virginia (U.S. Geological Survey Map, Lavalette, West Virginia, SW/4 Huntington 15′ quadrangle, N3815-W822-5/7.5 in a grid framed by $^{42}41 - ^{42}42$ and $^{3}74 - ^{3}75$) on 30 July, 1974. The collection area was characterized by gravel of a wide range in size overlying a base of sand and silt.

Mussels were collected by hand, placed in a container, and transported to the laboratory. Each *L. r. luteola* individual was measured for length, the greatest distance measured on a line perpendicular to a line forming a right angle with the hinge site; height, a line forming a right angle with the hinge site; width, the greatest shell dimension from the right to left valve; and weight, the mass of the entire living animal. A scalpel was then inserted between the valves and the anterior and posterior adductor muscles were severed. The visceral mass was removed from each clam, blotted dry on a paper towel, weighed and recorded as the wet weight. The wet weight samples were then placed in an oven to dry at 70C. After a 48 hour period the samples were removed from the oven, weighed and recorded as dry weight. Shells were blotted dry and allowed to dry thoroughly at room temperature before weighing. All weights were recorded to the nearest tenth of a gram on a triple beam balance.

## Results and Discussion

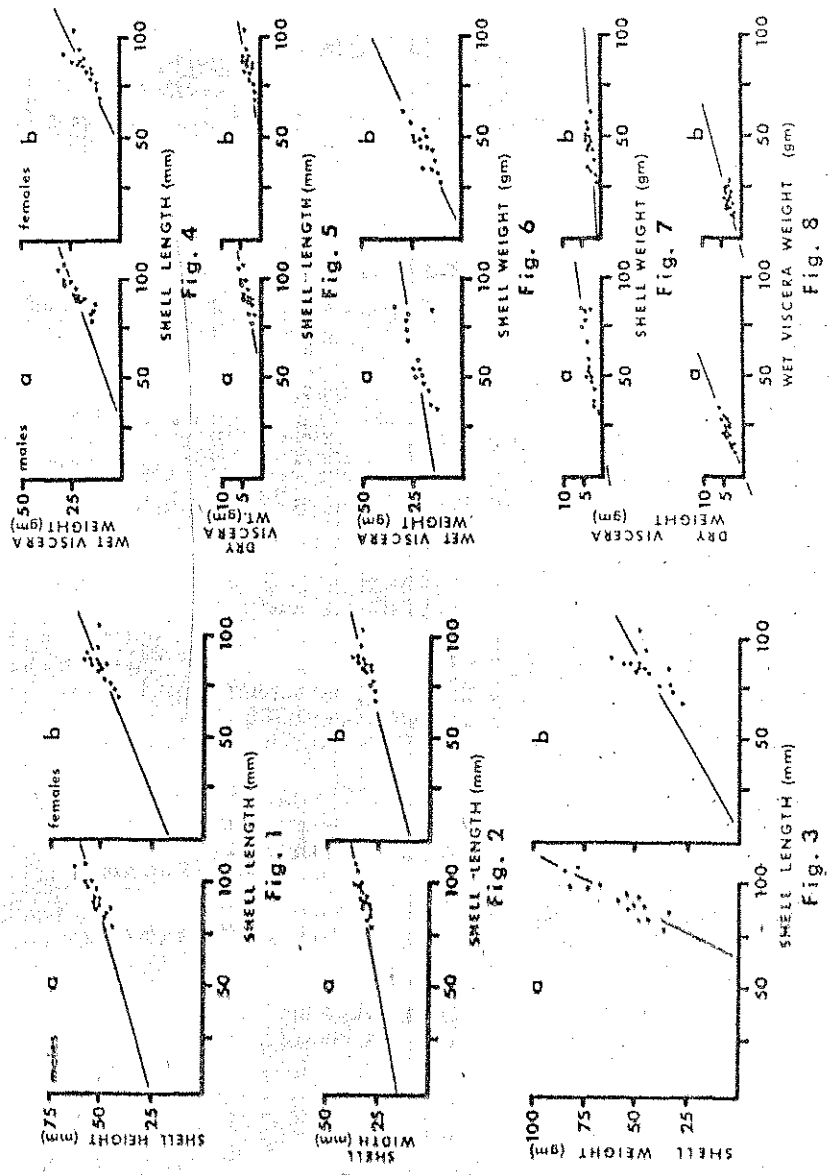
Coefficients of correlation were calculated for eight different relationships pertaining to shell size and weight, and viscera weight for both male and female *Lampsilis radiata luteola* (Table 1).

The highest coefficient of correlation for males (0.9964) was recorded for wet viscera weight vs. dry viscera weight and the lowest (0.4908) for shell weight vs. wet viscera weight. With the exceptions of the above mentioned relationships the remaining coefficients of correlation for males confined within a rather narrow range (0.5569 - 0.6983; mean 0.6630). Closely grouped r-values indicate a rather uniform shell configuration in male *L. r. luteola*.

For all relationships, females were shown to have a broader range (0.5510 - 0.8453; mean 0.7253), therefore considerable variation in shape and weight was demonstrated.

The relationships most indicative of sexual dimorphism were: 1) length vs. height, where the male shells were ellipsoid and the female shells were triangular, and 2) wet viscera weight vs. dry viscera weight, where variations in size of the female's marsupium account for the lower coefficient of correlation.






FIGURES 1 through 8. Scatter diagrams depicting various relationships between shell dimensions and weight, and wet and dry viscera weights of *Lampsilis radiata luteola* males (a) and females (b). Each point represents a single individual.