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ABSTRACT

Several characteristics of the clam, Mulinia lateralis *(Say) (Family: Mactridae), make it adaptable for use in studies of shellfish genetics. It has a short generation period (approximately 60 days), a relatively high reproductive rate (3 to 4 million eggs at a single spawning), reasonable longevity (2 years), sex differentiation is readily discernible through the shell in live specimens in ripe gonad condition (eggs are pink to red to orange and sperm are white), is relatively easy to culture, is small (adults 2.7 to 20.0 mm long), and requires little space for rearing.*

Most commercial mollusks, such as the American oyster, *Crassostrea virginica*, the hard shell clam, *Mercenaria mercenaria*, the surf clam, *Spisula solidissima*, and the soft-shell clam, *Mya arenaria*, require a year or more to attain sexual maturity, have no externally distinguishable sex differentiation, and at least some are presumably protandric. To keep significant numbers of these mollusks under controlled conditions, as required for genetic studies, considerable food, space and flowing sea water are needed.

Mulinia lateralis (Say) (Family: Mactridae), commonly known as the coot or little surf clam, has a number of characteristics that could make it useful for determining genetic principles of shellfish. Factors which make it an efficient organism for such study include: (1) short generation time, (2) sex differentiation readily discernible through the shell in live specimens in ripe gonad condition, (3) relatively high reproductive rate, (4) ease of culturing, (5) small space requirements and (6) reasonable longevity. (See Calabrese, 1969, for supporting data.)[1]

I determined from laboratory experiments that *M. lateralis* has a very short generation time. In one experiment fertilized eggs were obtained on 31 October and some clams of this new generation released viable gametes on 8 December, just 39 days later. Usually, however, *M. lateralis* were reared from fertilized egg to sexual maturity from 51 to 135 days, and 60 days was the average generation time. It is conceivable that under ideal conditions a new generation can be established approximately every 39 days.

The eggs of this clam are pink to red to orange and sperm are white; thus, when these clams are ripe the coloration of the gonad, due either to eggs or sperm, is discernible through the thin shell in the umbone region. The gonad color seen through the shells of ripe individuals is the only evidence of sexual dimorphism. Although the maximum length of these animals is 15 to 20 mm, both male and female specimens as small as 2.7 mm were induced to spawn and released viable gametes. This production of eggs at such a small size also suggests that *M. lateralis* is not protandric as are certain other bivalve species.

The fecundity of *M. lateralis* is high, as judged by the number of eggs discharged by individual females at a single spawning, although variable. The number of eggs released appears to depend upon the size of the animal and the degree of development of the gonad at the time of spawning. The greatest number of eggs released by a single female was about 7 million, but from the color of the gonad it was evident that not all

[1] Calabrese, A. 1969. The early life history and larval ecology of the coot clam, *Mulinia lateralis* (Say) (Mactridae: Pelecypoda). A dissertation submitted to the graduate faculty of the University of Connecticut in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

the eggs had been released. Usually, a single female released about 3 to 4 million eggs per spawning.

M. lateralis larvae were reared to metamorphosis in containers as small as 1 liter, but 15-liter containers are preferred. Approximately 250,000 larvae can be reared to metamorphosis within 6 to 8 days in 15-liter containers. Post-metamorphosed clams can either be reared in the same containers as were the larvae or transferred to small trays with running water facilities. Maximum development of fertilized eggs to straight-hinge larvae and maximum growth of larvae of *M. lateralis* from Long Island Sound occur at 20.0 and 27.5°C, respectively.

This little clam can be reared easily and with little effort and space under laboratory conditions by methods similar to those described by Loosanoff and Davis (1963). Thus, it can be readily observed at any stage of development. Even though these clams grow rapidly in the laboratory, they achieve faster growth if placed outdoors in boxes of sand kept in tanks of running water during the warmer period of the year. Several different populations can be established within the time period of 3 to 4 months.

The maximum longevity of this clam appears to be 2 years. Several areas of known populations of live clams were sampled yearly over a period of 5 years. It was noted that, after flourishing for at least 1 year, the numbers of live specimens decreased precipitously until practically none could be found. Several populations were also maintained in laboratory holding facilities for at least 1 year and survived a maximum of 2 years.

Because of these factors relating to efficiency of experimentation, *M. lateralis* would be an excellent choice for genetic studies of shellfish.

LITERATURE CITED

Loosanoff, V. L. and H. C. Davis. 1963. Rearing of bivalve mollusks. Advan. Mar. Biol. **1**:1-136.

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