

SURVIVAL AND GROWTH OF LABORATORY-REARED NORTHERN CLAMS  
(MERCENARIA MERCENARIA) AND HYBRIDS (M. MERCENARIA X  
M. CAMPECHIENSIS) IN FLORIDA WATERS

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ABSTRACT

The Florida State Board of Conservation delivered laboratory-reared "baby" clams, shipped by air from Milford, Connecticut, to eight locations on the Gulf and Atlantic coasts of Florida where interested persons planted them for growth studies. From mid-November 1960 to mid-June 1961, hybrid clams (Mercenaria campechiensis X M. mercenaria) grew in length from 0.125 inch or less to a maximum of 1.5 inch, and northern clams (M. mercenaria) grew from 0.25-0.5 inch to a maximum of 1.75 inch. This is faster growth than in northern states. Many clams were lost, or were killed by predators and unfavorable environmental factors such as low salinity.

INTRODUCTION

Recorded hardshell clam production began in Florida in 1880, increased significantly in 1908 with the exploitation of large clam beds in Collier and Monroe Counties near the Ten Thousand Islands, grew steadily until the peak year of 1932, remained at a high level through most of World War II and plummeted to a beginning low by 1950 with cessation of the clam industry in Collier and Monroe Counties. Since 1950 production has increased modestly. Table 1 shows production for selected years from 1880 to 1960 (taken from Fishery Statistics Digests, U. S. Fish and Wildlife Service).

The reason or reasons for the disappearance of the clam population in the Ten Thousand Islands area are obscure. Hurricanes, red tides, freshwater and mechanical harvesting have been blamed but nothing has been proved. Since the shutdown of the three canning plants at Marco in Collier County, Sarasota County has been the leading producer of clams on the west coast and in the state.

Invariably the densest concentrations of clams on the west coast of Florida are found on firm, sticky mud bottoms with an abundance of attached sea grasses, either Thalassia testudinum Konig, turtle grass, Diplanthera wrightii Ashers, Cuban shoalweed, or both.

<sup>1</sup> Contribution No. 58.

Table 1. Clam production in Florida (pounds)\*

Year	East Coast	West Coast	Total
1880	5,000		5,000
1908	57,000	182,000	239,000
1923	5,000	602,000	607,000
1930	49,840	661,736	711,576
1932	12,000	1,108,812	1,120,812
1940	6,700	701,100	707,800
1945	3,000	687,700	690,700
1950	900	4,440	5,300
1955	6,300	15,700	22,000
1960	2,134	23,893	26,027

\* 5.20 pounds of meat per U. S. Standard Bushel (Florida East Coast)  
8.00 pounds of meat per U. S. Standard Bushel (Florida West Coast)

Clam production on the east coast of Florida has been concentrated from Volusia County northward but yields have never approached the peak years of 1908 and 1930 since 1932.

In Florida waters clam growth is not normally interrupted by low winter temperatures. Consequently, clams reach marketable size more quickly than in temperate zone waters. With this knowledge and the prospect of decreased production in other areas and increased demand locally and nationally, interest in clams and clam culture has grown in Florida. The State has recognized the potential in planned aquaculture of clams, especially since the development of dependable techniques for culturing supplies of seed clams by Dr. Victor Loosanoff and his colleagues at the Milford, Connecticut, laboratory of the U. S. Fish and Wildlife Service.

## PROCEDURE

Dr. Loosanoff brought chilled baby clams in plastic bags to Miami by commercial airline on the night of 11 November, 1960; the clams were placed under refrigeration that night and delivered by two State airplanes the next day to three locations along the Atlantic (east) coast (Fig. 1) and to Tallahassee where Dr. Winston Menzel accepted a much larger quota for growth and other studies at the Oceanographic

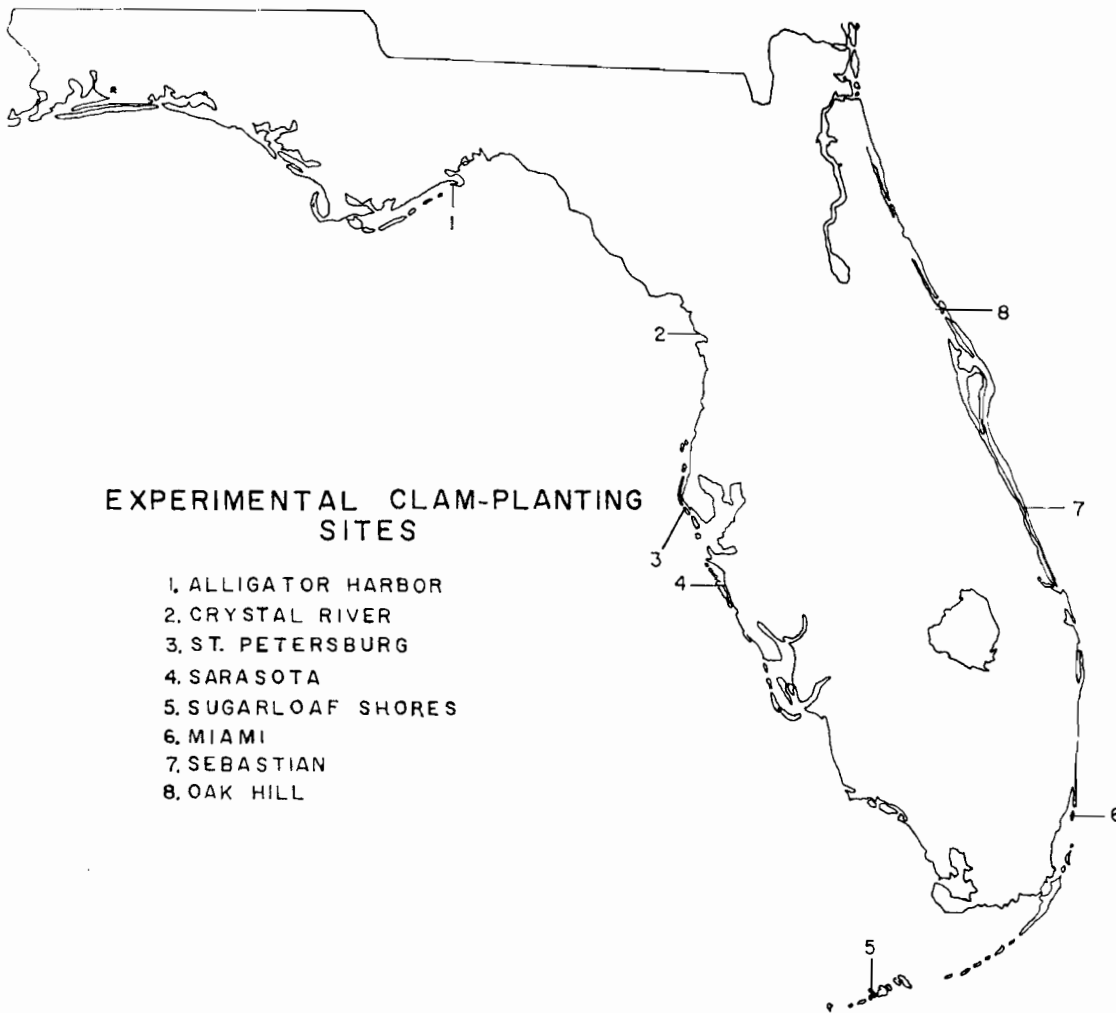


Fig. 1. Outline map of Florida showing places mentioned in text.

Institute of Florida State University. On 12 November 1960 the remaining baby clams were delivered by automobile to Sarasota and St. Petersburg. On 16 November 1960 half of the clams held in a bay at St. Petersburg were delivered by automobile to Crystal River.

Specifications prescribed by Drs. Menzel and Loosanoff for building screened-top boxes to protect the baby clams against predation had been sent to all prospective recipients. Only those who had built the boxes received clams, excepting Durbin Tabb, Biologist, University of Miami Marine Laboratory, who requested some to seed directly in a small tidal lagoon near the laboratory.

Each recipient received about 600 Mercenaria mercenaria (0.25 to 0.5 inch) and 2000 hybrids, male Mercenaria campechiensis x female Mercenaria mercenaria (0.0625 to 0.125 inch). The six locations chosen (except Crystal River) were ones where water salinities would not be expected to be less than 20 o/oo, the recommended minimum for clams.

Separate discussions of locations and results follow (see map, Fig. 1).

## RESULTS

Alligator Harbor (Franklin County): Dr. Winston Menzel received a grant from a seafood company for a cost feasibility study of raising hatchery clams to marketable sizes. Results at Alligator Harbor will be reported at a later date.

Crystal River (Citrus County): D. C. Crawford, vocational agricultural teacher, and his students at the local high school placed their clams in Crystal Bay, between the more saline waters of the open Gulf and Crystal River. Recorded salinities have ranged from 13.0 o/oo to 28.0 o/oo. On 16 November 1960 when the clams were placed, the salinity was 17.0 o/oo. Unfortunately, all but one box was lost and the clams in this were badly depleted by accidents in handling, so that results have been inconclusive.

St. Petersburg (Pinellas County): Bonnie Eldred, Biologist, Florida State Board of Conservation Marine Laboratory provided space for baby clams under the dock at her Madeira Beach home on the western shore of Boca Ciega Bay about one-quarter mile north of Johns Pass that connects to the Gulf of Mexico and assures a good tidal flow. Depending on tides, water depths range from one to four feet.

Salinities are very constant and rarely go below 30.0 o/oo or above 34 o/oo. The hybrid clams tripled or quadrupled in size and the northern hardshells doubled in size by 19 February 1961 when they were shifted to extra boxes to prevent overcrowding. Mortality was negligible and virtually confined to M. mercenaria at that time. Water temperatures had increased markedly during a record-breaking heat wave during February 1961. By the middle of June 1961 the hybrids had grown to maximum lengths of 1.5 inch, the northern hardshells to 1.75 inch. Approximately three-quarters of the hybrids had survived but one-half of the northern clams were lost when the screened lid of one box was dislodged and the clams were washed out or eaten by predators. A number of young clams have been found in the bottom near the boxes. They are larger than the ones in the boxes and presumably are the northern clams that were lost since there were no clams in this area previously.

Sarasota (Sarasota County): Ralph Davis, a planning and recreational specialist for Sarasota County, placed his quota of clams in a small salt-water pond behind his home on the eastern shore of Little Sarasota Bay. Mr. Davis had previously studied clam culturing techniques for two weeks at Milford, Connecticut. Baby clams that he had brought from Milford grew about one inch from 1 April 1960 until 5 August 1960 when they were killed by sudden freshwater intrusion into the small pond. Salinities generally range from 27.0 o/oo to 31.0 o/oo in this section of Little Sarasota Bay. By the middle of June 1961 hybrids planted 12 November 1960 had grown to maximum lengths of 1.5 inches and northern hardshells to maximum lengths of 1.25 inches. Since then some of the clams have been placed on the open bottom and enclosed by chicken wire. These clams appear to be growing faster than the ones remaining in protective boxes.

Sugarloaf Key (Monroe County): John Sammy, a crawfish fisherman, placed his quota of clams at the tidal cutoff between Sugarloaf and Saddlebunch Keys about 10 miles ENE of Key West. This location beside the Straits of Florida has near oceanic salinities and no fluvial drainage. On 30 May 1961 Sammy reported that he had found 10 or 12 large brown worms, six to eight inches long, but no hybrid clams or even dead shells in the protective boxes that were tight and intact with hardware cloth screening. Of his original 600 northern hardshell clams, 278 were still alive and ranged in length from 0.3 to 0.7 inch.

Miami (Dade County): The clams that were seeded in a small tidal lagoon without protective boxes apparently did not survive predation. During a check made in April, biologists from the University of Miami failed to find even single valves at Virginia Bay.

Sebastian (Indian River County): Mr. L. L. Fraunfelder, an engineer at the Cape Canaveral missile-testing center, placed his quota of clams on 12 November in the Indian River just north of the Sebastian River bridge on U. S. 1. Seven days later 50 per cent of the hybrids and 10 to 15 per cent of the northern hardshells were dead. No dead clams were found on 26 November. Salinities in this section of the Indian River range from 21 to 29 o/oo. By the middle of June hybrid clams had grown to maximum lengths of 1.25 inch and northern hard clams had grown to lengths of 1.375 inch. The sand was changed regularly to rid the protective boxes of crabs that had apparently entered when very small.

Oak Hill (Volusia County): Norman Jeffries, a veteran oyster-man from New Jersey, placed his quota of baby clams near his Indian Mound Fish Camp at the northern end of Mosquito Lagoon, about 13 miles south of Ponce de Leon inlet that lies between Daytona Beach and New Smyrna Beach. Salinities generally range from 23.0 o/oo to 32.0 o/oo unless there are torrential rains and large upland runoff such as accompanied hurricane Donna and lowered salinities enough to kill oysters. Clam growth was measured on 19 January 1961 and it was found that the hybrid clams had grown as large as the northern hard clams, which had nearly doubled in size themselves. By 15 May 1961, the hybrids and northern hard clams had grown to one inch in length. Five hundred of the northern hard clams and 1800 of the hybrids were still alive.