



Aquaculture Production Potential

THE SUNRAY VENUS CLAM *Macrocallista nimbosa* is a large, attractive, native clam distributed from South Carolina to Florida and the Gulf of Mexico states. During the 1960-70s, two million pounds of these clams were harvested in the Panhandle region of Florida. However, insufficient natural stocks of sunray venus clams, as well as the small size of the fishing grounds, limited the development of the fishery. This prior fishery, market and potential growth rate makes the sunray venus clam a logical choice as a new candidate species to expand and diversify the hard clam *Mercenaria mercenaria* aquaculture industry in Florida.

Over the past five years, research and extension faculty at the University of Florida and Harbor Branch Oceanographic Institute at Florida Atlantic University, along with industry project partners, have developed, tested, and demonstrated technical methods to culture the sunray venus clam. The project team used culture methods standard to those employed by the Florida hard clam culture industry as a starting point. Accomplishments for each culture stage follow:

- ▶ **Hatchery** – Wild broodstock were collected from the west coast of Florida, conditioned, and spawned by thermal shock.

ALSO IN THIS SERIES

- ▶ Consumer Acceptance of Cooked and Raw Clams
- ▶ Sensory Profile
- ▶ Shelf Life Assessment
- ▶ Nutritional Profile



Sunray venus clams harvested after 12 months in the growout culture stage reach about 2" in shell length.



An industry project partner plants sunray venus juveniles for evaluation on a commercial shellfish aquaculture lease.

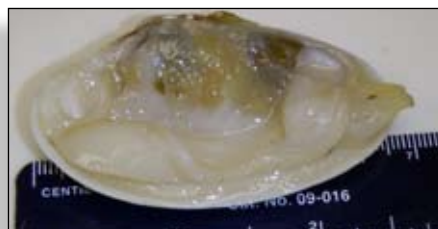
Comparison of Cultured Sunray Venus Clams to Hard Clams

Clam Species	Shell Width	Shell Length	Total Weight	Meat Weight (wet)
Sunray venus	26 mm (1")	68 mm (2.7")	42 g (11/lb)	11.4 g
Hard clam	25 mm (1")	48 mm (1.9")	34 g (13/lb)	4.4 g
Sunray venus	20 mm (0.8")	54 mm (2.2")	21 g (22/lb)	5.1 g
Hard clam	20 mm (0.8")	36 mm (1.4")	16 g (28/lb)	2.1 g

The sunray venus clam is oblong in shape, whereas the hard clam is round. Thus, harvest sizes of the sunray venus may differ from those typical for the hard clam. Two commercial sizes (1", or littleneck, and 7/8" in shell width or thickness) of the hard clam are compared with harvest data obtained in rearing trials for the sunray venus clam in the table above. Note that for the same size clam in terms of shell width, the meat of the sunray venus weighs about 2.5 times more than the meat of a hard clam.

- ▶ **Larval Rearing** – Larvae were reared under controlled hatchery conditions through setting. Pediveliger stage (approx. 0.2 mm in shell length, SL) was reached in seven days at water temperatures of 78–82°F and salinities of 28–30 ppt.
- ▶ **Post-set Rearing** – Post-set were reared in downwellers under controlled conditions with a 46–63% return. Sunray venus, about 2 mm in SL, were obtained after two to three months of culture at water temperatures of 74–82°F and salinities of 28–30 ppt.
- ▶ **Land-based Nursery** – Juveniles (2 mm SL) were reared under flow-through conditions in raceways at densities of 1,000–2,500/ft². After two months, sunray venus reached 8 mm in SL with a return of 85–91% at water temperatures of 74–88°F and salinities of 26–28 ppt.
- ▶ **Field Nursery** – Juveniles (8 mm SL) were reared under open-water

- conditions in polyester (3 mm mesh) bottom bags at densities of 330–550/ft². After four months, sunray venus reached 24–26 mm in SL with a return of 88–90% at water temperatures of 61–82°F and salinities of 22–28 ppt.
- ▶ **Growout** – Juveniles (25 mm, or 1" SL; 10 mm shell width, SW) were reared under open-water conditions in polyester (9 mm mesh) bottom bags at densities of 38–62/ft². After 12 months, sunray venus reached 48–58 mm (1.9–2.3") in SL and 20–22 mm (0.8") in SW with survivals ranging from 67–82% at water temperatures of 61–86°F and salinities of 22–30 ppt.



Sunray venus meat at harvest.

Summary

Results from rearing trials are commercially acceptable. Overall survival of sunray venus clams cultured in bags under field conditions (nursery and growout) was 67–72%. Using production data from these trials, clams can reach potential market-size in 20–21 months from spawning, whereas it takes about 24 months to obtain similar-sized hard clams. Production performance is dependent on relatively high and steady salinities in all culture stages, and a sandy substrate in the field nursery and growout stages.

Current trial production efforts appear successful. To date, spawning, larval and post-set rearing, land-based nursery, field nursery and growout culture methods for sunray venus clams are exhibiting little difference from hard clam methods and should not be beyond the capacities and capabilities of most shellfish growers in Florida.



THIS COMPONENT OF AN INTEGRATED RESEARCH AND EXTENSION PROJECT EVALUATING THE AQUACULTURE AND MARKET POTENTIAL OF THE SUNRAY VENUS CLAM WAS CONDUCTED BY LESLIE STURMER AT THE UNIVERSITY OF FLORIDA, COOPERATIVE EXTENSION SERVICE, AND JOHN SCARPA AT HARBOR BRANCH OCEANOGRAPHIC INSTITUTE AT FLORIDA ATLANTIC UNIVERSITY, WITH FUNDING FROM THE FLORIDA SEA GRANT COLLEGE PROGRAM.