



Evaluation of the Sunray Venus Clam *Macrocallista nimbosa* for Aquaculture in Florida

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Background

- Florida bivalve aquaculture production: \$0.4M in 1987, \$18M in 2001, \$10M in 2005
- Based “solely” on hard clam
- Diversifying product line may avoid economic, marketing, and disease problems
- Different species have been examined (e.g. angel wing, bay scallops, ark clams)
- New species: Sunray Venus





Background



- Attractive large (up to 6" SL) clam distributed from SC to FL
- Targeted species for commercial harvest in 1960s along west coast
- Harvest halted due to spotty distribution, limited fishing grounds
- Natural growth rate experiments suggested fast grower
 - (3", 40 g in 12 months)



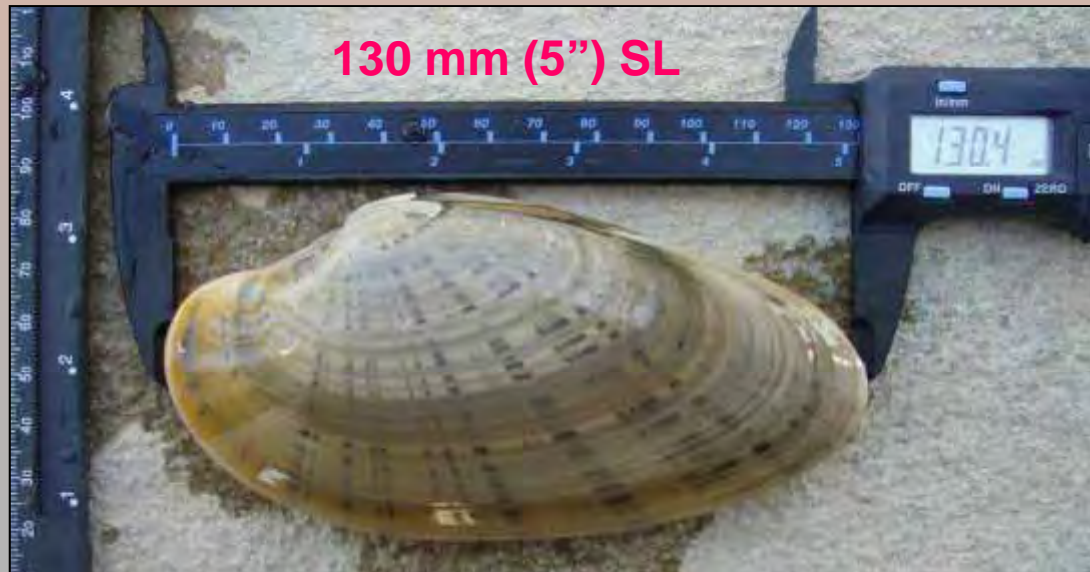
Shell pile at Apalachicola processing plant
Photo courtesy of Florida State Archives

Objective

- Utilize current hard clam methods as a starting point to:
 - 1) Identify spawning methods
 - 2) Establish hatchery protocols
 - 3) Examine nursery culture
 - 4) Grow a test group
 - 5) Test market acceptance



Broodstock



Broodstock



Wet Shipping

Dry Shipping



Broodstock

1:1 sex ratio



< 10% mortality after 1 week

Spawning



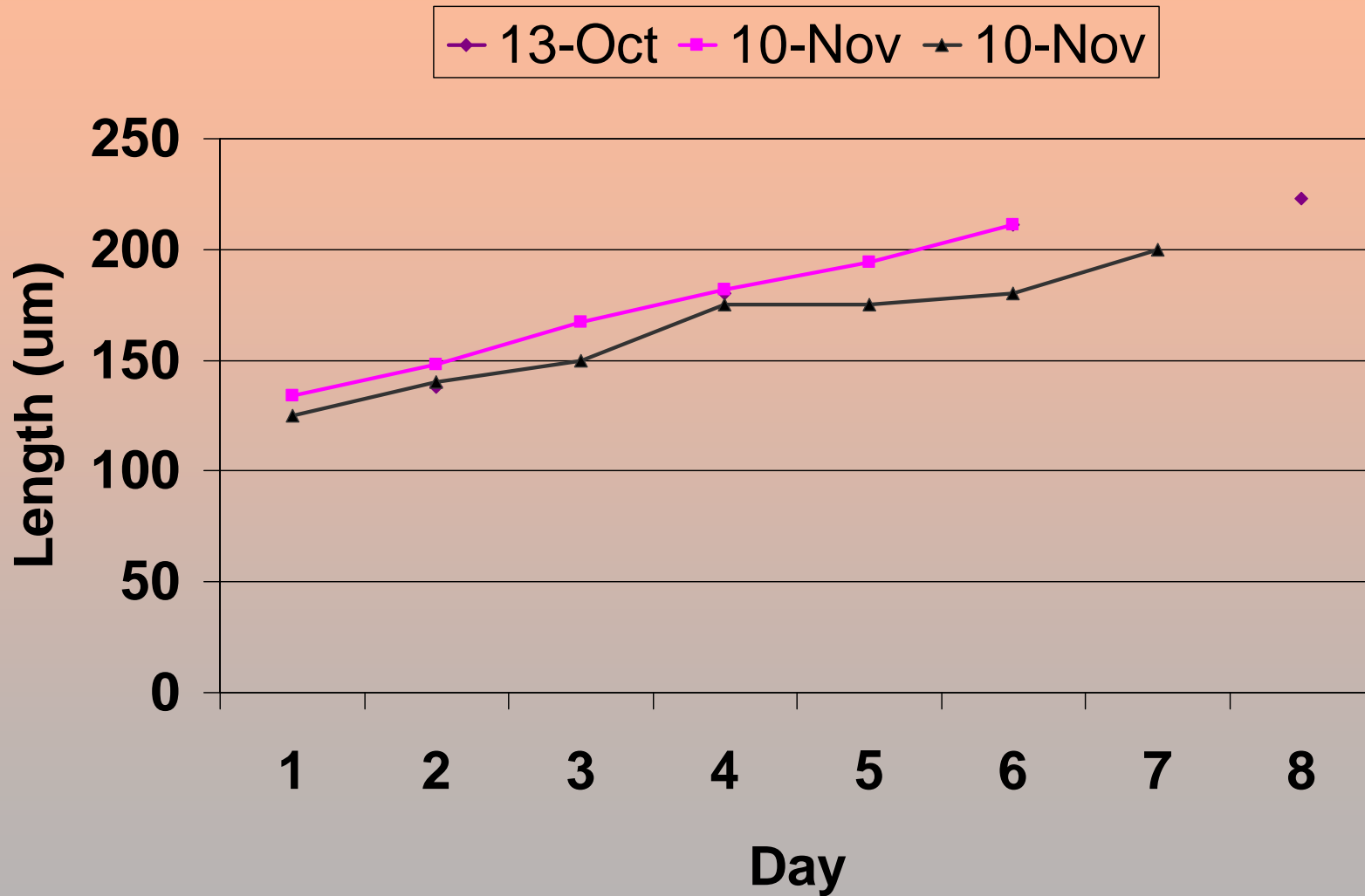
Thermal Shock -
(increase 10°C)
Dissected sperm addition
Serotonin injection -
(0.4 mL 2mM)



Larvae Culture

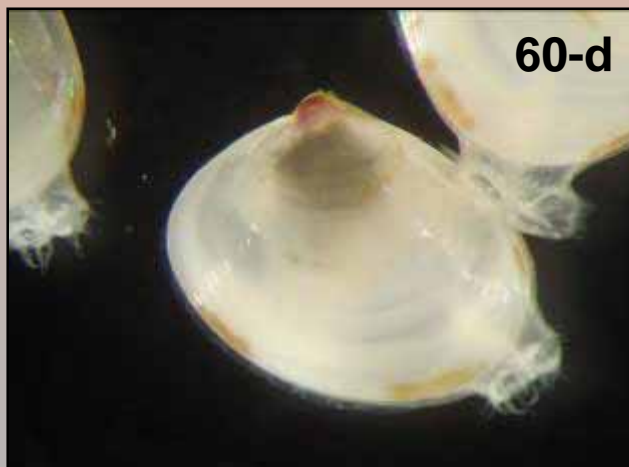


Larval Growth



Survival: 13 Oct: - 13% ??, 10 Nov HBOI – 88%, 10 Nov UF – 85%

Larval Culture



Post-Set Culture



No Substrate
Aragonite (0.5-1.0 mm)
Sand (<0.5mm)

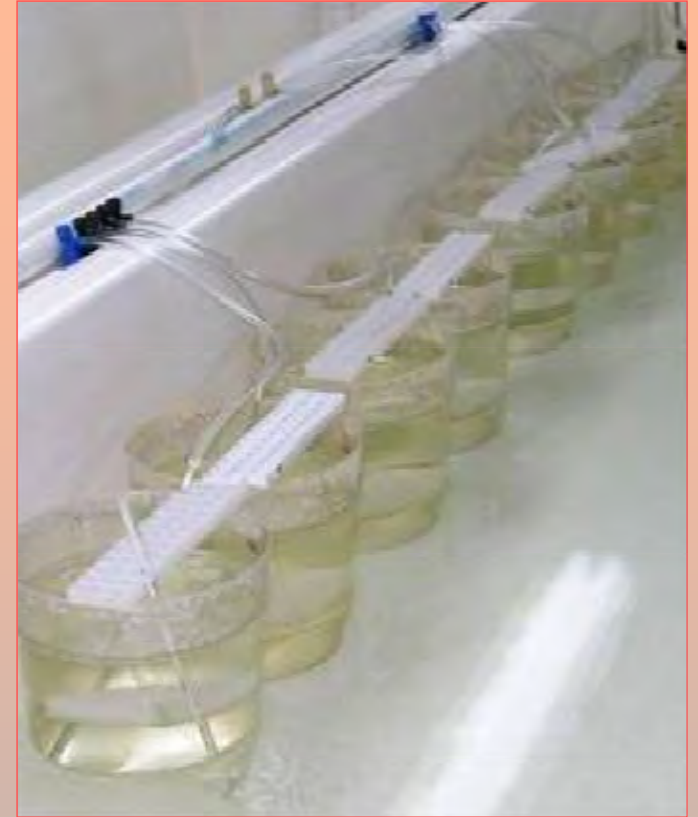
Post-Set Culture

- First Exp: (n=1)
 - Sand: **100%**
 - Aragonite: 71%
 - No Substrate: 49%
 - Total: 32,000 juveniles
 - 63% return
- Second Exp: (n=3)
 - Sand: 58%
 - No Substrate: 35%
 - Total: 454,000 juveniles
 - 46% return



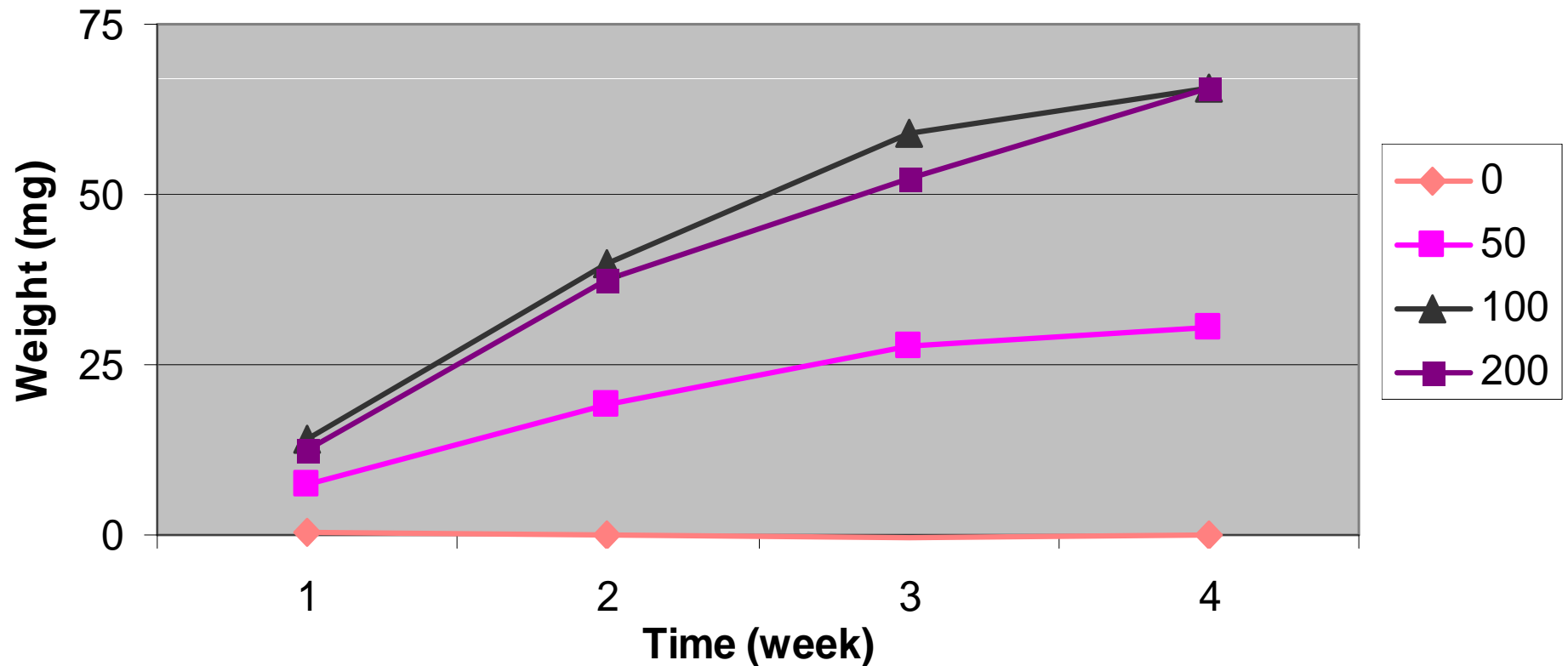
Feed Experiment

- Triplicate 4-L beakers
- 24 clams/beaker
(42 ± 3 mg/clam)
- Fed T-Iso, twice/day
(0, 50, 100, 200K cells/mL)
- Salinity ~30 ppt
Temp 73-84°F



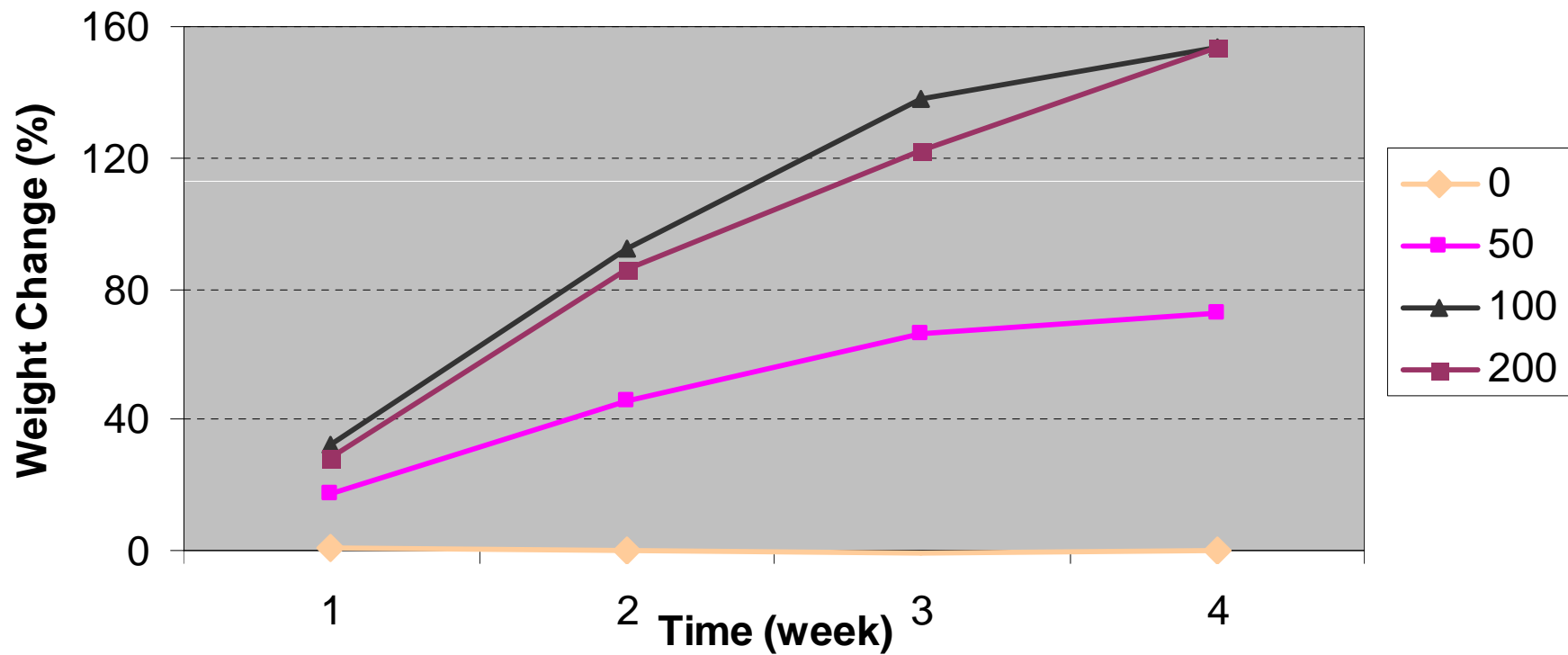
Feed Experiment

Sunray Total Growth Fed Different Concentrations of Microalgae



Feed Experiment

Sunray Total Growth (%) Fed Different Concentrations of Microalgae

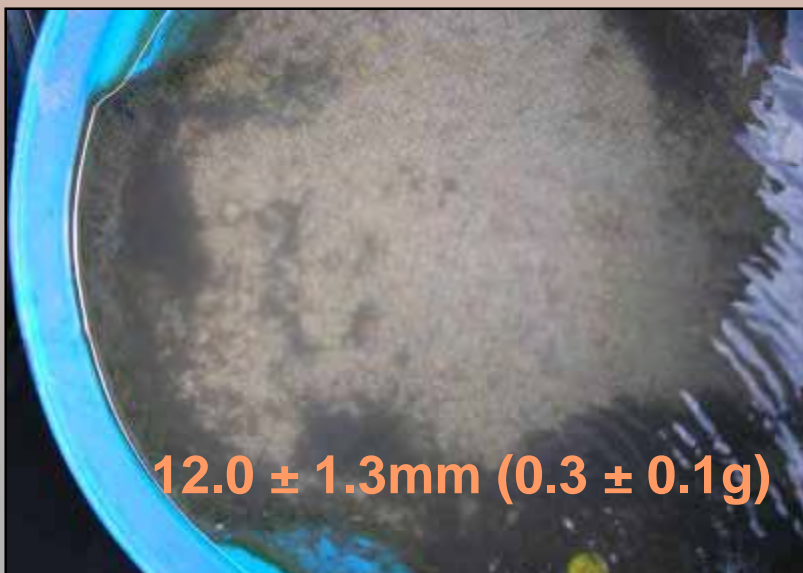
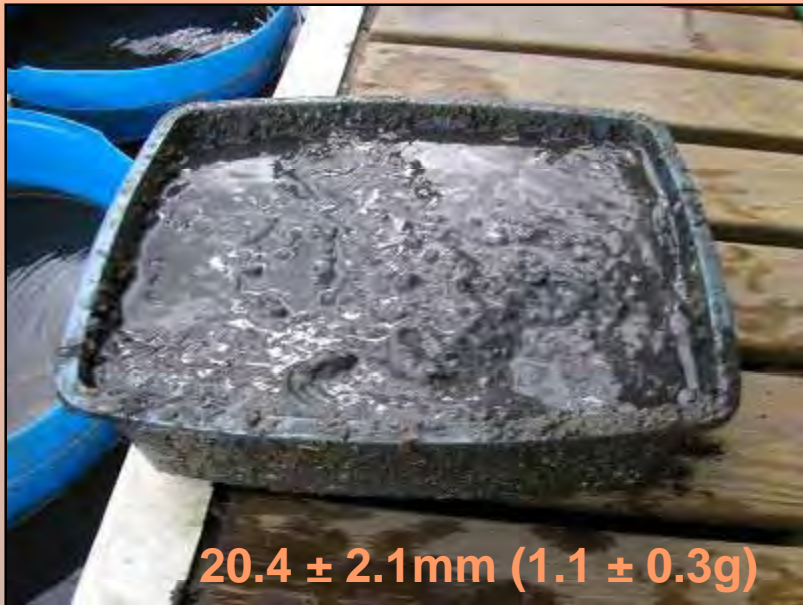


Land-based Nursery



37/mL at 17,200/m² (1600/ft²)

Land-based Nursery (4 months)



Land-based Nursery



118,000 seed available for field nursery trials

Field Nursery – Bottom Bags



Nursery bags (3' by 4') made of
4 mm polyester mesh material

Stocked at densities of 332 – 554/ft²
Nursery periods of 78 – 128 days



Field Nursery - Cages



Nursery cages (3' x 1.5' x 6" deep)
constructed of wire and lined with
4 mm polyester mesh material

Stocked at densities of 100 – 375/ft²
Nursery periods of 42 – 119 days



Field Nursery Results

Site*	Sieve (mm)	System	Density** (#/ft ²)	Survival (%)	Growth (mm/month)
AH	>9.0	Cage	200	94	6.5
AH	>9.0	Cage	100	69	5.9
AH	>6.7	Cage	222	70	5.3
AH	>6.7	Bag	332	78	3.4
AH	>5.0	Bag	554	32	5.0
CK	>6.0	Cage	375	82	4.1
CK	>4.0	Bag	441	90	3.9

* AH – Alligator Harbor, CK – Cedar Key

** Density of 4' x 4' nursery bag stocked at 10,000 hard clams = 625/ft²

Field Nursery Results



Approximately 75,000 juveniles (22-28 mm SL) nursed for growout trials during June – December 2007

Growout



Growout bags (4' x 4') made of 9 mm polyester mesh material



Growout bags (4' x 4') made of 9 mm polyester mesh material with internal 1"- and 1 ½"-PVC pipe frames, covered with plastic netting



Several growout systems being evaluated

Growout



Growout cages (3' x 3' x 6" deep') constructed of wire and lined with 9 mm polyester mesh material



Bottom plant (4' x 8') covered with 9 mm polyester mesh material and chicken wire

Several growout systems being evaluated

Growout



Evaluating stocking densities* ranging from 38 to 70/ft²

* Hard clams planted at 1200 per 4' x 4' bag = 75/ft²

Growout



Measuring at intervals the following parameters:

- Growth – SL, SW, SH, weight, meat weight
- Survival
- Condition Index
- Histology





Summary

- **Sunray Venus clams were successfully:**
- Collected and transported broodstock
- Spawned for first time under controlled conditions in hatchery
- Cultured through setting, land-based and field nursery
- Methods similar to hard clam
- Growout to “marketable-size” proceeding

What's Next?

- Harvest test plants
- Determine shelf life
- Evaluate “grit” pocket and “degritting” methods
- Test market acceptance
 - Chefs
 - Restaurants
 - Sushi market sector
- Determine salinity and temperature preferences for seed sizes
- Characterize economics



Sunray Venus Clams!



Acknowledgements



- **Supported by Florida Sea Grant (R/LR-A-44)**
- **Many, many people who assisted in collecting and caring for the clams:**
 - Eric Cassiano, Chuck Mulligan, Reggie Markham (UF)
 - Ewan Leighton (Leighton Clam Co.)
 - Kevin Reinecke (Blue Acres)
 - John Stevely, Don Sweat (UF Sea Grant)
 - Van Lewis, Johnny Sheridan, Andy Arnold
 - Chris Taiani, (Big 'T' Clams)
 - Fred Prah, Kyrstal Baird (HBOI)
 - and those we have missed