6-1-2000

# Clam Strain Registry

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## Recommended Citation

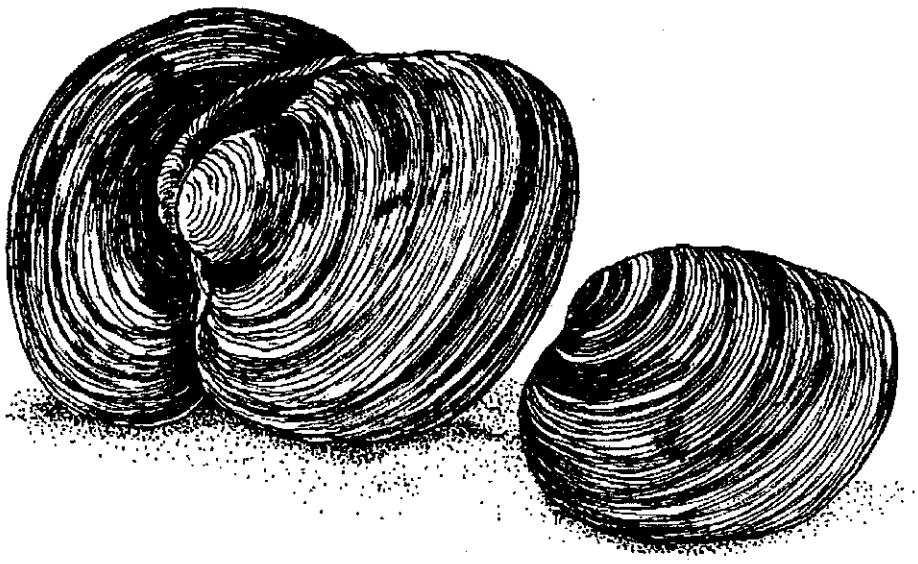
Gallivan, T., & Allen, S. K. (2000) Clam Strain Registry. Marine Resource Advisory No. 72; VSG-00-10. Virginia Institute of Marine Science, College of William and Mary. http://dx.doi.org/doi:10.21220/m2-2qpb-7758

Aquaculture
genetics & breeding technology

# Clam Strain Registry



Tom Gallivan and Stan Allen
Aquaculture Genetics and Breeding
Technology Center
Virginia Institute of Marine Science



Sea Grant
Virginia

WILLIAM & MARY
VIMS
VIRGINIA INSTITUTE OF MARINE SCIENCE
SCHOOL OF MARINE SCIENCE

This document was published by the
Virginia Institute of Marine Science, School of Marine Science,
College of William and Mary, Gloucester Point, Virginia 23062.

Virginia Sea Grant Marine Resource Advisory No. 72
VSG-00-10
June 2000

This work is a result of research sponsored by NOAA Office of Sea Grant, U.S. Department of Commerce, under federal Grant No. NA56RG0141 to the Virginia Graduate Marine Science Consortium and the Virginia Sea Grant College Program.


# Clam Strain Registry

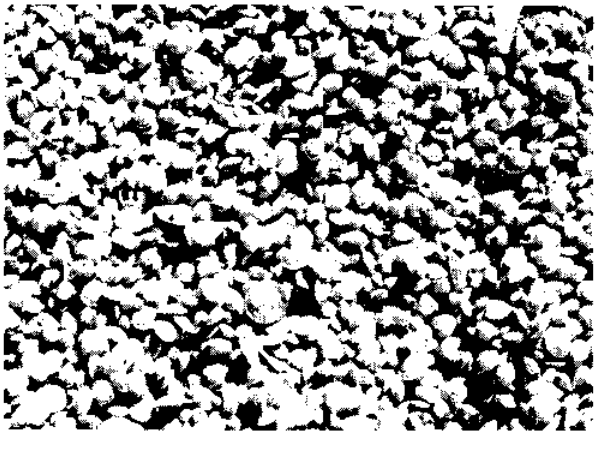
## Introduction

In 1998 the Aquaculture Genetics and Breeding Technology Center (ABC) at the Virginia Institute of Marine Science initiated the first phase of the Clam Breeding Project (CBP). The goal of CBP is to develop useful strains of hard clam, *Mercenaria mercenaria*, for the growing hard clam industry. The Clam Strain Registry is a product of the first phase of CBP. (See Clam Breeding Project mission statement.) Our goal eventually is to produce an annual ABC Hard Clam Brood Stock Catalog full of data on the performance of various lines in industry settings. (For example, see "2002 Hard Clam Brood Stock Catalog." on page 5.) Development of the Registry was funded by Virginia Sea Grant project development funds and ABC.

The Clam Strain Registry sprung from the need to know more about stocks that already have been developed through years of industry effort. In fact, everywhere hard clams are cultured, domestication is slowly marching on. Some of these domestication efforts have been more intentional than others. Even the most inadvertent domestication usually drives the performance of clams toward some endpoint that is perceived as beneficial to aquaculture. Therefore it is interesting to peruse the list of traits that have been emphasized by the users themselves.

Most of the data were collected by personal contacts made by Gallivan in his travels of the East Coast. Far more information was collected than is included here. Some of the information we deemed proprietary or site or situation specific; we have chosen to omit it. There was also a significant body of information exchanged relating to general *Mercenaria* culture. We sincerely thank these Industry Partners who took the time to share this with us.

Besides gathering the information for the Registry, the objective of Phase I of CBP was to acquire some of these stocks for further testing. Again, we are grateful to those Industry Partners who graciously provided brood stock - they range from Florida to Massachusetts. How did we decide which ones to evaluate and which ones not? We didn't. Members of the Virginia hard clam industry decided.



In 1999 ABC spawned nine clam lines in our hatchery located at the Eastern Shore Laboratory of VIMS. These lines have been planted on Industry Partner grounds primarily in Virginia for the time being. They will be tested head-to-head to evaluate the most promising lines for further breeding efforts. Through CBP we hope to define and refine

strains continually, while extending the body of data on their performance across environments. The Hard Clam Brood Stock Catalog would then be a compendium of data about various lines from which industry might choose those that perform well in their locale. This is common practice in agriculture. We have a long way to go before we reach the level of sophistication in modern day agriculture. We must start with baby steps.

A selective breeding program requires an incredible amount of resources. ABC intends to commit a significant portion of its own resources to the CBP, in particular the technical aspects. But ultimately, the future of the CBP relies not only on industry cooperation but also participation. So far industry participation has been enthusiastic. Hard clam culturists appreciate the analogies made with their counterparts in agriculture. You need only drive along any rural section of America to see marked test plots for corn, soybeans, wheat, or cotton. These test plots are intermingled with production crops for direct, on-site comparison. We aspire to this model. So if you see an ABC logo with cryptic acronyms, like MV99-x or ALC00-1, posted in the top of a piling, stuck into the mud on some coastal site, know that it is one or more of our test stocks and could one day be listed as a variety for you to ponder for this year's crop.

# Clam Breeding Project
# *"Building a Better Clam"*

## Project Mission Statement

The Clam Breeding Project (CBP) will facilitate the development of Virginia *Mercenaria mercenaria* aquaculture by applying needed genetic breeding practices to this growing industry. The project will evaluate the industrial value of currently available *Mercenaria* stocks and maintain the best of these. Controlled selective breeding and performance assessment of strains under various environmental conditions will provide the basis for farmers to select among a variety of clam strains.

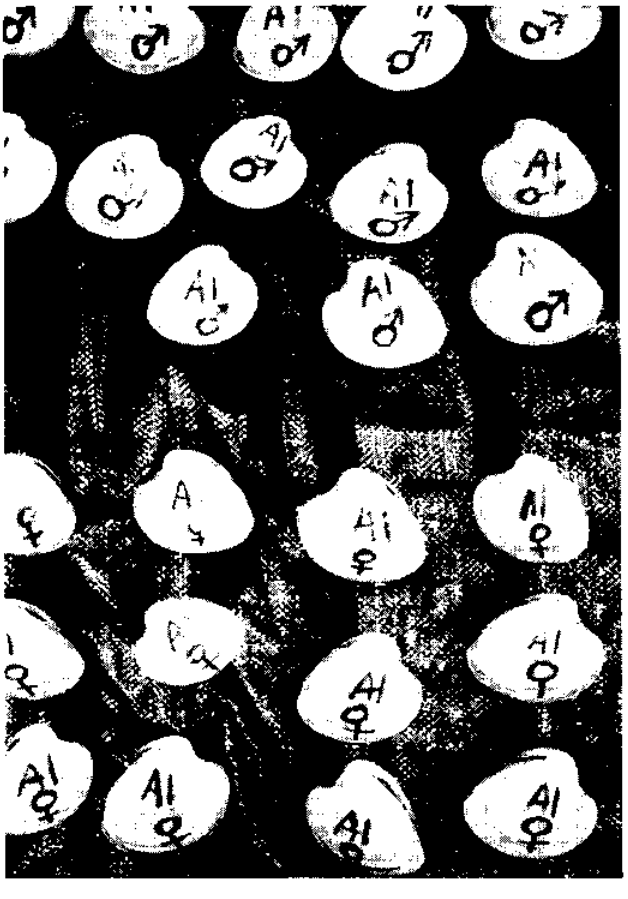
The CBP will continue the mutually beneficial relationship between VIMS, the Aquaculture Genetics and Breeding Technology Center (ABC), and Virginia's hard clam industry while aiming to bring cultured *Mercenaria* on par with it's agricultural counterparts.

### Phase I

The first phase of this project will create a registry of *Mercenaria* strains available to the Virginia aquaculture industry. The registry will describe all strains of *Mercenaria* of potential use to the Virginia aquaculture industry. This phase will establish relationships between ABC investigators and aquaculture industry partners.

### Phase II

The second phase of this project will evaluate a sub-set of brood stocks in head to head trials. Selection of strains was conducted from information obtained in Phase I and Virginia Industry Partner subjective input. Brood stock were obtained from Industry Partners and spawned in the ABC Hatchery located at VIMS Eastern Shore Lab in Wachapreague. After culture in commercial field conditions by the project's Industry Partners, ABC will evaluate performance of individual strains and convey this information to Industry Partners. Phase II will be a continuous effort marked by the maintenance of individual strains and the inclusion of novel strains of *Mercenaria* as they become available.

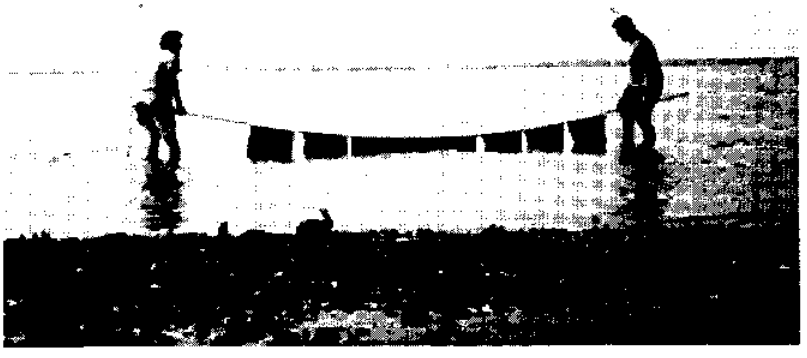


### Phase III

The ultimate objective is that of Phase III. CBP will create clam strains that perform well under various commercial conditions in Virginian waters. The testing program can be extended to growers

in other clam producing states through collaborative arrangements with other groups. The wider the testing program using common, genetically distinct strains, the more useful CBP becomes. Incorporation of intra and inter-strain selective breeding of the strains identified in Phase II will ultimately "build a better clam" for the aquaculture industry.

A continuing product of this Clam Breeding Project will be the "Hard Clam Brood Stock Catalog" analogous to current seed catalogs in agriculture. This catalog will report the environmental regime under which maximum performance of a strain was obtained and will allow the industry to select ABC brood stock accordingly.



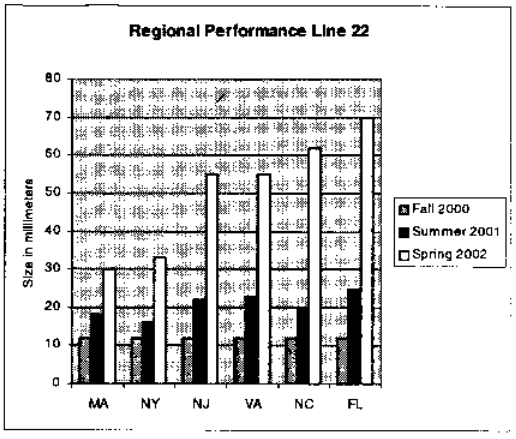
## Acknowledgments

Aquaculture Genetics and Breeding Technology Center
Virginia Sea Grant
VIMS Marine Advisory Service

# 2004 Hard Clam Brood Stock Catalog

### Aquaculture Genetics and Breeding Technology Center

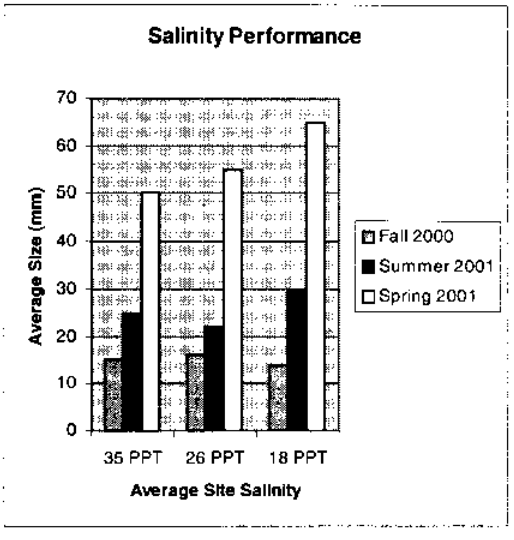
## Line 22 Performance Evaluation




**General Information:**
Line 22 is a second-generation ABC selectively bred line. The performance goal for this line is rapid growth in moderate salinity in the Virginia and North Carolina region.

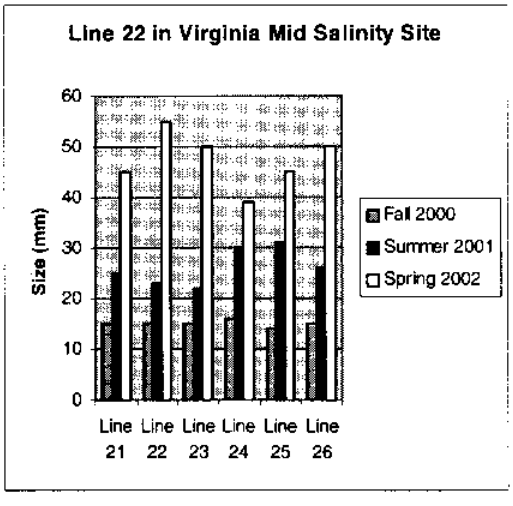
**Coloration:**
Line 22 has approximately 70% *Notata* marking; background color is generally white to very light brown. This coloration is also subject to environmental influences.

**Growth Rate:**
Line 22 is the third fasting growing line of the six lines ABC is offering this year overall. However, it is the fastest growing line in the lower mid-Atlantic lower salinity locations (~20-ppt.).




**Climate Performance:**
Line 22 was derived from Southern brood stock and is not recommended for grow-out North of Maryland. It is well suited for the southern Mid-Atlantic region. Growth of Line 22 in Florida was not as fast as Florida derived brood stock. (See ABC Line 25 information.)

**Salinity Performance:**
Line 22 has out-performed all other lines in <20ppt-salinity regime during the 2000-2002 grow-out.




**Disease resistance:**
Line 22 was found to have light QPX infections in higher salinity locations in New Jersey and Massachusetts. Since Line 22 is selected for lower salinity regions where QPX is absent, this should not concern growers in these areas.

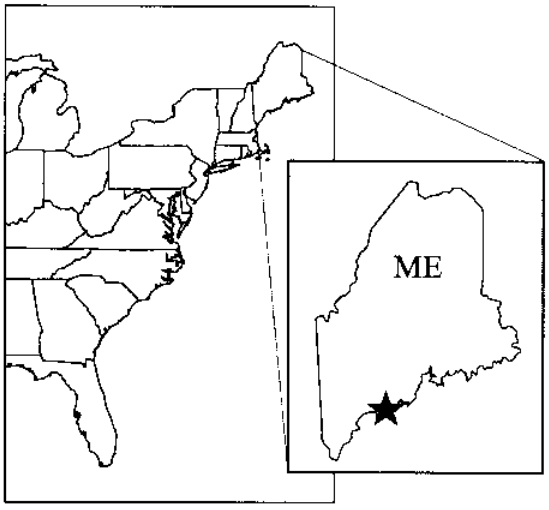
**Recommendations:**
ABC is pleased with Line 22 thus far. Line 22 is best suited for lower salinity areas in Virginia and North Carolina. All of ABC's lower salinity test sites were in sheltered bays or lower river mouths that are low energy environments. Site specific factors should be considered among lower salinity regimes.

# Industry Partners

## Pemaquid Oyster Company

Carter Newell & Chris Davis
RFD# 1
Box 149
Damariscotta, ME 04543
(207) 563-8440
carter@lincoln.midcoast.com

Chris Davis - contact
P.O. Box 302
Waldoboro, ME 04572
(207) 832-6067 - office
(207) 529-4460 - hatchery




**Type of Company:** Hatchery, seed sales, grow-out

**Strain(s) Maintained:** Wild Maine clams

**Number of Generations of Selection:** One

**Traits Selected For:** Growth

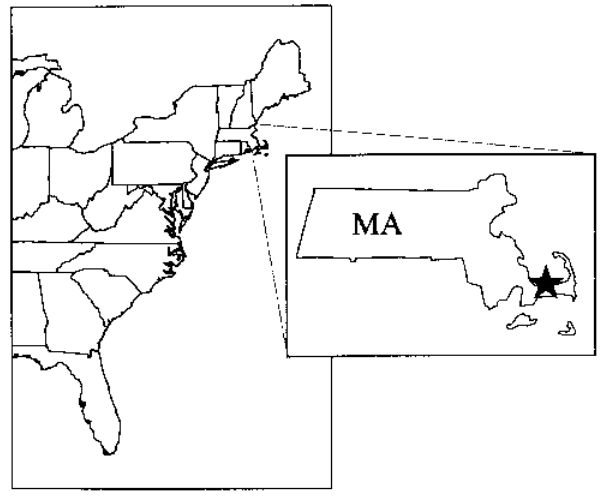
**Other Desired Traits:** Cold tolerance, growth, and disease resistance

**Comments:** Pemaquid Oyster is entering its third hatchery season after a number of years of oyster grow out in the Damariscotta River. They are interested in developing seed markets for hard clams in addition to their current oyster seed sales.

***This brood stock is available for the Clam Breeding Project, but not included in 1999 spawn.***

## Aquaculture Research Corporation

Richard A. Kraus
Aquaculture Research Corporation
P.O. Box 2028
Dennis, MA 02638
(508) 385-3933
(508) 385-3935 Fax




**Type of Company:** Hatchery, seed sales, grow out

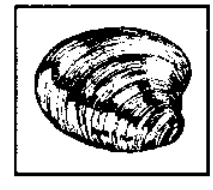
**Strain(s) Maintained:** ARC

**Number of Generations of Selection:** Since 1974, one stock has been maintained. Original stocks came from a mixture of three stocks:
1) Wild stock from Wellfleet and Chatham on Cape Cod, MA
2) Wild stocks from New Jersey coast
3) Wild stocks from Virginia from Burton Brothers Seafood, Chincoteague VA (*Notata* stock)

**Traits Selected For:** 80% *Notata* marking
Growth rate

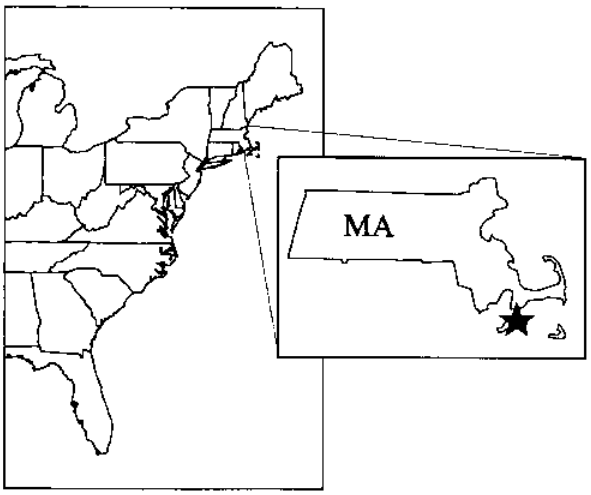
**Comments:** ARC is one of the "founding fathers" of the clam culture industry in the United States culturing clams for over 20 years. It is for this reason most of the other stocks listed in this registry have some ARC mixed in at one time during their development. ARC has pointed out that growth rate seems to plateau in their selection after 5-6 generations but no deterioration in performance (inbreeding) has been noticed over 20 years.

***This brood stock is included in the 1999 Clam Breeding Project.***



## Martha's Vineyard Shellfish Group

Richard C. Karney
Martha's Vineyard Shellfish Group Inc.
P.O. Box 1552
Oak Bluffs, MA
(508) 693-0391




**Type of Company:** Public stock enhancement

**Strain(s) Maintained:** Vineyard *Notata* Cross

**Number of Generations of Selection:** 15 Years of selection
Original brood stock came from:
1) 1980 ARC clams *(Notata)*
2) Local clams
3) North Carolina stock

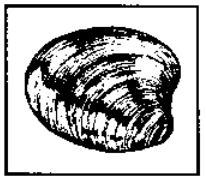
Each year they use brood stock dug from seeded public beds and use approximately 80% *Notata* and 20% wild clams for their spawns.

**Traits Selected For:** Fast growth, *Notata* as a gauge of stocking efficiency

**Other Desired Traits:** Purple shell color for the wampum jewelry industry.
Thick shells
Disease resistance to QPX
Good shelf life

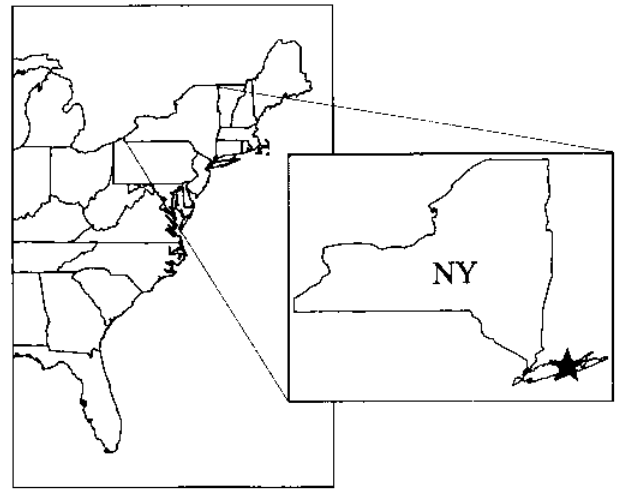
**Comments:** MVSG has seen some negative effects of their brood stock selection, which include thin shells on the fast growing *Notata* and less purple coloration for the wampum jewelry industry.

***This brood stock is included in the 1999 Clam Breeding Project.***



## BluePoints Co., Inc.

Craig Strong & Stanley Czyzyk
P.O. Box 8
West Sayville, NY 11796
(516) 589-0123
(516) 589-1096 Fax




**Type of Company:** Hatchery, Nursery, Grow-out, Seed sales

**Strain(s) Maintained:** BluePoints Line

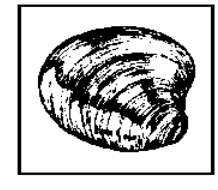
**Number of Generations of Selection:** Since 1964

**Traits Selected For:** Fast growth, *Notata*, ability to tolerate variable environment

**Other Desired Traits:** Disease resistance, faster growth

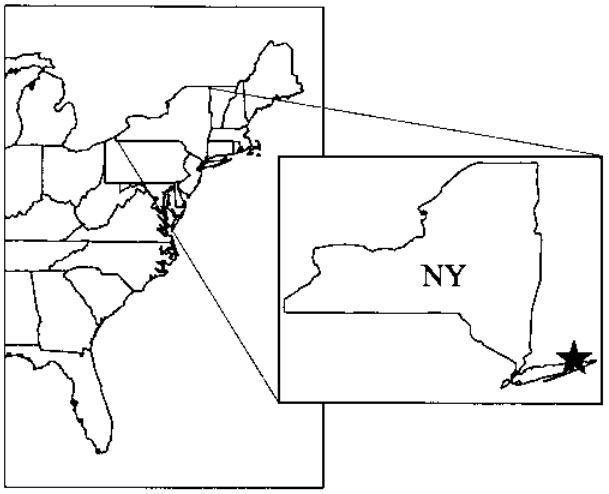
**Comments:** BluePoints is where much of the early work on clam culture was conducted in the United States by William Firth Wells in the 1920's and later Joseph Glancy in the 1960's. They have had a long standing breeding program selecting for fast growth and *Notata* coloration. In recent years, they have "de-selected" their brood stock because of high environmental variability on their 13,000 acres of leased bottom in Great South Bay, NY. It is thought that heterozygosity in the brood stock will better accommodate the heterogeneity in the environment.

***This brood stock is included in the 1999 Clam Breeding Project.***



## Suffolk County Marine Environmental Learning Center

Greg Rivara
Suffolk County Marine Env. Learn. Center
Cornell University Cooperative Extension
3690 Cedar Beach RD
Southhold, NY 11971
(516) 852-8660
(516) 852-8662 fax
grivara@cce.cornell.edu




**Type of Company:** Research/Public Resource Enhancement

**Strain(s) Maintained:** Suffolk County Marine Environmental Learning Center Line

**Number of Generations of Selection:** 2-3 generations of *Notata* selection originating from FM Flowers brood stock (Oyster Bay, NY)

**Traits Selected For:** *Notata*, fast growth

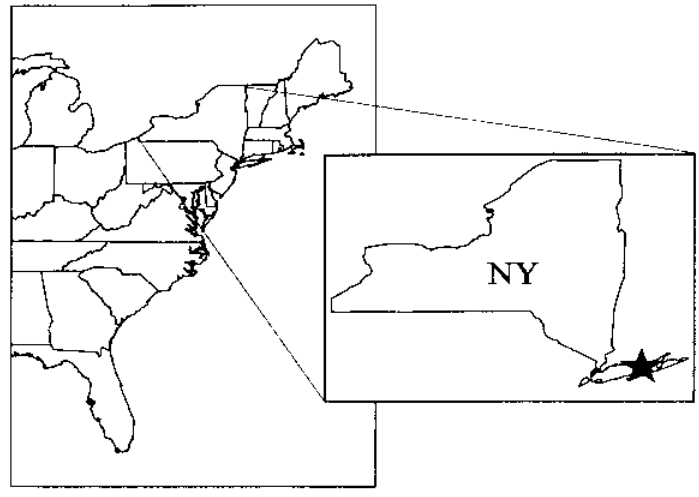
**Other Desired Traits:** Thick shells, QPX resistance

**Comments:** The majority of commercial clam culture on Long Island is done subtidally with no predation nets and is harvested via mechanical dredge. For this reason selection of thick shells are important so that breakage is minimized during harvest and handling.

***This brood stock is available for the Clam Breeding Project, but not included in 1999 spawn.***

## Paradise Point Oyster Farms Inc.

Robert I. Parrino
5 Jacqueline Drive
Manorville, NY 11949
(516) 878-6951
ShminiP@aol.com




**Type of Company:** Hatchery, Nursery, Grow-out, and Seed Sales

**Strain(s) Maintained:** 1 derived from 100 FM Flowers (Oyster Bay, NY) cherrystones

**Number of Generations of Selection:** 0

**Traits Selected For:** Fast growth, *Notata*

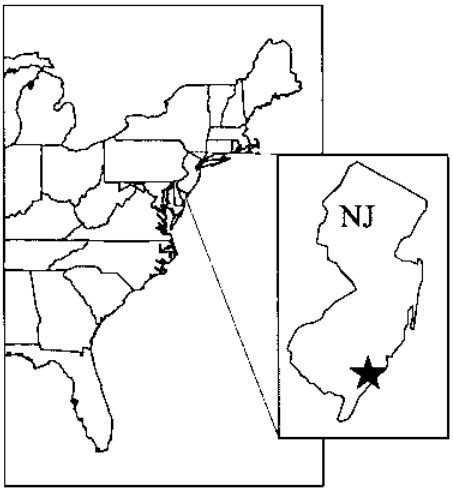
**Other Desired Traits:** Thick shells

**Comments:** Paradise Point Oyster farm is a fully integrated company which produces seed in it's own hatchery for grow-out and seed sales. They also produce oyster seed and scallops for the seed market.

***This brood stock is available for the Clam Breeding Project, but not included in 1999 spawn.***

## Mathis & Mathis

George Mathis Jr.
RD. #2
T-11 Leektown Road
Egg Harbor, NJ 08215
(609) 296-7026




**Type of Company:** Hatchery, grow-out

**Strain(s) Maintained:** Mathis

**Number of Generations of Selection:** 3

**Traits Selected For:** Fast growth, *Notata*

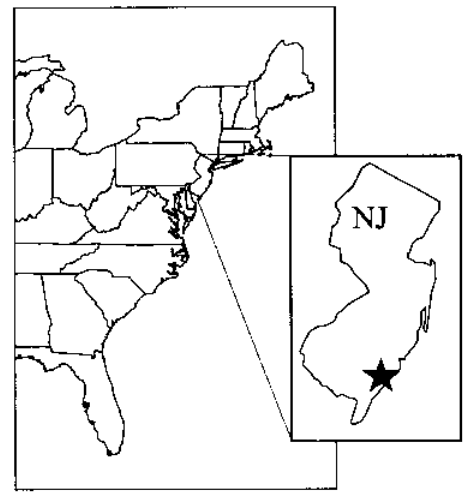
**Other Desired Traits:** QPX tolerance

**Comments:** George Mathis is a partner in an S-K funded QPX project. ABC has provided 1999 Clam Breeding Project lines for this research. Data from this activity will be included in the 2001 Hard Clam Brood Stock Catalog.

***This brood stock is available for the Clam Breeding Project, but not included in 1999 spawn.***

## Great Bay Hatchery

Richard Beckley Jr & Sr. and Don Reighn
#1 12th Street North
Brigantine Island, NJ 08215
(609) 266-4380 Hatchery




**Type of Company:** Hatchery and grow out

**Strain(s) Maintained:** Great Bay/Beckley strain

**Number of Generations of Selection:**

5 generations of selection
Brood stock originally from a mixture of:
1) Elwood Bayer's Coastal Zone hatchery in Moorhead City, NC 1975
2) Local NJ clams from Dry Bay
3) 1974 F.M. Flowers clams from Long Island, NY

In 1987 some Cherrystone Aquafarms, VA clams were added and have been in the selection process for 3 generations. There have been no other commercial lines added since 1987.

Each season 10-20% wild clams with sharp "beaks" are added into the brood stock.

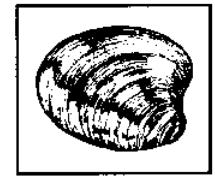
**Traits Selected For:** Fast growth, survival to market size

**Other Desired Traits:** Shelf life, QPX resistance

**Comments:** The primary grow out area for Great Bay Hatchery is in Dry Bay, NJ which is a sandy mud substrate. This is the center of the New Jersey *Mercenaria* aquaculture industry.

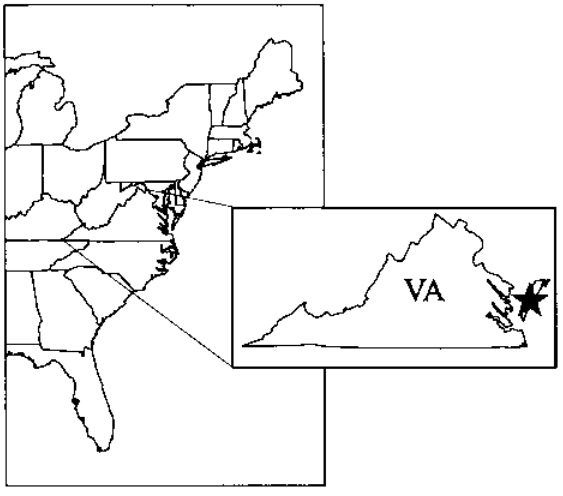
Each spawn consists of approximately 50 females and 50 males. Females are spawned separately in dishes and pooled sperm is added to each individual to ensure representation of all the spawned animals.

***This brood stock is included in the 1999 Clam Breeding Project.***



## Cherrystone Aquafarms

Dr. Mike Pierson
Cherrystone Aquafarms
P.O. Box 347
Cheriton, VA 23316
(757) 331-1208
(757) 331-4366 fax




**Type of Company:** Hatchery, Nursery and Grow out

**Strain(s) Maintained:** Cherrystone Aquafarms Line
This line was derived almost entirely from 1985 ARC brood stock

**Number of Generations of Selection:** Selection since 1985, 6 generations

**Traits Selected For:** Fast growth, uniform growth and survival

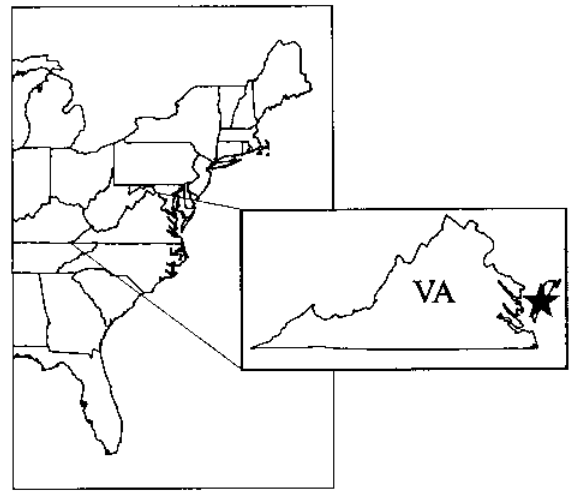
**Other Desired Traits:** Disease resistance, mid-salinity performance

**Comments:** Cherrystone Aquafarms has tested a number of different brood stock lines since 1985 and found their ARC derived line out-performs both wild and previous VIMS-derived lines.

***This brood stock is available for the Clam Breeding Project, but not included in 1999 spawn.***

## J.C. Walker Brothers

Tom & Wade Walker
J.C. Walker Brothers
100 Main Street, Box 10
(4509 Willis Wharf Road FedEx)
Willis Wharf, VA 23486
(757) 442-6000




**Type of Company:** Hatchery, nursery, Grow-out

**Strain(s) Maintained:** 1 Walker Line that was derived from local Seaside clams.

**Number of Generations of Selection:** Selection process has occurred for 15 years.

**Traits Selected For:** Growth and survival

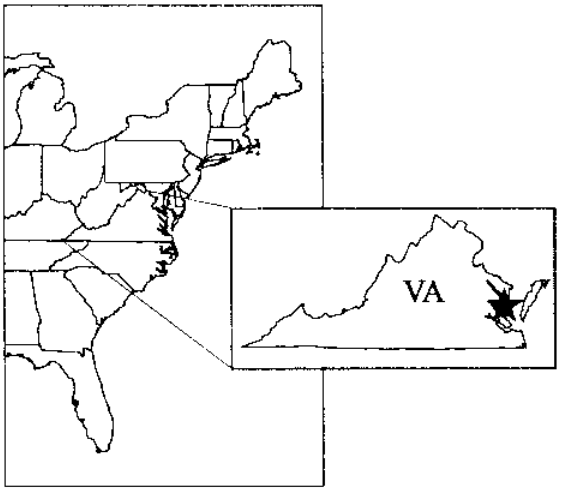
**Other Desired Traits:** None listed

**Comments:** J.C. Walker Brothers is a fully integrated company which has been in business since 1985. J.C. Walker Brothers will provide grow-out sites for the Clam Breeding Project.

***This brood stock is available for the Clam Breeding Project, but not included in 1999 spawn.***

## Middle Peninsula Aquaculture/ Mobjack Bay Seafood

Ken Kurkowski & John Vigliotta
Middle Peninsula Aquaculture
P.O. Box 769
North, VA 23128
(804) 725-0159




**Type of Company:** Hatchery, Nursery, Grow-out, Seed Sales

**Strain(s) Maintained:** Mobjack Bay

**Number of Generations of Selection:** 2

Brood stock derived from a mixture of Mook Sea Farm, Bagwell Enterprises, Cherrystone, and Bayfarm NJ stocks that preformed well in the Mobjack Bay area.

**Traits Selected For:** Low salinity tolerance
Fast Growth

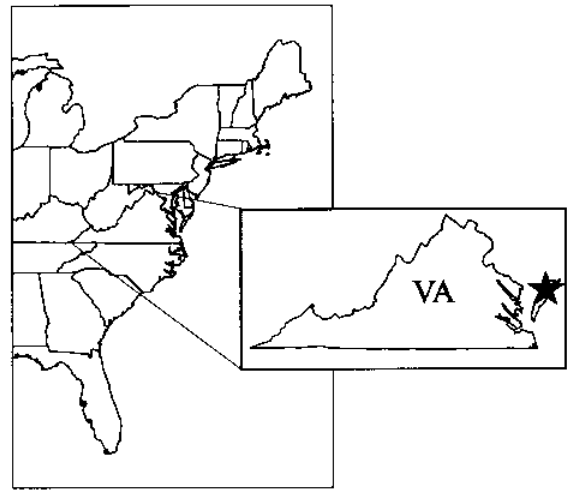
**Other Desired Traits:** Shelf life
Low salinity performance

**Comments:** This strain represents the first effort to select a line of *Mercenaria* that will perform well in low salinity under commercial conditions.

***This brood stock is included in the 1999 Clam Breeding Project.***

## Bagwell Enterprises

Yvonne Bagwell
P.O. Box 508
Smith Beach Road
Eastville, VA 23347
(757) 678-5806
Clammom@esva.net




**Type of Company:** Hatchery, Nursery
Grow-out and Seed Sales

**Strain(s) Maintained:** Bagwell Line
Brood stock line was derived from a mixture of:
1.) VIMS
2.) Wild Virginia Seaside
3.) Cherrystone
4.) 1987 Dave Monte/Mercenaria Manufacturing

**Number of Generations of Selection:** Selection since 1987

**Traits Selected For:** Notata, Fast growth, Mid-salinity tolerance

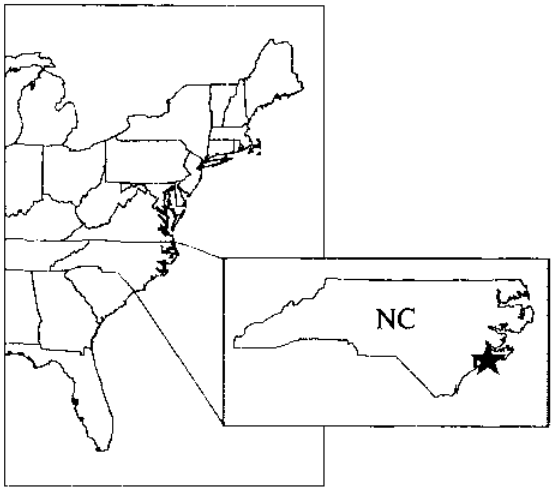
**Other Desired Traits:**

**Comments:**

***This brood stock is available for the Clam Breeding Project, but not included in 1999 spawn.***

## Carolina Cultured Shellfish

Carolina Cultured Shellfish
Guthery Street
Harper's Island, NC
(919) 728-1411




**Type of Company:** Nursery

**Strain(s) Maintained:**

**Number of Generations of Selection:** 8 years of brood stock maintenance

The Brood stock was derived from the following sources:
1) Local clams
2) VIMS
3) Mook/Bob-Baldwin
4) Cherrystone Aquafarms

**Traits Selected For:** Fast growth

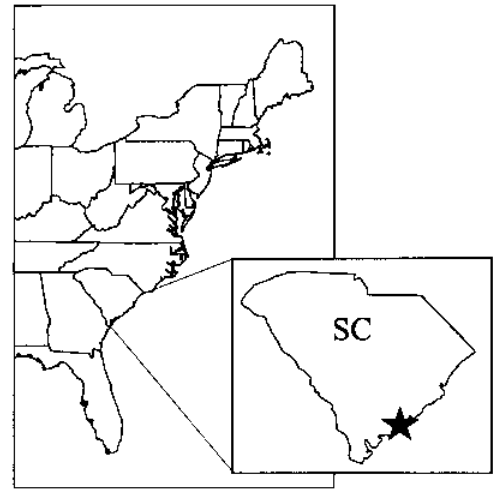
**Other Desired Traits:**

**Comments:** Carolina Cultured has selected 3 generations of fast growing clams from its growing operation that were spawned by various private hatcheries.

***This brood stock is available for the Clam Breeding Project, but not included in 1999 spawn.***

## Atlantic Farms

Mr. Colden Battey
Atlantic Farms
P.O. Box 12139
Charleston, SC 29422
(803) 762-0022
(803) 795-6672




**Type of Company:** Hatchery, Seed sales and Grow-out

**Strain(s) Maintained:**
1) ARC- from topnecks purchased from ARC in late 1980's
2) ALC- originating from first generation of a South Carolina selected line
3) Fla.-SEM- Indian River Lagoon, Florida Sembler & Sembler (Sebastian FL)
4) Fla.- Cedar Key West coast of Florida (mix of HBOI stock)

Animals are spawned as groups and maintained in nursery as separately as possible.

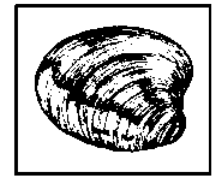
**Number of Generations of Selection:** 3 generations of selection on the ALC and Florida clams are added to the Florida lines as needed.

**Traits Selected For:** Fast Growth, 50-60% *Notata*

**Other Desired Traits:** Faster growth

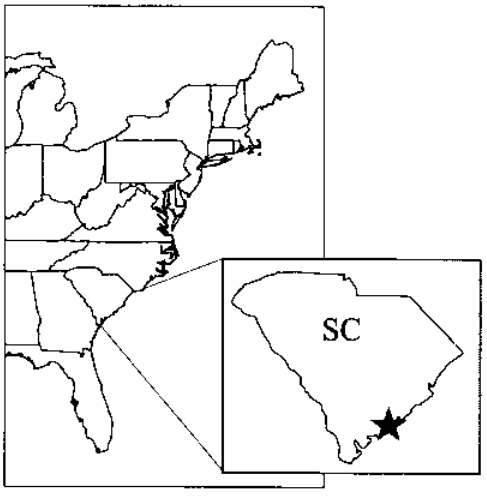
**Comments:** Atlantic Farms, formerly Atlantic Littlenecks, has one of the largest facilities on the East Coast with many innovative nursery and grow-out techniques. They maintain two major grow-out sites in South Carolina: a 400-acre site in the Charleston area and a 350-acre site in the Beaufort area. The clams are planted in muddy substrate intertidally. They are a major seed supplier to Florida, Virginia, and New Jersey grow out operations in addition to their own grow-out.

***ALC brood stock is included in the 1998 Clam Breeding Project.***



## MRRI

Nancy Hadley
MRRI
P.O. Box 12559
Charleston, SC 29422-2559
(803) 762-5022
HadleyN@cofc.edu




**Type of Company:** Research

**Strain(s) Maintained:** SC strain

**Number of Generations of Selection:** Three generations of selection on FXC line

**Traits Selected for:** *Notata*, fast growth

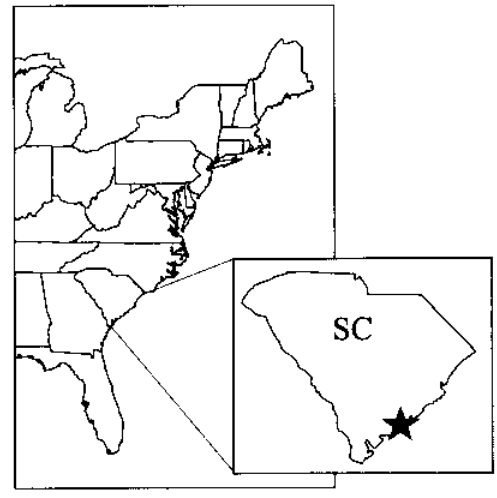
**Other Desired Traits:** None listed

**Comments:** MRRI had maintained a selective breeding program for hard clams in the early 1990's. They had a Florida line (FL) from 1988 and a second generation South Carolina (SC) line which they crossed together in 1989. From this they created a FXC line on which 3 generations of further selection was conducted. This was the last effort of their breeding program. This brood stock is used by Atlantic Farms and Low Country Seafood and other industry members.

***This brood stock is available for the Clam Breeding Project, but not included in 1999 spawn.***

## Low Country Seafood

Bob Baldwin
Low Country Seafood
McClellanville, SC 29458
(803) 887-3389
lcsf@awod.com




**Type of Company:** Nursery, Grow-out

**Strain(s) Maintained:** Baldwin line

**Number of Generations of Selection:** 4 generations of selection since 1989.

Original line was derived from MRRI that was a third generation selected Florida X South Carolina cross done in 1993. (See MRRI) 30-40 brood stock clams are sent to Mook Sea Farm in Damariscotta, Maine for spawning each year.

**Traits Selected For:** Fast Growth, *Notata*, round shell shape

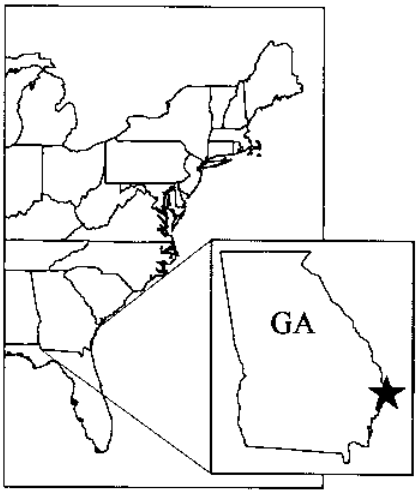
**Other Desired Traits:** Uniformity in growth (especially to 20mm)
Shelf Life

**Comments:** Low Country Seafood uses a unique grow-out system consisting of 4' X 8'wooden pressure treated trays made of 1.0 grade pressure treated wood stacked 3 high on racks. Nursery trays are covered with window screen and grow-out trays are filled with #789 crushed limestone. These racks are placed on the bottom in areas where 1-2 knot currents exist.

In using this grow-out system, Low Country Seafood has also found some performance variation in seed from different hatcheries. For example, New Jersey selected seed appears to elongate in shape as it grows and ARC seed seems to be uniform in growth.

***This brood stock is available for the Clam Breeding Project, but not included in 1999 spawn.***

## Skidaway Marine Lab




Randy Walker, Dorset Hurley
Skidaway Marine Lab
The University of Georgia Marine Extension Service
Shellfish Research Laboratory
P.O. Box 13687
Savannah, GA 31416
(912) 598-2348

**Type of Company:** Research Hatchery

**Strain(s) Maintained:** Georgia line

**Number of Generations of Selection:** 2-3

**Traits Selected For:** Fast growth, no *Notata*

**Other Desired Traits:** None listed

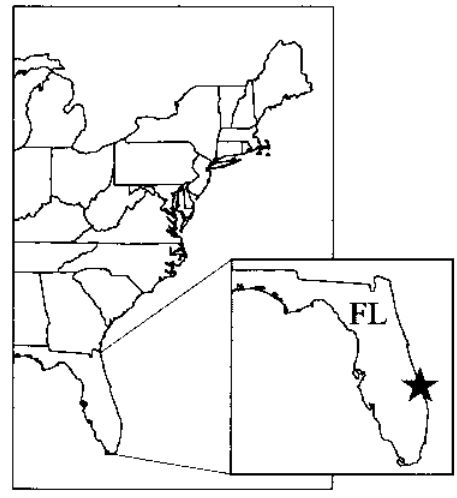
**Comments:** Shellfish Aquaculture Lab researchers have established a genetic selection program to increase growth rates in quahogs. Already in its third generation, the program has documented a 10% increase.

They are also working on the non-native northern surf clam which has shown excellent potential for development as an aquacultural species. While this clam will not survive the high temperatures typical of Georgia waters during summer months, it does exhibit rapid growth rates when planted in fall and harvested in spring. Seed clams (6 to 10 mm in length) may attain 50-60 mm size in six months, which is comparable to two years' growth in their natural northern habitat.

***This brood stock is available for the Clam Breeding Project, but not included in 1999 spawn.***

## Harbor Branch Oceanographic Institute

Dr. David Vaughn
Harbor Branch Oceanographic Institute
5600 US 1 North
Fort Pierce, FL 34946
(407) 465-2400




**Type of Company:** Hatchery, Research, seed sales

**Strain(s) Maintained:** HBOI Strain

**Number of Generations of Selection:** 8-9
This brood stock was derived from *Notata* Indian River, and possibly some northern stock mixed in from Paul Chanley's brood stock from Indian River Mariculture.

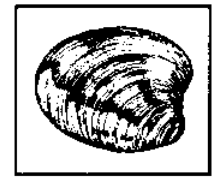
**Traits Selected For:** Notata, fast growth, and high survival

**Other Desired Traits:** Shelf life, less *Notata* (too red)

**Comments:** Recently Harbor Branch will begin using some white (non-*Notata*) males to decrease the deep red color in its seed. They are concerned market size product might be confused with Mahogany clams. 150-200 animals are used per spawn and they spawn 50 weeks of the year.

Clams in the Cedar Key, FL area, which is Harbor Branch's main market, grow to market size in as little as 10 months.

***This brood stock is included in the 1999 Clam Breeding Project.***



# Other Industry Partners

## Moonstone Oysters

Dr. Robert Rheault
Spatco, Ltd.
264 Foddering Farm Road
Narragansett, RI 02882
(401) 783-3360
oysters@ids.com

Former hatchery operation which now grows American oysters, scallops, and hard clams in Rhode Island. Dr. Rheault is the President of the Rhode Island Aquaculture Association.

## Aeros Cultured Oyster Company

Karen Eno
41 Heathcote Ct.
Shirley, NY 11967
(516) 281-0679
Keeno@juno.com

Hatchery, Nursery, Seed sales
Aeros is a hatchery primarily producing American oyster and scallop seed for seed sales. Aeros nurseries small *Mercenaria* seed in upwellers to plantable size seed for growers.

## Tommy's Seafood

A. Thomas Leggett, Jr
P.O. Box 412
Wicomico, VA 23184
(804) 642-2240

This grower of hard clams, in the lower York River, will provide one of the Virginia mid-salinity sites for the Clam Breeding Project.

## Folly Creek SeaFarm

Mike Steelman
Folly Creek SeaFarm
P.O. Box 910
25343 Oregon Drive
Accomac, VA 23301
(757) 787-7251

Hatchery, nursery and grow-out.

## Parramore Island Oyster Farm

Jeff Gardner
Parramore Island Oyster Farm
P.O. Box 142
Wachapreague, VA 23480
(401) 322-7280

Jeff Gardner grows American oysters, hard clams, and scallops on the Eastern Shore of Virginia and in Rhode Island.

## H & R Seafood

Richard Riggin & Freddie Harris
4454 Seaside Road
Exmore, VA 23350
(757) 442-6383

Growers of hard clams in the Hog Island Bay region that will provide a test site for the Clam Breeding Project.

## Hooper Family Seafood

Mark Hooper
P.O. Box 186
Smyrna, NC 28579
(919) 729-2521

Grower of hard clams and American oysters in North Carolina that will provide a test site for the Clam Breeding Project.

## Bear Creek Shellfish

Jon Townson
Bear Creek Shellfish
104 Fox Lane
Hubert, NC 28539
(910) 326-1983

North Carolina hatchery and nursery that specializes in seed sales. They will participate in Clam Breeding Project.