Clam Aquaculture

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What are clams?

- Bivalve molluscs which live within the substrate of a waterbody – infaunal animals – many species
- Lifecycle - clams start their lives as planktonic larvae, but once they settled into the bottom, they stay in sediment often for many years – (some are mobile but still live in the bottom - razors)
- Siphons extend to the sediment-water interface to bring in water for feeding and respiration
- Marine varieties have more commercial value
- Species can be found from the intertidal estuaries to deeper offshore waters (some freshwater species)
What clams are farmed?
Many species of clams – 2 currently important to commercial aquaculture in the US

- Northern Quahog or hard shell clam (Mercenaria mercenaria)
- Atlantic coast
- Manila clam (Venerupis philippinarum)
- Geoduck (Panopea generosa)
- Pacific coast

Other Species: Razor & Soft-shell

Photos: Taylor Shellfish farms
Industry Scale

Values based on the 2005 Census of Aquaculture by USDA (most recent #s available)

• East Coast
  – Maine to Florida
• Hard clams (quahogs)
• Production valued at over $60,000,000

• West Coast
  – Largely Washington
• Manila clams
• Production valued at over $19,000,000
• Geoducks - high value

Current Figures are probably much larger, Virginia to Florida have significantly increased clam aquaculture production
Starting out – find a site

- Intertidal or subtidal?
- Sediment type?
- Water quality characteristics?
  - Waters approved for harvest of shellfish
  - Food availability for the clams
  - Health of water body - DO, pH
- Ease of access?
- Potential for weather related damage?
- Get permits (a small line for what usually amounts to big job)
  - Consult your local authorities and extension personnel
How are clams cultured - Seed

• Specialized expertise and equipment are required to spawn clams and raise them through larval phases – hatcheries specialty

• Should be purchased from a reputable hatchery
  – Follow state and local guidelines to prevent disease transfer and illegal movements

• Smaller seed more fragile – must be handled very carefully

• Buy seed you are equipped to handle
  – Starting with larger seed is usually much easier
How are clams cultured – Nursery methods

• Upwellers are one option
  – Floating – FLUPSY
  – Land-based

• Advantage – lots of seed in small easy to access space

• Disadvantage – costly, require power source, require routine maintenance, may require additional permits
How are clams cultured – Nursery methods

- Field plant boxes or nursery trays
- Advantages: allow seed to be deployed in field, protected from predators, fairly inexpensive
- Disadvantages: not typically as easy to access, mesh must be maintained to keep water flushing
How clams are cultured – Grow out

• Typically ready for planting at about 12+ mm
  – Larger, thicker shelled animals are more hardy
• Should typically remain protected until at least one inch in length (depending on predation)
• Stocking densities are an important consideration, often site specific
  – Too many – growth slows, increased disease risk
Grow out – Netted runs

• Decide on size and layout for amount of seed to be grown
  – typically 12’ x 50’ or 12’ x 100’
  – Nets secured with rebar and steel staple pins or sometimes weighted line

• Runs usually stocked at around 40-100 per square foot in New England

• Use largest mesh that will protect clams and prevent loss
  – Larger mesh will foul less quickly

• Nets can be raised slightly with small buoys, foam or PVC grids to reduce settling of nets and improve water exchange
Grow out - Planting a run

- Layout where nets will go
- Trenching (if necessary or possible)
- Rake site to remove crabs, rocks etc
- Lay one side of net and secure
- Seed
- Cover and secure run completely (before the tide!)
Grow out - Mesh Bags

- Florida bags - Very common method in Florida
  - Loaded with 850 seed/bag
  - Pinned down on farm bed
  - Hauled when ready for harvest
- Can be linked into trawls
- May require added protection over top in some cases
Maintenance - Labor

• Keep mesh/net/screen clean!
  – Clean mesh means water flow to your clams
  – Water flow brings food and oxygen

• Nursery - clean screens, rinse clams, grade

• Grow out – keep nets clean, maintain nets from tears/breaks, follow clam size to harvest
Predators – from the ground
(Invertebrates)

- Crabs
- Moon snails
- Oyster drills
- Starfish
- Whelk/conch
Predator – tell-tale signs

Oyster drills – small hole in shell, typically attack seed clams

Moon snails – large hole with a beveled edge
Predators – from above
(Vertebrates)

Birds/Sea ducks

Poachers!

Fish/Rays
Predators – and even from below

• Infaunal predator
• Mostly hits clams that can’t completely close their shell
  – Soft shell clam - most preferred species
  – Also observed attacking razor clams
• Though may prey on seed quahogs
Diseases

- QPX (Quahog Parasite Unknown)
  - Slows growth and can cause mortality
- Mortality often seen in spring and late summer
- Chipped shell and nodules are signs of the disease (often in its late stages)
Pests

• Do not directly harm clams, but can cause issues like fouled nets

*Didemnum* and *Botrylloides* sp. (USGS)
Other Potential Pitfalls

- Storms
- Ice
- Sedimentation
- Freshwater
- Harmful algal blooms
Harvest

- Ideally when at least 50% are harvestable
- Bull raking – helps to have some water on site
- Hand scratching – when site is dry
- Hydraulic dredges
- Size sorting – size class for market
  - Replant the sub legal clams
Market

• Northern quahog worth more sold when sold at small size classes – don’t hang on to them
  – Littlenecks – 10-12/lb., <2” in length
    • Countnecks, topnecks
  – Cherrystones – 3-5/lb., ~2-3” in length
  – Chowders – 1-2/lb., >3”

• Raw bars or for restaurants and retail

• May require different licenses and added record keeping for direct marketing
  – Need to decide at what level you’d like to sell
Economics

• Will vary greatly by location and site specifics
  – Time to market will vary by geographic regions
    • As little as 12-18 months or 3 years +
    • Also time to first potential income
  – Clam value will also vary by region
    • $0.09-$0.30 per littleneck clam

• Business plans will help focus your efforts and determine if a business venture is worthwhile

• If possible talk to other growers to figure out what methods have worked and what have not
  – Start small and determine best methods to scale up

• Economies of scale – improved profitability

• Mechanize labor intensive tasks if possible

http://shellfish.ifas.ufl.edu/getting_started.html
Other items to be aware of...

• Insurance
  – Liability
    • Injury to employee or public
    • Shellfish consumption
  – Crop insurance
    • Cultivated Clam Crop Insurance Pilot Program
    • AGR-Lite
    • Noninsured Crop Disaster Assistance

• Record keeping is important!

• Be a good neighbor
  – Clean up old nets/gear
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