Marine Resource Bulletin
A Sea Grant Advisory Service
Vol. X, No. 4
VIMS, July/August 1978

CULTURING THE CLAM--A VIRGINIA INNOVATION

by Dick Cook, Editor

Wachapreague, Virginia, is Eastern Shore, salt marsh smells and gull screams. It is also 20 or so charter boats, a huge 3-story frame hotel with oak rockers on every deck and a place to go when you want to fill the boat with doormat-size flounder. Wachapreague is not that different from any of a dozen small towns that perch on the Eastern Shore unless you want to learn how to grow clams. Then it is the only place to go . . . and the guy you need to look up is Mike Castagna.

Castagna, a scientist for the Virginia Institute of Marine Science (VIMS), has probably grown more clams than anyone alive. Now he is teaching others how to do it. He has paid his dues and speaks with the authority of experience. For the past two years his work has been sponsored by the Sea Grant Program at VIMS.

Like so many other innovations, the idea of growing clams, and the subsequent clam culture courses taught at Wachapreague, were born of necessity. In this instance, it was because of dire trouble with another shellfish, the oyster.

The year 1960 saw a catastrophic decline in oyster production in Virginia, due primarily to the disease organism, MSX. People started leaving the industry in droves, according to Castagna.

"We figured we could solve a lot of their problems if we could give them an alternate industry to fall back on while the oyster was recovering," he explained.

The idea for culturing clams in Virginia surfaced around 1963, with operations getting underway at Wachapreague in 1969. As Castagna stated it:

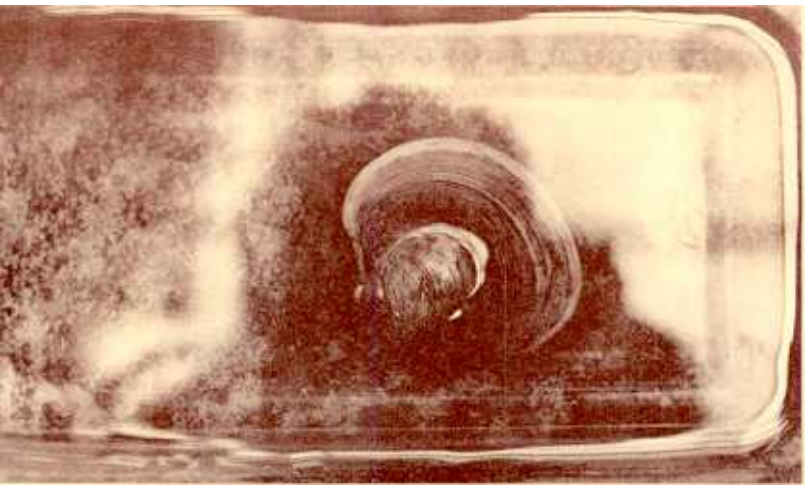
"Blithly and blindly we went about breeding northern quahog clams *(Mercenaria mercenaria)*

Senior scientist and project leader Mike Castagna believes in the personal touch when it comes to teaching clam culture. He limits his classes to six students. Here he demonstrates a sampling method to determine egg count.

and producing larvae. We had garbage cans lined up and down the halls with larvae in them. We'd wheel them out on dollys and drain them down, then bring them back in. It was real hard work. We grew a bunch of clams and planted them out at various sizes that year.

"In one planting we put out over 7 million clams, and in two weeks lost every one of them.

Later we lost a planting of 3 million ¾-inch clams. All told, we lost close to 40 million clams that first year. By that time I'd probably planted more clams than anyone else and harvested less. The oyster industry, which was enthusiastic at first, was getting pretty dubious by then. We eventually did get some of the bugs worked out of the system though, and achieved 86-92 percent survival."



Selected for its fast growth traits, this adult quahog emits sperm (white area) in a laboratory demonstration.

The "system" is to raise seed clams, from parents exhibiting fast growth rates, to 2 mm size in the hatchery (about 6-8 weeks). At this time they are moved out to a natural seawater environment and planted on prepared aggregate beds of crushed stone or crushed marble.

The beds, containing 1½ to 2 inches of aggregate, are surrounded by wire baffles to decrease current force and keep the small clams from being swept away before they can burrow in. Once they get under the protecting gravel, they are safe from such predators as crabs and small fish.

To protect against cownose rays, a bullfish fence is later added. The fence is made from a plastic mesh that was developed to protect grapes and cherry trees from birds. It is ½" mesh plastic up to 11' tall and is placed around the plots.

The tiny clams are planted at a rate of 31,000 per sq. meter, or 250 per sq. foot, and Castagna likes to have the plantings finished by early October.

"Where it normally takes a hard clam 3 years to reach the little nick size, we can get the same results in 20-22 months," Castagna said. "By selecting parent clams for fast growth, we can speed up the growth rate by about 30 percent."

After planting, bed maintenance is minimum. Mostly it's a matter of making sure the plantings aren't vandalized, or that no boats go through them. Other than that, a survey trip several times a week to tie down a baffle or so is all that's needed.

Between the 16th and 18th months the baffles are removed and the clams are raked through and harvested. At this point about 20 percent are harvestable. These are the fast growers, many of which will be moved right into the spawning stock. How big are they? They're about an inch thick . . . "New York nicks" in clam parlance.

"Between the 22nd and 24th months we come back and harvest them all," Castagna said. "At that time they're running about 80 percent New York nicks and 20 percent Philadelphia nicks (slightly smaller). You can get at least 6 cents apiece for them."

While the VIMS clam venture is purely experimental, with the emphasis on teaching, some clams have been sold to test marketability.

"We wanted to see if they would be acceptable if it were known that they were cultured clams," Castagna explained. "We not only saw them accepted, but were offered a cent higher than market price because of the uniformity of size."

When a clammer sells his harvest to a buyer, the buyer often takes them "as they run" . . . that is, large, small, intermediate . . . all mixed together. By handling the clams only as nicks, the Wachapreague operation saw a premium price offered, a price that held even when the market was depressed. How so? Because the market for nicks favors a clammer who can consistently produce that most sought-after size.

Although Virginia–in the person of Mike Castagna–developed the clam culture idea, other states have shown more interest in turning the technique into a profitable commercial venture.

"We've had some great success at teaching here, apparently," Castagna said. "We've had someone from every coastal state in the U.S. except Alaska, and usually fairly large groups of students from each state. We've also taught students from at least ten foreign countries."

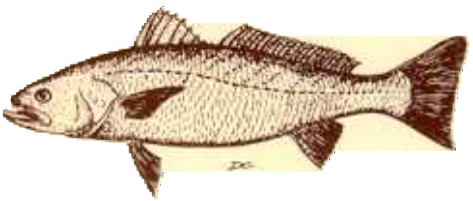
The clam culture course, initially offered in 1973, accepts applicants on a first-come, first-served basis. Cost is $35.00 per person, and in order to insure a hands-on, personal approach to instruction throughout, course groups are

cont. on Page 5.

THE FISH HOUSE KITCHEN

TROUT SOUFFLE

The weakfish, commonly known as the gray trout, is one of the most abundant and tasty fish in Virginia's marine waters. This year, especially, fishermen seem to be bringing in bragging strings of trout. Although most of the fillets from these fish will likely be fried or broiled, there are other taste-tempting methods of preparation. This one that is especially noteworthy.



- 1½ c. milk
- 1 t. butter or margarine
- 4 egg yolks
- ¼ t. seafood seasoning
- ½ t. salt
- 4 egg whites
- 2 c. trout (weakfish) cooked, cooled and flaked
- 1 c. shredded dry bread crumbs
- 1/8 t. paprika
- 4 drops liquid hot pepper sauce

Scald milk over low heat in heavy saucepan or in top of double boiler. Add trout, bread crumbs and butter to milk and stir. Beat egg yolks in large bowl until thick. Add fish mixture to egg yolks a little at a time, stirring constantly. Mix in seafood seasoning, paprika and liquid hot pepper sauce. In small bowl, add salt to egg whites; beat to form softly rounded peaks. Fold egg whites into fish mixture. Pour into a greased, deep 6 to 8-inch baking dish set in a pan containing hot water to cover 2/3 of baking dish. Bake at 350° F. until knife inserted in center comes out clean: About one hour. Serve immediately. Serves 6; about 3/4 cup each.

BOATBUILDING SCHOOL

by Jon Lucy, Marine Recreation Specialist

As part of its program to improve and develop the downtown area's waterfront, the City of Norfolk recently helped establish the Norfolk School of Boatbuilding. The school was dedicated June 10, 1978, at its location in a refurbished warehouse on the C & O Railroad Pier B at the foot of Brooke Avenue.

Norfolk's support of the school manifests itself in two ways. In addition to enabling the school to lease facilities for a nominal fee, the city supplied $25,000 start-up money from its Human Resources Fund. The school itself is operated by Nautical Adventures, Inc., a non-profit organization of Norfolk businessmen, city employees and people in the marine trades whose primary goal is improved utilization of the city's waterfront.

Tuition is $250 per month, including tools which the students keep upon completion of the 12-14 month course. Students may apply for federally funded openings at the school, also. Thirty-two students are already at work in either the school's traditional boatbuiding program or program for marine jointer work, cabinet making and small boat building. In addition to learning to build boats, either from models or from eye, students also receive instruction in marlinspike seamanship, nomenclature, lofting, fastenings and adhesives, and elementary marine design.

Beginning the third week in September the school will initiate a 10 week night program (one three-hour session per week) which will essentially cover the material in the regular curriculum. The fall sessions will deal mainly with basic courses, with a night shop program beginning in the spring.

Another aspect of the school's activities were demonstrated June 22-23, when it hosted a Traditional Maritime Skills Preservation Seminar cosponsored by the National Trust for Historic Preservation in Washington, D.C.

Restoration and boatbuilding programs from eight east coast states, the District of Columbia and California were represented at the seminar. A major outcome was development of a student exchange program between the Bath Marine Museum's apprentice shop in Maine, Mystic Seaport in Connecticut and the Norfolk School of Boatbuilding.

Additional information on the new school can be obtained by writing Norfolk School of Boatbuilding, P. O. Box 371, Norfolk, VA, 23501, or calling (804) 627-7266.

MENHADEN FISHERY IN VA

The menhaden purse seine season, which started in Virginia May 15, will extend through November 17 this year.

The catching and processing of menhaden constitutes an important part of Virginia's commercial fishery, but questions frequently arise as to whether the boats are within their prescribed fishing area boundaries. The legal season and areas within which the menhaden purse seiners may operate are set forth in Section 28.1-59 of the "Laws of Virginia, Relating to Fisheries of Tidal Waters."

The following is a list of areas within the state that are "off limits" to the menhaden purse seiners:

(a) Piankatank River.
(b) James River, west of the Hampton bridge tunnel.
(c) Rappahannock River, west of the Robert O. Norris, Jr. Bridge.
(d) York River, west of a line from the west end of Allen's Island (Ellen Island) to the west end of Goodwin Island (Godwin Islands).
(e) In the East, North, Ware and Severn Rivers.
(f) On the Eastern Shore: In Cape Charles Harbor; in King's Creek and Cherrystone Inlet; in Mattawoman and Hungars Creeks; in Nassawadox Creek; in Occohannock Creek; in Nandua Creek; in Pungoteague Creek; in Onancock Creek; in Chesconessex Creek eastward of a line from Sound Beach to westernmost part of Beach Island to Halfmoon Point to Peters Point to Simpson Point to Flood Point to Ebb Point to the mouth of Great Gut; Messongo Creek; in the Virginia portion of the Pocomoke River eastward of a line from Long Point to VA-MD Spar Buoy "A." On the western shore: Dividing, Prentice and Jarvis Creeks; Indian Creek; Dymers Creek; Tabbs Creek; Horn Harbor and Dyer Creeks; Beck and Claxton Creeks and the Thorofare; Chisman Creek, Poquoson River and Bennetts Creek; Back River; Little Creek; Lynnhaven Bay.

More detailed boundary descriptions may be obtained from Section 28.1-59 or by contacting your local office of the Virginia Marine Resources Commission listed in the telephone directory.

CURRENT SPATFALL INFO

The period of June through early October is used by scientists at the Virginia Institute of Marine Science (VIMS) to gather oyster spatfall information at selected sites in Tidewater Virginia. After the work is completed, a summary is compiled and published, usually several months later.

Persons interested in obtaining weekly spatfall information on specific areas during the survey period may do so by contacting Dexter Haven or Paul Kendall, VIMS Dept. of Applied Biology, (804) 642-2111, ext. 185.

STURGEON INFO NEEDED

The Virginia Institute of Marine Science (VIMS) is interested in gathering information on sturgeon (both Atlantic and short-nosed) that occur in Virginia waters. Although it is illegal by Virginia law to take sturgeon from Virginia waters, some are accidentally caught.

VIMS requests that anyone who catches a sturgeon measure its length and weight. Live fish should be returned to the water immediately; dead fish should be held for pickup by VIMS personnel.

Posters showing distinguishing characteristics of both species of sturgeon are available upon request from the Ichthyology Department, Virginia Institute of Marine Science, Gloucester Point, VA 23062, (804) 642-2111, ext. 269.

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DICK COOK ..... EDITOR

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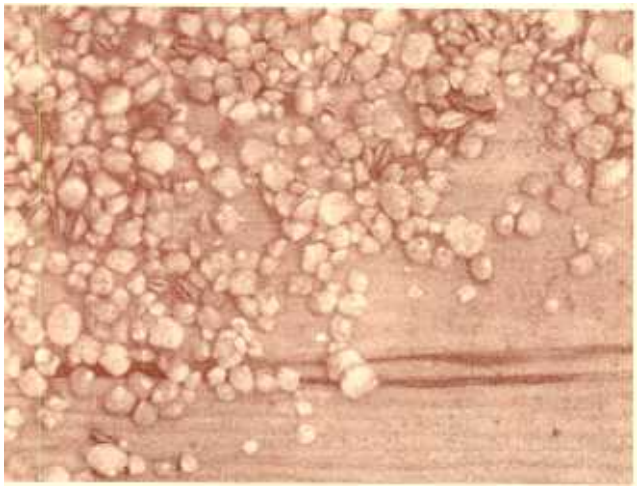
William J. Hargis, Jr. ..... Director

limited to six students. The course runs a week, and usually is held in late May or early June. When demand is high, a second course is sometimes offered in the fall. So far, the people most interested in growing clams are those from Massachusetts, New York and New Jersey, places that already have viable clam industries.

"We've probably trained a dozen or so people from New Jersey alone, and I know two sets of partners from there who are making a profit on the technique they learned here," Castagna said. "They check back from time to time to see if we've got anything new going. We're real happy about their progress. It shows the system works commercially."

Castagna envisions no plans for expansion of the Wachapreague clam culture operation. As a research, teaching and advisory facility, he feels it is sufficient.

"In research you should move on to something else, anyhow. As soon as industry gets into it they should be doing their own pilot plant work," he said, "and we shouldn't be competing with them in producing seed clams. We could continue monitoring private operations and offer extension help where needed. Right now, we don't have any hatcheries in Virginia,



Immersed in flowing seawater, young quahog clams are raised to approximately 2-5 mm size in culture troughs. From here they go to aggregate beds for planting.

Right foreground, larval growout tanks hold fertilized eggs and larvae of parent clams selected for rapid growth characteristics. Once the larvae set, they are moved to culture troughs. The larval clams are fed algae from tanks across the aisle.

Dr. John Kraeuter (face to camera) helps move a baffle. These screen devices are placed over newly planted beds where they slow current flow and give young clams a chance to burrow in.

so we're not competing with any in seed production. Besides, almost all of our seed is used for research."

There are two clam culture plots on Virginia's Eastern Shore: One at Metompkin Bay and the other at Bradford Bay. Another is just getting underway at Lynnhaven Bay on the western shore. In order to have a successful "grow off" of clams, the water salinity must average 20 parts per 1000.

Castagna would like to see Virginia regain the title of the "Clam Capitol of the U.S.," a position it once held before New York introduced better harvesting methods. He feels Virginia has "better areas in which to grow clams, better water, just as good a clam and better laws for it."

"One direction Virginia could take is to create a seed hatchery, and furnish seed to growers at cost. Massachusetts plans to furnish clam seed through their reforestry department, because the same procedure used to dispense pine seedlings can be used for seed clams. I think our clammers should be putting their effort in the field, not in the hatchery," he concluded.

Asked about risks in the cultured clam business, Castagna said weather, in the form of storms and ice, can wreck beds. Boats, too, can create havoc, and poachers and predators can clean you out fast if you are not properly protected. As in any business, watchfulness and attention to detail, plus a little luck, can make the difference between success or failure.

The system has proved it will work, though ironically, outside the state that fostered it. Created as an alternative industry for mollusk-gathering watermen, clam culture in Virginia is only recently getting some serious attention from the faction it was designed to aid.

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