



Issue 1997-01

Winter, 1997

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## **23rd Annual East Coast Commercial Fishermen's and Aquaculture Trade Exposition**

**January 17-19, 1997  
Wicomico County Civic Center  
Salisbury, Maryland**

**Don Webster, Eastern Shore Area Agent**

Watermen and aquaculturists will be able to learn about new and exciting innovations at the 1997 East Coast Commercial Fishermen's and Aquaculture Trade Exposition. The [seminars for watermen](#) are included in the price of admission to the trade show. There will be an additional charge of \$20 for the [aquaculture seminars](#).

Seminar programs are produced in cooperation with the Mid-Atlantic Sea Grant Advisory Programs to educate commercial watermen, aquaculturists and other marine interests on topics having an impact on their lives and businesses. Extension programs are available to all persons regardless of race, color, religion, national origin, sex, or handicap. Sea Grant is a program of the National Oceanic and Atmospheric Administration (NOAA) and funds research, education, and extension program in all of our nation's coastal and Great Lakes states. These seminar programs are annually planned with advice and assistance from the Maryland Waterman's Association Board of Directors.

### **Commercial Fisheries Seminar Schedule**

**Saturday, January 18, 1997**

**11:00 Keeping Yourself Safe: Regulations And Equipment for Safety and Survival**

CWO Stephen Oakley, U.S. Coast Guard, Baltimore; Frank Hornig, Vane Brothers Marine Safety and Services, Baltimore

Covering the latest regulations affecting the commercial fishing industry and the

equipment that has been engineered to keep you working in safety.

**12:00 More Power! Diesel Designs for Competitive Fishermen**

Richard Sutton, Cummins Chesapeake Power, Baltimore; Harry Fitch, Alban Engine Power Systems, Baltimore; Bill Draper, Deere Power Systems Group, Waterloo, Iowa; Doug Rose, Volvo Penta

Industry representatives will talk about boat powering issues, engine design, maintenance, and features for the cost effective power you need to compete on the Bay and in the ocean.

**1:30 Biodiesel 101: How to Make Your Exhaust Smell Like Popcorn**

Henry Rehberg, NOPEC Corporation, Lakeland, Florida

Using soybean oil, a nontoxic and biodegradable product, in your marine diesel engine and the experiences of test marketing in Maryland and other regions.

**2:00 Power to the Propeller! Update on Marine Transmissions**

Vernon McCarty, Transmission Engineering Company, Baltimore

An overview of marine gearing with an eye towards getting the most efficiency from your workboat.

**2:30 Preparing for Problems: Understanding Marine Insurance**

Barry Davis, Sunderland Marine Mutual Insurance Co., Inc., Sunderland, England; Maurice J. "Whitey" Laurier, Marine Surveyor & Naval Architect, Gloucester Point, Virginia; Sarah Ann Wilks, Bobbi Dailey, and Jack Devnew, Flagship Group, Ltd., Norfolk

Insurance specialists will cover the different types of marine insurance and how to be a wise businessperson by minimizing your chance of financial disaster in this risky business.

**Sunday, January 19, 1997**

**11:00 Planning for Your Financial Future**

Alan Becke, MetLife Securities, Annapolis

How to plan and invest for your future when the kids are ready for college or you are ready to slow down and retire.

**12:00 Blue Crabs: Status of the Stocks and Regional Overview**

Harley Speir, Maryland DNR

Current assessment of blue crab resources in the Chesapeake Bay and what you can expect in the 1997 season.

**12:30 Impacts of Haul Seining on Submerged Aquatic Vegetation**

Bob Sadzinski, Maryland DNR

Resource managers will show the results of studies in the Chesapeake Bay on what haul seining does to the important submerged vegetation in the estuary.

**12:45 Marine Mammal Take Reduction**

Bill Outten, Maryland DNR

Measures taken by resource managers to assure protection of marine mammals in the Maryland coastal waters and impacts upon the commercial fishing industry.

**1:00 Limited Entry: Will There Be Room for All?**

Pete Jensen, Maryland DNR

An update on the renewal of the Maryland limited entry program, changes that have occurred in the General Assembly session, and what the future looks like for the commercial fishing industry.

**1:30 Whose Fish Are They Anyway? Allocation Issues in Maryland**

Steve Early, Maryland DNR

Approaches to solving issues involving competition between groups of resource users and how resource managers plan to deal with emerging problems in the future.

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## **Aquaculture Seminar Schedule**

(There will be an additional charge of \$20 per day to attend the following)

### **Saturday, January 18, 1997**

**9:00 Opening**

Roy Castle, Maryland Department of Agriculture (MDA)

**9:15 Hard Clam Culture**

Yvonne Bagwell, Bagwell Enterprises, Virginia

**10:00 Surf Clam Culture**

Bill Mook, Mook Sea Farms, Inc., Maine

**11:00 Oyster Bottom Culture**

Steve Fleetwood, Bivalve Packing Company, New Jersey

**1:00 Soft Clam Culture**

Sam Chapman, Tim & Tide RC&D Office, Maine

**1:45 Oyster Off-Bottom Culture**

Rich Pelz, Circle C Oyster Ranchers, Maryland

**2:45 Shellfish growing Equipment**

Don Bishop, FUKUI, Ontario, Canada

**3:30 Questions and Closing**

Roy Castle

### **Sunday, January 19, 1997**

**9:00 Opening**

Roy Castle

**9:15 Summer Flounder Culture**

George Nardi, Great Bay Aquafarm, New Hampshire

**10:00 Bluefin Tuna Project**

Sebastian Belle, New England Aquarium, Massachusetts

**11:00 Ocean Net Pens**

Greg Sangster, Ocean Spar Technologies LLC, Washington

**3:30 Bay Net Pens**

Bill Evans, Mariculture Systems, Washington

**2:00 Questions and Closing**

Roy Castle

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## **17th Milford Aquaculture Conference**

**February 24-26, 1997  
New Haven, Connecticut**

### **Don Webster, Eastern Shore Area Agent**

Many years ago, Walter Blogoslawski of NOAA's National Marine Fisheries Service saw the need for a meeting of oyster growers and hatchery operators. It was to be an informal get together where they could talk about their successes and problems during the year and discuss possible solutions with scientists. Although the conference was purposely limited during the early years to those in actual shellfish production, it proved to be too good to hold back. Today, the Milford Aquaculture Conference stands as one of the region's most comprehensive aquaculture meetings.

For 1997, the conference will be held on February 24-26 at the Quality Inn Conference Center in New Haven Connecticut. The meeting will review shellfish disease, shellfish and finfish aquaculture production, and shellfish research activities. The conference begins in the evening of the 24th with a shellfish get-together mixer and poster session. Growers from throughout the region will provide clams and oysters for the gathering, giving participants an opportunity to

sample their products and compare them.

The Milford Aquaculture Conference has become known as much for its informal sessions as for the formal presentations. Groups of people interested in working on specific problems affecting the seafood industry gather during the off hours to discuss options and form working groups. The Northeastern Regional Aquaculture Center, which helps sponsor the meeting through its Regional Extension Project, has frequently used the Milford Conference as a site for meetings of work groups.

The 1997 conference will include papers that range from nursery bag culture of hard clams by Gef Flimlin of New Jersey Sea Grant to preliminary culture work on tautog by Renee Allen and Dean Perry of NMFS in Milford. Bay scallop culture has been progressing in recent years and research on this species will be presented by Milford Lab researchers Jennifer Alix and Sheila Stiles.

Disease has always been a focus of this conference, affecting as it does many oyster growing areas of the east coast. Results of the 1996 work on Juvenile Oyster Disease will be presented by Earl Lewis of Maryland's Oxford Cooperative Lab. This is a relatively new disease which has affected young oysters in the New England area and has been a prime focus of recent Milford meetings.

Kim Harrison, the new Executive Director of the Northeastern Regional Aquaculture Center, will provide an overview of NRAC activities. She will also include progress on existing studies, and future directions of that important organization.

Many more papers will be scheduled. For lodging and registration information contact Walter Blogoslawski at the NMFS Milford Lab at (203) 783-4235. Last year over 40 people who tried to register at the door were turned away for lack of room. Don't let this happen to you in 1997!

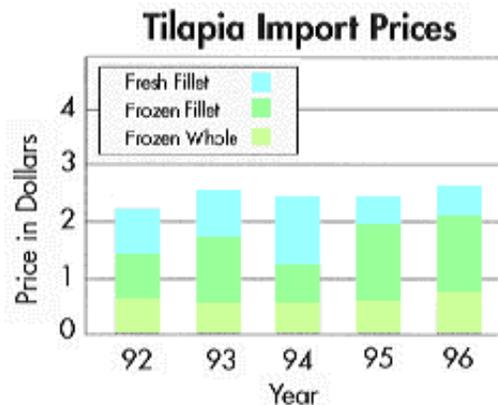
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## Tilapia Takes Hold

**Douglas W. Lipton, Marine Economic Specialist**

Statistics indicate that after decades of breeding programs and marketing efforts tilapia is making significant inroads in the U.S. market. The good news for producers so far is that unlike other aquaculture species that have been introduced in the U.S. market, tilapia prices seem to be holding fairly steady for now. Salmon, shrimp and catfish, the other major aquacultured seafood, all experienced significant declines in price as their markets expanded. These price declines are expected as large expansion in supply exceeds the increase in demand that results from new market penetration.



Tilapia import prices, on the other hand, have increased as expanded production in favorable climates has led to increased exports to the United States. The greatest price increase has been for frozen tilapia fillets which through the first half of 1996 saw the price 45% higher when compared to 1992. Frozen whole tilapia and fresh fillets had much smaller price increases, but any increase at all is a positive sign when supply is rapidly increasing.

It is more difficult to get information on prices of domestic tilapia production. The bi-weekly price survey by the Maryland Department of Agriculture reports on prices for live tilapia, the market of choice for U.S. producers. Price in that market held steady over the 1996 period at about \$1.90 a pound.

So far tilapia expansion into the marketplace has matched the demand resulting in steady or slightly increasing prices. Whether this will continue to hold in the future will depend on the worldwide levels of production.

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# Commercial Recirculating Aquaculture Systems

**Don Webster, Eastern Shore Area Agent**

Recirculating aquaculture systems are:

1. the system of the future
2. the way to go now
3. interesting scientifically but a loser financially
4. a one way ticket to bankruptcy
5. all of the above

Recirculation systems probably generate more controversy than any other production system in aquaculture. But frankly they are addictive. You can't be interested in aquaculture and not, at one time or another, have wondered about their practicality.

The thought process runs like this: "If I could bring these animals inside, I wouldn't have to worry about weather affecting their growth. They would grow throughout the year and I could have a consistent harvest, making marketing easier and taking the bumps out of production. I could put them in tanks and get a lot more fish on a given amount of land." But then you carry the thought further - "if I move them inside and heat the water to keep them in their prime growing range, I can't just dump that heated water. If I reuse it, then I have to remove the impurities that go in from the feed cycling through the fish. And I have to do it and make a profit because, ultimately, that's what this business is all about."

Anyone who thinks this business is easy has a lot to learn. But a book is now available that can help you to do just that, *Successes and Failures in Commercial Recirculating Aquaculture*.

The book is a result of an excellent conference at Virginia Tech this past summer. Under the direction of George Libey, who has been a leader in recirculation technology for many years, the organizers did an excellent job. They figured a couple of hundred people would come - 500 showed up. Yes, there is a great deal of interest in the subject. The title of the conference was appropriate, too, because there have been some spectacular failures which have served to poison the financial community on aquaculture in general in many areas. Unfortunately, the successes don't seem to draw the same attention.

The book is available in two volumes from the Northeast Regional Agricultural Engineering Service, which has brought us similar useful volumes in the past. It covers a wide range of topics such as water quality, waste management, nutrition, disease prevention, design and management, environmental improvement, economics, and computer models. Along with the papers that were presented at the conference are those from two open technical sessions and the poster session, where topics that weren't addressed in other sessions are included.

*Successes and Failures in Commercial Recirculating Aquaculture* should be in the library of anyone interested in recirculation systems. The \$65 price tag (plus \$7 shipping and handling within the U.S.) is a bargain compared to some of the higher priced publications on the market that don't have half as much useful information. Engineers, biologists, aquaculturists, scientists, regulators, and financiers will find the information of great benefit in their aquaculture work.

Copies of the book, as well as previous volumes on intensive aquaculture and recirculation systems, are available from NRAES, Cooperative Extension, 152 Riley-Robb Hall, Ithaca NY 14853-5701. The phone number for NRAES is (607) 255-7654, the fax is (607) 254-8770, and the e-mail address is [nraes@cornell.edu](mailto:nraes@cornell.edu). Refer to *NRAES-98, Successes and Failures in Commercial Recirculating Aquaculture*. Quantity discounts are available.

# Water Quality Issues in Aquaculture: Nitrate

**Dan Terlizzi, Water Quality Specialist**

- [Introduction](#)
- [Toxicity of Nitrite](#)
- [Treatments](#)
- [Testing](#)

This is the second installment of a series on water quality issues that aquaculturists need to be concerned with.

The first -- on ammonia -- appears in the [Summer 1996 issue](#).

Healthy water quality is the first concern you will have in the rearing of aquatic species -- it is up to you to ensure that your fish or shellfish or plants have a healthy environment. Fish produce wastes that can be toxic, in particular, ammonia and nitrite; unless they are converted to non-toxic nitrate, you can get high bacterial counts, oxygen depletion, disease, off flavors and mortality.

Monitoring for important chemical properties like ammonia and nitrites and for water conditions such as temperature and pH is essential -- it provides the early warning signals you will need for actions to protect your aquatic crop.

## Introduction

Nitrite ( $\text{NO}_2^-$ ) is an intermediate compound in an oxidation sequence called nitrification and occurs naturally as part of the nitrogen cycle, the movement of nitrogen through an ecosystem.

First, ammonia from fish excretion or other sources is oxidized to nitrite by the bacterial genus *Nitrosomonas*. Nitrification is completed by *Nitrobacter* species that convert nitrite to nitrate ( $\text{NO}_3^-$ ). The rate of nitrification is influenced by water temperature, pH, oxygen and other environmental factors that affect growth and metabolism of the nitrifying bacteria; it is also influenced by the abundance of nitrifiers which are themselves influenced by the availability of attachment surfaces, or substrate.

When the nitrification activity of natural bacterial populations or in biological filters is inhibited, you may see increases in nitrite.

## Toxicity of Nitrite

Once in the blood, nitrite readily oxidizes hemoglobin to methemoglobin, which cannot transport oxygen. This condition, known as brown blood disease, causes suffocation of fish, even with adequate levels of oxygen.

In freshwater fish, nitrite levels as low as 0.20 parts per million (ppm) can cause deaths and in sensitive fish like rainbow trout, a level of 0.10 ppm nitrite is a concern. More resistant species such as the channel catfish may survive up to 30 ppm nitrite.

In marine systems, nitrite is less likely to be toxic. Studies suggest calcium in sea water protects against toxicity, while chloride prevents the uptake of nitrite, thus enabling fish in salt water environments to withstand levels that would be toxic in freshwater.

## Treatments

In ponds, nitrite toxicity is routinely prevented by adding sodium or calcium chloride at five times the nitrite concentration. To increase the chloride concentration by 1 ppm per acre-foot of water, use 4.3 pounds of calcium chloride or 4.5 pounds of sodium chloride.

Other methods are available to keep nitrite levels under control, for example, feed rates may be reduced to lower the ammonia available for conversion to nitrite. Increased aeration may accelerate nitrification rates and prevent nitrite from accumulating. In many recirculation systems or smaller pond systems, replacement of part or all of the water with nitrite-free water is a practical

### Treating a Pond for Nitrite: An Example

Assume that a one-acre pond with an average depth of six feet contains 8 ppm nitrite. The chloride required for treatment is 5 (parts chloride) x 8 ppm nitrite, which equals 40 ppm chloride. To determine how much salt to add to the pond, multiply 4.5 pounds sodium chloride by the acre feet of water; then multiply by the ppm of chloride required. In the case of the one-acre pond, 4.5 pounds x 6 acre feet x 40 ppm chloride equals 1,080 pounds sodium chloride.

solution.

Biological filtration units can be inoculated with commercially available nitrifying bacteria to improve or reestablish activity.

## Testing

Because nitrite is toxic to many fish species at relatively low concentrations, you should test frequently. In recirculation systems that support high densities of fish, you may need to test daily. In open pond or cage culture systems, test nitrite several times a week.

Nitrite tests available from test kit manufacturers generally involve a simple one or two-step procedure. Under acidic conditions, nitrite reacts with sulfanilamide to produce sulfanilic acid. Reaction with N-(2 Naphthyl)-ethylene diamine dihydrochloride (NED dihydrochloride) produces red-purple azo dye that can be measured using visual colorimetric devices or electronic colorimeters. This procedure is very sensitive and permits visual detection of nitrite levels below 0.1 ppm in fresh and salt water.

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## Oyster Disease Research Program: The Commercial Connection

The catastrophic decline of oyster populations in Chesapeake Bay -- the consequence of several factors, among them, overfishing, habitat loss and, in recent years, unchecked parasitic disease -- has been the catalyst for federal support of the Oyster Disease Research Program. Its aim, the support of research and extension for developing innovative techniques to restore oysters.

The research program, with initial oversight by the Chesapeake Bay Office of NOAA's National Marine Fisheries Service, is now administered by the National Sea Grant College.

Measurable progress has been made on several fronts in the laboratory and in limited field trials over these last several years, for example, in developing rapid tests for diagnosing disease, in breeding oyster strains that could have better resistance to disease, in better certifying disease-free oyster spat.

While the upcoming request for proposals will continue support of fundamental research, the [National Sea Grant Program](#) is also seeking partnerships that will involve the private sector and extension/outreach in transferring basic research findings and new technology to the field.

Contact [Maryland Sea Grant](#) or your [local Sea Grant program](#) for a copy of the RFP, or visit [National Sea Grant Oyster Disease Program](#) where you will also find descriptions of current research projects.

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## Publications and Internet

*From the Halfshell* is the quarterly newsletter of The Oyster Recovery Partnership. The Winter issue includes brief articles on DNR's Fall spat survey and oyster mortality and on the recent meeting of The Oyster Roundtable at Piney Point. To receive the newsletter, contact Executive Director Robert Pfeiffer at PO Box 6775, Annapolis, Maryland 21401, (410) 269-5570.

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## Tributes and Acknowledgements

**Merrill Leffler, Communications Specialist**

*Maryland Aquafarmer* begins its 13th year of publication with a new look -- though we have

changed the format, we will continue bringing you the latest news on aquaculture developments in Maryland and the mid-Atlantic.

Readers of *Maryland Aquafarmer* know Eastern Shore Area Agent Don Webster, if not personally, at least through the articles he has been writing since 1984. That was the year he started the newsletter -- and for a time Don wrote all the articles, designed it, and produced photo-ready mechanicals for the printer as well. While he has been a first-rate editor, he is more than equal as a writer -- his writing is conversational and exact, which adds up to a stylistic ease. An article such as the one on recirculating systems in this issue is an example. And by all means, read his pointed review in the Fall 1996 issue on William K. Brooks' *The Oyster* (1905), reprinted by The Johns Hopkins University Press -- you will see what I mean. While Don has left editing, he has not left writing; you will continue to get his take on aquaculture.

For some years, June Thomas has been working with Don at the Wye Education and Research Center, putting *Aquafarmer* together for printing and handling the continuously changing mailing list. Keeping up with the latter, which she will continue to do, is no ordinary job, especially as subscriber numbers increase, as do address changes -- we're talking major computer literacy here. When asked for remarks about June's contribution, Webster replied, "you can attribute anything to me about June Thomas, as long as it's great."

One more acknowledgment -- and this is for Steve Rothman and his staff at the Cooperative Extension Service's Ag Duplicating and Distribution, which has been printing *Maryland Aquafarmer* from the beginning. Steve's shop is not only steady and reliable -- the folks there go out of their way to help. And they do terrific work.

Finally a note on the University System of Maryland and aquaculture: together with the University of Maryland Cooperative Extension Service and other units of the UM System -- the University of Maryland College Park, the University of Maryland Eastern Shore, the University of Maryland Center for Environmental Science and the Center of Marine Biotechnology -- Maryland Sea Grant is strongly committed to the development of aquaculture research and education in Maryland. We are working to assist the industry and the public. Toward these goals, you will continue to hear from us -- we also need to hear from you as well on how *Maryland Aquafarmer* can best serve you.

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