

Proceedings of the:



**29<sup>th</sup> Annual Eastern  
Fish Health Workshop**

Rocco C. Cipriano, editor

March 22-26, 1999

Royal Pavillion Resort And Conference Center  
Atlantic Beach, North Carolina



Sponsored by:

**National Fish Health Research Laboratory**

U.S. Geological Survey - Biological Resources Division  
11649 Leetown Road  
Kearneysville, West Virginia 25430

## Editorial Note

The staff of the National Fish Health Research Laboratory welcomes you to the 29<sup>th</sup> Annual Eastern Fish Health Workshop at the Royal Pavillion Resort and Conference Center on Atlantic Beach. Twenty-nine years ago, a small group of federal researchers gathered on the Eastern Shore of Maryland to share their research, discuss problems, plan new studies, and enjoy the fellowship of each other. That first meeting was originally inspired by Dr. Stanislaus Snieszko of the Eastern Fish Disease Laboratory (predecessor to the National Fish Health Research Laboratory) of the Department of the Interior and Drs. Carl Sinderman and Aaron Rosenfeld of the National Marine Fisheries Service Laboratory of the Department of Commerce at Oxford, Maryland. Both laboratories were somewhat close geographically and both researched problems associated with fish disease, but their emphasis differed between the freshwater and marine environment. The early workshops were a focal point that fostered interactions between the two facilities and provided staff members with opportunities to plan and conduct collaborative studies. Within a few short years, fish disease research became well established in the graduate programs of several major universities in the eastern United States and participation in the workshop evolved beyond its original intent. Although the title of the workshop appears to be exclusive for fish, the workshop actually encourages much broader participation in all aspects of aquatic animal health from shellfish to mammals. Furthermore, the workshop remains true to its roots and encourages contributions from researchers, resource managers, biologists, and university personnel working within both marine and freshwater environments. Even though the Workshop has occasionally been held in conjunction with other organizations such as the Fish Health Section of the American Fisheries Society and the International Association of Aquatic Animal Medicine, it is not affiliated with any parent organization and the meeting is an entity unto itself. Today, the National Fish Health Research Laboratory is extremely proud to continue the tradition of the Eastern Fish Health Workshop and serve as its annual host. We hope that you enjoy the meeting and the beauty of the local surroundings, here on the Crystal Coast of North Carolina.

*Rocco C. Cipriano*

**Monday, March 22**

5:00 **Evening Registration And Welcome Reception**

Hospitality room: Seasonal fruit display with yogurt dip, vegetable crudite with ranch dip, international cheese display with cracker, beer, chees and soft drinks

8:00 **Registration Adjourns**

**Tuesday, March 23**

7:00 **Breakfast**

Assorted juices, fresh fruit bowl, scrambled eggs, bacon, sausage, breakfast potatoes, grits, French toast with syrup, cold cereals, bakery basket, butter, preserves, coffee, hot tea, milk

8:15 Panek Welcome

**Session I:** **Bacterial Disease In Fish**

**Clifford E. Starliper, moderator**

National Fish Health Research Laboratory, Kearneysville, WV

8:30	Cipriano	Evaluation Of Single Contact Applications Of Iodophor Against <i>Aeromonas salmonicida</i> , Cause Of Furunculosis	1
8:45	Bader	A Polymerase Chain Reaction Assay To Monitor Channel Catfish ( <i>Ictalurus punctatus</i> ) Eggs For <i>Flavobacterium columnare</i>	2
9:00	Welch	Isolation And Characterization Of A Bacteriophage Which Infects <i>Yersinia ruckeri</i>	3
9:15	Pieper	Mycobacteriosis, Is It Truly A Chesapeake Bay Disease Or East Coast Problem	4
9:30	Gauthier	Detection Of Mycobacteria In Paraffin-Embedded, Formalin-Fixed Tissues Of Striped Bass ( <i>Morone saxatilis</i> ) With Peptide Nucleic Acid (PNA) Probes	5
9:45	Serfling	Evaluating The Effects Of Oxytetracycline On The Microflora Of A Recirculating Aquaculture System	6

**10:00 Morning Break**

**Session II:**

**Unusual Diagnostic Cases**

**Mohamed Faisal, moderator**

Michigan State University, East Lansing, MI

10:30	Wolf	Mystery Of Epizootic Oral Tumors In Spring Chinook Salmon	7
10:40	McLaughlin	Coral Mortalities Along The Kenyan Coast Associated With Extensive Tissue Lysis: Possible Mycotic Etiology	8
10:50	Marcquenski	Catch And Release: The Importance Of TLC	9
11:00	Eissa	First Record Of <i>Renibacterium salmoninarum</i> Isolation From The Sea Lamprey ( <i>Petromyzon marinus</i> )	10
11:10	Bowser	A Case Of Helminth Parasitism In Fish In A Small Impoundment	11
11:20	Mitchell	An Unusual Case: Walleye Lesions in the Visceral Cavity	12
11:30	Marcquenski	A Serendipitous Finding While Screening Spotted Musky for <i>Piscirickettsia</i> sp.	13
11:40	Faisal	Abnormal Growth Associated With An Intracellular Bacterium In The Yellow Perch ( <i>Perca flavescens</i> )	14
11:50		<b>Open Discussion</b>	
12:00		<b>Lunch</b>	

London broil with Bordelaise sauce, parslid potatoes, steamed broccoli, fresh baked bread, death by chocolate, Iced tea and coffee

**Session III:**

**Largemouth Bass Virus Disease**

**John Grizzle, moderator**

Auburn University, Auburn, AL

1:30	Grizzle	Introduction To Largemouth Bass Virus	15
1:45	Bakal	Development Of Non-Lethal Testing Methods For Largemouth Bass Virus	16
2:00	Goldberg	Host, Pathogen And Environmental Factors That Affect The Susceptibility Of Largemouth Bass To Largemouth Bass Virus	17
2:15	Gaskin	Application And Implication Of Serology For Largemouth Bass Virus Infection Of Largemouth Bass ( <i>Micropterus salmoides</i> )	18
2:30	Faisal	Expansion Of Largemouth Bass Virus Range In Michigan's Lower	19

Peninsula Lakes

2:45 **Open Discussion**

**3:00 Afternoon Break**

**Session IV: Emergent Health Concerns Of Ornamental And Tropical Fishes**

**Roy Yanong, moderator**

University of Florida, Ruskin, FL

3:30	Yanong	Cryptobiosis In Cichlidae: Fun For The Whole Family	20
3:45	Neiffer	Fusariomycosis In Captive Parrotfish (Family <i>Scaridae</i> ) And Bonnethead Sharks ( <i>Sphyrna tiburo</i> )	21
4:00	Lewbart	Surgical Cases In Ornamental Fish: A Chance To Heal With Cold Hard Steel	22
4:15	Mauel	Piscirickettsiosis-Like Syndrome In Tilapia	23
4:30	Murphy	Whole Blood and Plasma Cholinesterase Levels In Normal Koi ( <i>Cyprinus carpio</i> )	24
4:45	Elsayed	Ichthyophthiriasis: Atypical Outbreak In Two Susceptible Ornamental Fish Species In Egypt Under The Same Environmental Conditions	25

5:00 **Adjourn**

**Dinner On Your Own**

7:30 **Ghost Tour: Old Burying Grounds, Beaufort**  
(Ticket purchase required)

**Wednesday, March 24**

7:00 **Breakfast**

Assorted juices, fresh fruit bowl, scrambled eggs, bacon, sausage, breakfast potatoes, grits, French toast with syrup, cold cereals, bakery basket, butter, preserves, coffee, hot tea, milk

**Session V: Emergent Issues Associated With Commercial Aquaria**

**Scott Weber, moderator**

New England Aquarium, Boston, MA

8:15	Weber	From Wild To Exhibit: Notes On Caribbean Collecting, Shipment	26
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		And Quarantine	
8:30	Arnold	Diagnostic Microbiology For Small Laboratories: A Practical Guide For The Identification Of Bacterial Isolates From Fish	27
8:45	Frasca	Molecular Approaches To The Diagnosis Of Infectious Disease Concerns In Commercial Aquaria	28
9:00	Harms	Apatite Concretions In Spiral Valve Of Yellow Stingray ( <i>Urolophus [Urolophus] Jamaicensis</i> ) Fetal Pups	29
9:15	Goodridge	Problems With Protozoa: Treating A Large Reef Tank For <i>Cryptocaryon irritans</i>	30
9:30	Arnold	Characterization Of <i>Photobacterium damsela</i> Subspecies <i>damsela</i> Isolates From Teleosts And Elasmobranchs Housed In An Aquarium Exhibit	31
9:45		<b>Open Discussion</b>	
10:00		<b>Morning Break</b>	
	<b><u>Session VI:</u></b>	<b>Myxozoa, Molluscs And Crustacea</b>	
		<b><u>E. Jay Lewis, moderator</u></b> Center for Coastal Environmental Health and Biomolecular Research Cooperative Oxford Laboratory, Oxford, MD	
10:30	Khoo	Further Investigation Into The Brain Parasite In Yellow Perch	32
10:45	Beauchamp	The Discovery Of Four Cryptic Species Of Oligochaete Hosts ( <i>Tubifex tubifex</i> ) Provides Insights Into The Spread Of <i>Myxobolus cerebralis</i> Among Wild Trout Populations	33
11:00	Burreson	<i>Bonamia</i> Sp. (Haplosporidia) Found In Non-Native Oysters, <i>Crassostrea ariakensis</i> , In Bogue Sound, North Carolina	34
11:15	McLaughlin	Protozoan Infections of the Eastern Oyster ( <i>Crassostrea virginica</i> ) in the Upper Chesapeake Bay: A Potential Ecological Forecast	35
11:30	Burnett	The Depression Of Oxygen Uptake In Blue Crabs In Response To Bacterial Challenge	36
11:45	Kapareiko	Effects Of Stressors On Mortality Rates In Lobsters: A Controlled Laboratory Study	37
12:00		<b>Lunch</b>	
		Layfayette crabcakes with Remoulade sauce, saffron rice, sugar snap peas, fresh baked bread, Key Lime pie, iced tea, and coffee	

**Session VII:**

**Trends In Aquatic Animal Diagnostics**

**Stephen L. Kaattari, moderator**

Virginia Institute of Marine Science, Gloucester Point, VA

1:30	Kaattari	Immunodiagnostics In Theory And Practice	38
1:45	Reece	Molecular Diagnostics In Theory And Practice	39
2:00	Burreson	Issues Associated With An OIE Reference Laboratory For Shellfish Disease Diagnosis	40
2:15	Warg	USDA/APHIS And Veterinary Diagnostics	41
2:30	Barbash	Standardization And Implementation Of Molecular Diagnostics Used In The United States Fish And Wildlife Service's National Fish Health Program	42
2:45		<b>Open Discussion</b>	
3:00		<b>Afternoon Break</b>	

**Session VIII:**

**Health And Disease Of Coral Reefs**

**Laurie Richardson, moderator**

Florida International University, Miami, FL

3:30	Richardson	Species Specific Molecular Probe Investigations Of "White" Diseases Of Corals	43
3:45	Rothenberger	Assessment of Bacterial Communities Associated with White Plague-Infected <i>Montastraea annularis</i> Corals from St Croix	44
4:00	Mills	Amplicon Length Heterogeneity - A Tool To Investigate Coral Microbial Communities	45
4:15	Smith	Recent Studies On Yellow Band Disease Of Scleractinian Corals	46
4:30	Gil-Agudelo	Differential Response Of Zooxanthellae To Bacterial Toxins That Produce Bacterial Bleaching In Stony Corals	47
4:45	Sutherland	Histopathology Of The White Pox Disease Of The Caribbean Elkhorn Coral <i>Acropora palmate</i>	48
5:00	McLaughlin	Update On The International Registry Of Coral Pathology	49

5:15 Woodley Shifting the Paradigm For Coral Reef Health Assessment 50

5:30 **Adjourn**  
**Dinner On Your Own**

**Thursday, March 25**

7:00 **Breakfast**

Assorted juices, fresh fruit bowl, scrambled eggs, bacon, sausage, breakfast potatoes, grits, French toast with syrup, cold cereals, bakery basket, butter, preserves, coffee, hot tea, milk

**Session IX:** **Immunological Processes In Aquatic Organisms**

**Lester Khoo, moderator**  
University of Pennsylvania, Kennett Square, PA

8:15 Anderson The Prophenoloxidase Activating System Of The Lobster 51  
*Homarus americanus*

8:30 Wiens Identification Of Tumor Necrosis Factor (TNF) And TNF-Receptor 52  
Superfamily Members Expressed In Rainbow Trout (*Oncorhynchus mykiss*)

8:45 Burge Striped Bass (*Morone saxatilis*) *Nramp* Is Inducible *In Vitro* After 53  
Exposure To LPS And *Mycobacterium marinum*

9:00 Dacanay The Response Of The Immunome Of Haddock To Vaccination 54

9:15 Pasnik Potency And Shelf-Life Of A *Streptococcus agalactiae* Vaccine 55  
In Nile Tilapia (*Oreochromis niloticus*)

9:30 Xu Immune Responses Of Channel Catfish Against *Ichthyophthirius* 56  
*multifiliis* After Immunization With Live Theronts And Sonicated Trophonts

9:45 **Open Discussion**

10:00 **Morning Break**

**Session X:** **Helminths of Fish**

**Alistair Dove, moderator**  
Cornell University, Stony Brook, NY

10:30	Dove	<i>Bothriocephalus acheilognathi</i> : The Australian Experience	57
10:45	Mitchell	Bolbophorus Infections In Catfish: Identification, Impact And Treatment	58
11:00	Cartwright	Preliminary Study On The Mitochondrial Genome Of The Tapeworm <i>Bothriocephalus acheilognathi</i>	59
11:15	Caira	Cestodes Of Elasmobranches: Friends Or Foes	60
11:30	Sokolowski	Histopathological Examination Of Wild American Eels, <i>Anguilla rostrata</i> , Infected With <i>Anguillicola crassus</i>	61
11:45	Burreson	The State Of Science Of Leech Parasites Of Fish	62
12:00		<b>Lunch</b>	
		Chicken Florentine Roulades stuffed with spinach, cream cheese and pine nuts served over white and wild rice with grapes and champagne sauce, tomato parmesan, fesh baked bread, chocolate amaretto mousse with raspberry sauce, iced tea and coffee	
<b><u>Session XI:</u></b>		<b>Chlamydial And Viral Pathogens</b>	
		<b><u>Paul Bowser</u>, moderator</b> Cornell University, Ithaca, NY	
1:30	Draghi	Molecular Characterization Of The Chlamydia-Like Bacterium Associated With Epitheliocystis In Arctic Char ( <i>Salvelinus alpinus</i> )	63
1:45	Bowser	Prevalence Of Walleye Discrete Epidermal Hyperplasia And Walleye Dermal Sarcoma By Age Class In Walleyes ( <i>Sander vitreus</i> ) From Oneida Lake, New York	64
2:00	Merrill	Maine Strain II: A Case History Of The Multidisciplinary Analysis Of An Emerging Infectious Salmon Anemia Virus Strain Variant	65
2:15	Giray	Environmental Persistence Of Infectious Salmon Anemia Virus	66
2:30	Shivappa	Critical Factors For Establishment Of Biosafety Level-3 Aquaria	67
2:45		<b>Open Discussion</b>	
3:00		<b>Afternoon Break</b>	

<b><u>Session XII:</u></b>		<b>Physical, Chemical And Nutritional Elements Affecting Aquatic Animal Health</b>	
		<b>Vicki S. Blazer, moderator</b> National Fish Health Research Laboratory, Kearneysville, WV	
3:30	Demers	The Acute Effects Of A Handling Stressor On Select <i>Oreochromis aureus</i> Plasma Components	68
3:45	Pasnik	Absence Of Intestinal Histologic Changes In Fingerling Channel Catfish ( <i>Ictalurus punctatus</i> ) Fed Raw Soybean Meal	69
4:00	Iwanowicz	Histopathological And Physiological Evidence Of Thyroid Disruption In Common Carp ( <i>Cyprinus carpio</i> ) From The Middle And Lower Rio Grande River Basin	70
4:15	Darwish	Copper Sulfate Target Animal Safety In Channel Catfish	71
4:30		<b>Open Discussion</b>	
4:45		<b>Adjourn</b>	
7:00		<b>Banquet and dance</b>	
<p>“<b>The Hawaiian Luau</b>” includes tropical watermelon basket with fresh fruit, Polynesian carrot salad, cole slaw with pineapple, Pacific conch chowder, broiled mahi-mahi with coconut cream sauce, Maui style sweet and sour chicken, honey suckling pig with condiments, island rice, green beans with water chestnuts, royal rum sweet potatoes, sweet corn squares, banana bread, lemon pie, island fruit tarts, coconut pie, coffee and iced tea</p>			
<p><b><u>Dancing</u></b> by Patrick Pake, DJ America, Inc.</p>			

**Friday, March 26**

<b><u>Optional Program:</u></b>	<b><u>Tumor Biology In Fish</u></b>
	<b>American Fisheries Society/Fish Health Section Continuing Education Class</b>
7:00	<b>Breakfast</b>

	Assorted juices, fresh fruit bowl, scrambled eggs, bacon, sausage, breakfast potatoes, grits, French toast with syrup, cold cereals, bakery basket, butter, preserves, coffee, hot tea, milk
8:30	<b>Class Begins</b>
	<b><u>Instructors:</u></b>
	Vicki Blazer, National Fish Health Res. Laboratory, Kearneysville, WV John Fournie, Environmental Protection Agency, Gulf Breeze, FL Paul Bowser, Cornell University, Ithaca, NY Jeffrey Wolf, Experimental Pathology Laboratories, Inc., Sterling, VA
10:00	<b>Morning Break</b>
12:00	<b>Lunch</b>
	Roasted pork loin with apple brandy sauce, white and wild rice with cranberries, green beans almondine, fresh baked breads, pumpkin pie, iced tea and coffee
1:30	<b>Tumor Biology in Fish</b> , continues
3:00	<b>Afternoon Break</b>
4:30	<b>Class Adjourns</b>
	<b>Dinner On Your Own</b>