J. WARREN

FHS NEWSLETTER

FISH HEALTH SECTION-AMERICAN FISHERIES SOCIETY

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Carrier State of Enteric Septicemia of Catfish (ESC)

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Studies were conducted to investigate the carrier state following experimentally induced enteric septicemia of catfish (ESC). Two groups of 500 healthy channel catfish (5.0 g) were exposed by immersion to a 1:2 dilution of a broth culture of *Edwardsiella ictaluri*. Two control groups of equal size were exposed only to brain heart infusion (BHI) broth without the bacterium (Baxa, Groff, Wishkovsky & Hedrick 1990, Dis. Aquat. Org. 8:113-117). The fish were maintained in 130 l aquaria receiving 25 $\pm$ 2°C well water. The bacterium was recovered from dead and moribund fish at the peak of infection (4 - 8 d post exposure) and a total of 20 % of the fish died from the primary infection. Mortality had ceased after 3 wk and at 1 mo following the initial exposure the bacterium could no longer be isolated from the kidneys of 10 fish randomly taken from each of the two experimental groups. Attempts to isolate the bacterium at 2, 3, and 4 mo post exposure were also unsuccessful although at each sampling all fish showed serum agglutination titers to *E. ictaluri* ranging from 8 to 512. At 4 mo post exposure 20 fish from the experimental group and 20 control fish were injected intramuscularly (0.8 mg/g fish) with kenalog 40 (Triamcinolone acetonide, Squibb, Princeton, NJ), an anti-inflammatory drug. A similar number of exposed fish and control fish were injected with an equal volume of PBS. Two weeks after kenalog administration, all 20 fish in each group were anesthetized, blood collected for determinations of serum agglutinating antibody titers and the kidneys cultured onto the selective *E. ictaluri* medium (Shotts & Waltman 1990, J. Wildl. Dis. 26:214-218), blood agar and BHI plates for reisolation of the bacterium.

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Edwardsiella ictaluri was recovered from 6/20 exposed fish at 14 d after injection with the anti-inflammatory drug (Table 1). The bacterium was isolated in pure culture from these fish using the *E. ictaluri* medium. However, other bacteria were present in several fish, usually *Aeromonas hydrophila*, which appeared on blood agar or BHI plates particularly in the control and exposed groups receiving kenalog. High agglutination titers (8 - >2048) were detected in previously exposed fish treated with kenalog but there was no apparent correlation between the levels of antibody and the ability to recover the bacterium following drug treatment. Titers were also detected in the exposed group not administered kenalog but the bacterium could not be reisolated from any of the 20 fish examined. The bacterium was not found among the control groups either nontreated or treated with kenalog. Although other bacteria were recovered, no antibody titers to *E. ictaluri* were detected in these unexposed groups.

In a second study, groups of previously exposed and control fish from the same populations of fish at 4 mo post exposure to *E. ictaluri* were administered kenalog as described above. At 14 d after kenalog treatments, exposed fish treated and nontreated with kenalog were given a secondary exposure to a full-strength broth culture of the bacterium or to BHI broth without the bacterium. Control (not previously exposed to the bacterium) fish treated and nontreated with kenalog were also given a primary exposure to the bacterium. All fish

dying and those surviving to 14 d post re-exposure to the bacterium were examined for serum agglutinating antibody titers (except mortalities) and their kidneys cultured onto *E. ictaluri* medium for reisolation of the bacterium.

The bacterium was isolated from 2/8 previously exposed fish treated with kenalog which succumbed to infection at 7 - 8 d after the secondary exposure to the bacterium. In addition, the bacterium was recovered at the end of the study at 14 d from all 6 surviving fish (Table 2). Previously exposed fish treated with kenalog did not succumb to infection without a secondary bacterial exposure but the pathogen was reisolated from 2/8 surviving fish examined at the termination of the study. In the absence of kenalog, previously exposed fish did not experience morbidities or mortalities during the 14 d following a second exposure to the bacterium. However, 1/8 fish examined at the end of the study was positive for the bacterium (antibody titer of 128) and all 7 remaining fish examined had high antibody titers (128 - >2048) at the end of the study. Again, no correlation between serum agglutination titers and recovery of the bacterium was observed in these fish receiving a secondary exposure to the bacterium. Previously exposed fish treated or nontreated with kenalog had lower antibody titers in the absence of a secondary bacterial exposure.

Exposure of the control fish (not previously exposed) treated with kenalog to the bacterium resulted in a 100% mortality between 4 and 9 d post infection. In the nontreated control (no kenalog) group exposed to the bacterium 5/8 fish succumbed to infection at 4 - 7 d post exposure. The control fish that received kenalog or no treatment and were not exposed to the bacterium did not show any agglutination titers or any signs of the disease during or at the end of the study.

Our results show that fish previously exposed to the pathogen can harbor the bacterium for periods of at least 4 mo in the absence of any clinical signs or the ability to culture the organism from the kidney. The equilibrium between the host and pathogen during this carrier state however, can be impaired by administration of anti-inflammatory compounds such as kenalog. Presumably other factors perturbing the immune response could have similar effects (eg temperature, hauling or handling stress, etc.). The important role of environmental factors on fish diseases has been well described with nearly all microbial pathogens but only recently have the direct effects of temperature on the functions of catfish lymphocytes been investigated (Clem, Faulmann, Miller, Ellsaesser, Lobb & Cuchens 1984, Dev. Comp. Immunol. 8:313-322). Their study described the stages of the response and the effect of temperature on immune cell functions which may in part explain the distinct seasonal patterns in certain diseases.

When the equilibrium of the carrier state with *E. ictaluri* is disrupted, the bacterium can replicate, spread to other tissues and induce clinical or subclinical disease. Although channel catfish infected with *E. ictaluri* are known to resist the disease (ESC) upon recovery from primary infection (Klesius & Horst 1991, J. Aquat. Anim. Health 3:181-187), our studies indicated that a certain proportion of these fish can continue to harbor the organism (Table 2) and presumably can undergo recurrent episodes of disease.

Defining the immune mechanisms impaired by kenalog treatment will help us to understand how the host sequesters the bacterium. Additionally, a sequential study of the kenalog induced reactivation of the bacterium should lead us to the sites where the bacterium resides during the carrier state.

(See Tables 1 & 2, page 3)

AFS Publishes Robert J. Behnke's Native Trout of Western North America

The trout native to western North America have evolved a great variety of adaptations to often extreme environments. All this diversity and more has been compiled in *Native Trout of Western North America.* By demonstrating the scope and importance of trout diversity for enhancing fishery resources, Behnke has made a major contribution to resource management in North America.

Behnke has drawn not only on published literature and agency reports but on his own vast experience with these fishes as well. He has integrated the biology and ecology these fish with their taxonomy, classification, and evolutionary history to provide the most comprehensive survey of indigenous western trout available in one document.

Books can be ordered from the American Fisheries Society at the following prices: Hard cover: $41.00; AFS members $33.00. Soft cover: $33.00; AFS members $26.00. (Prices include postage and handling). Inquire about the limited edition series.

Table 1. Recovery of *Edwardsiella ictaluri* and serum agglutinating antibody titers in channel catfish previously exposed to the bacterium and then treated with the anti-inflammatory drug kenalog[+].

Group	Bacterial isolation	Agglutination titer (Geometric mean)
Exp + ken	6/20[*]	554.8
Exp - ken	0/20	162.4
Cont + ken	0/20	0.0
Cont - ken	0/20	0.0

[+]Fish were survivors at 4 mo post exposure to 1:2 dilution of full-strength broth culture of the bacterium. *E. ictaluri* was not recovered from this population but agglutinating titers were detected. Exposed (Exp) or control (Cont) fish were injected intramuscularly with kenalog (+ ken) at 0.8 mg/g fish; nontreated kenalog fish (- ken) received an equal volume of PBS.

[*]Bacterium was isolated from 3, 2 and 1 fish with agglutination titers of 2048, 512 and 128, respectively.

Table 2. Incidence of infection in previously exposed (Exp) channel catfish treated or nontreated with kenalog and then re-exposed to *Edwardsiella ictaluri*+.

Groups		Mortality	Bacterial[*] recovery	Agglutination titer (Geometric mean)
Exp + ken				
Re-exposed	2/8	6/6	162.6	(16, 32, 32, 128, 256, 512)[**]
Unexposed	0/8	2/8	28.0	(2, 32)
Exp - ken				
Re-exposed	0/8	1/8	640.0	(128)
Unexposed	0/8	0/8	2.0	
Cont + ken				
Exposed	8/8	-	-	
Unexposed	0/8	0/8	0.0	
Cont - ken				
Exposed	5/8	0/5	896.0	
Unexposed	0/8	0/8	0.0	

[+]Previously exposed (4 mo post infection with 1:2 dilution of full strength broth culture of bacterium) or control fish were injected with kenalog (+ ken) at 0.8 mg/g fish or with an equal volume of PBS (- ken). Fish were re-exposed to the bacterium or to BHI broth without bacterium 14 d after kenalog treatment.

[*]Number of surviving fish positive for *E. ictaluri*. The bacterium was isolated from all dead fish.

[**]Indicate the agglutination titers of fish where the bacterium was recovered.

Iridovirus in Cultured White Sturgeon (*Acipenser transmontanus*) from the Lower Columbia River

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During August and September, 1990, several samples of juvenile white sturgeon from a private hatchery at Dodson, Oregon located about five miles downstream from Bonneville Dam were examined for viruses. The water supply to the hatchery at this time was pumped Columbia River water. The sturgeon juveniles were progeny from four lower Columbia River white sturgeon females, one spawned at the Dodson, OR facility and three spawned by culturists from another private hatchery at Troutdale, OR. Some of the sturgeon juveniles from the hatchery at Troutdale were transferred in June to the Dodson facility.

The fish culturist at the Dodson facility reported that ichthyopthiriasis, columnaris disease and saprolegniasis were problems in July and again in September. In early August, tissues from live juveniles from both private hatcheries were placed on EPC and CHSE-214 cells with no subsequent observation of CPE. On August 10th, 900 juvenile sturgeon were transferred to the Oregon Department of Fish and Wildlife (ODFW) Columbia Region headquarters, Clackamas, OR for further rearing in spring water at 12°C. Many of theses fish became emaciated and weakened, having pale livers and empty guts. About 25% of the fish had died by September 6th. Tissue samples from 18 of these juveniles were inoculated on EPC and CHSE-214 cell cultures with no evidence of CPE developing.

On September 18, thirty moribund fish were collected from the Dodson facility, fixed in Bouins solution for 48 hr then placed in 70% ethanol and shipped to the Fish Disease Laboratory, School of Veterinary Medicine, University of California, Davis, CA for histopathology examination. All 30 fish were confirmed to have basophilic cells in their skin and gills typical of the sturgeon iridovirus. On December 4, fresh tissue samples from three fish were inoculated on WSS-2 cell cultures, but no virus CPE was detected after 2½ months of incubation. Subsamples of the fixed tissues positive for basophilic cells were sectioned and observed by transmission electron microscopy. Virus particles of 267 nm in diameter with a morphology typical of the iridovirus found in California white sturgeon were observed. Juvenile sturgeon losses at the private facility from September 24 to October 24 were about 23%.

This is the first report of white sturgeon iridovirus in the Lower Columbia River sturgeon. We suspect the source of this virus is the Columbia River water which supplied this hatchery. Very likely wild sturgeon in the Columbia River are infected, although this has not been demonstrated. If this virus does occur in wild sturgeon, the likelihood is that it is present in most Northwest white sturgeon populations because white sturgeon are known to migrate from one river system to another by entering the Pacific Ocean (personal communication, Steven D. King, ODFW, Columbia River Management, Clackamas, OR; Chadwick, H.K. 1959. California sturgeon tagging studies, California Fish and Game 45: 297-301). Since 1986, at least three white sturgeon tagged in the Sacramento-San Joaquin systems have been captured in the Lower Columbia River.

We would like to thank Harriet Lorz, Dept. of Microbiology, Oregon State University, Corvallis, OR; John Kaufman, ODFW, Corvallis, OR; and Terry McDowell, Dept. of Medicine, School of Veterinary Medicine, University of California, Davis, CA for the tissue culture work.

Spore-Forming Bacteria Isolated from Fish Feed Found Positive in Direct Fluorescent Antibody Test with *Renibacterium salmoninarum* Antisera

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It has become general knowledge among fish health biologists that commercial fish feed can contain antigens similar to *Renibacterium salmoninarum*, the bacterial pathogen which causes kidney disease (BKD) in salmonids. The nature of these antigens and their possible interference with BKD detection in fish has remained speculative and controversial. Techniques used in the detection of *R. salmoninarum* include the fluorescent antibody test (FAT) and the enzyme-linked immunosorbent assay (ELISA). Both methods are highly sensitive and employ antibodies developed against *R. salmoninarum* to detect specific antigens within fish tissues. Both, however, will sometimes yield positive reactions to commercial fish feed and their components as well. It is quite possible that cells of *R. salmoninarum* are processed into feed from infected fish products. However, unpublished reports have implicated feed types and components of non-ocean origin as well.

Among the several types of bacteria that can be readily isolated from homogenates of fish feed on tryptic soy agar (TSA) incubated at 20°C are several morphological variants of the spore forming genus *Bacillus*. Slide preparations of actively sporulating *Bacillus* cultures were found to give positive reactions during Direct FAT using fluorescein isothiocyanate (FITC) conjugated *R. salmoninarum* antiserum obtained from the Immunobiologics Laboratory (Lot #181-022) of the National Fish Health Research Lab in Kearneysville, West Virginia (NFHRL).

The reacting cells possessed dimensions similar to the spores within the cultures, and these ranged from 0.5 X 1.0 um to 2 X 3 um, depending upon the isolate. Only a portion of spores within a preparation reacted in DFAT, indicating that the cross reaction may occur during the brief period of molecular transformation involved with spore germination and outgrowth. The identification of these organisms as the source of BKD cross reactions was nearly accidental, due to the varying cycles of sporulation in different cultures and their temperature requirments.

Preliminary trials were set up to quantify spore-forming bacteria that can be cultured from fish feed, and to determine if there is correlation with the quantity of positive cells in DFAT preparations of fish feed and some of the components. Varying sizes of trout and salmon diets representing three commercial feed manufacturers, and eight feed components from one manufacturer were aseptically homogenized in phosphate buffered saline (PBS, pH 7.1). Serial ten fold dilutions were plated onto TSA and incubated at 28°C for 24-48 hours. Spore forming bacteria were enumerated and isolated onto TSA for further examination.

Slide preparations of ten fold dilutions (.01 ml drop) were stained with FITC conjugated *R. salmoninarum* antisera obtained commercially (rabbit) and from the NFHRL (goat), prepared from whole cell antigens. Positive and negative controls were employed to confirm conjugate reactivity and absence of autofluorescence. Positive reactions were converted to reactions per gram of original sample, using the formula adapted from Elliot and Barila, 1987 (1).

Plate counts indicated that fish feed contained an average of 3.5×10^5 colony forming units per gram (cfu/g) of bacteria (Table 1). Up to 60% of all isolates cultured from fish feed can be comprised of bacteria which form spores within two days at 28°C. All sporulating cultures gave a strong positive DFAT reaction to NFHRL *R. salmoninarum* antisera. Commercially prepared antisera also cross reacted to the cultures, but fluorescence was weak and cells were poorly defined. Positive DFAT reactions resembling the morphology of *R.salmoninarum* could be observed from cultures containing vegetative rods measuring 2-5 um in length by 1-2 um width that produced small oval spores (0.5-1 X 1-1.5 um) located at one end of the swollen sporangium. Other variants were much larger in size and the fluorescing cells in DFAT appeared much larger than that expected for *R. salmoninarum*. Spore forming bacteria were also isolated from blood meal, blood flour, shrimp meal, fish meal, and herring meal components (Table 1). The highest concentration of bacteria was isolated from shrimp meal (1.6×10^6 cfu/g), and consisted entirely of spore formers which resembled BKD in DFAT.

Observations on slide preparations of feed and feed components were converted to reactive units per gram (ru/g) as displayed in Table 1. All feed types stained with NFHRL conjugate contained a minimum of 10^6/g fluorescing cells that varied in morphology. Fewer

reactions were observed in samples tested with commercial conjugate (Average $6x10^4$ ru/g). Many of the cells observed were similar in morphology to that of *R. salmoninarum* (0.5 X 1.0 um). Seven of eight feed components tested contained a variety of material cross-reactive to the NFHRL conjugate in DFAT. Notable numbers of cells (>10^5 ru/g) resembling *R. salmoninarum* were observed in slides of wheat midds, blood meal, herring, fish and shrimp meals. BKD-like cells which appeared in preparations stained with the commercially available conjugate were observed only in wheat midds and blood meal, in addition to the larger reactions observed in herring meal.

Spores produced by the genus *Bacillus* are highly resistant to adverse environmental conditions such as extremes in temperature, pH and desiccation (2). The observations presented are evidence of their ability to survive through the processes involved in the manufacture of fish feed. This work establishes that sporulating bacteria cultured from fish feed possess the potential to cross react with FITC conjugated *R. salmoninarum* antisera prepared from whole cell antigens. Therefore, it is conceivable that spore forming bacteria are partly responsible for the cross reactions noted in fish feed.

There is no way, however, to determine conclusively from data in Table I that material observed in DFAT of feed is representative of viable and culturable organisms, nor can we assume that they are cross reacting spores. In fact, positive DFAT reactions were observed in wheat midds and soy flour, from which no spore forming bacteria were cultured. In addition, not all samples contained material that cross reacted with both commercial and NFHRL antisera in DFAT. Therefore, it is probable that reacting organisms in addition to the spore forming bacteria described exist within fish feed, and have yet to be identified.

The data encourages further awareness of the antigenic similarity of material within fish feed with *R. salmoninarum*. The significant quantities of potentially cross-reactive material within fish feed can influence the accuracy of a diagnosis if care is not taken to avoid contamination of samples with contents of gastrointestinal tracts fish. The significant number of viable spore producing organisms within feed indicates the potential for their proliferation after ingestion by fish. Furthermore, antigenic material entering the digestive system may not necessarily remain there nor be broken down during the process of digestion. It has been well established in the literature that intact, unhydrolysed proteins can be absorbed across the intestinal epithelium of fish (3). Horse radish peroxidase was used as a soluble antigen with ELISA to trace the absorption of macromolecular structures from the GI tract of rainbow trout to blood circulation, and subsequently to a variety of organs (4).

The findings suggest that further consideration is warranted when unconfirmed, low level infections of *R. salmoninarum* are detected within fish tissues using serological techniques. Confirmation of serological results with selective culture techniques (5) is essential when low levels of *R. salmoninarum* antigens are detected in populations of fish which lack a history and clinical signs associated with the pathogen.

(See Table 1 - page 7).

REFERENCES

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2. Berkeley, R.C.W. and M. Goodfellow. 1981. The Aerobic Endospore-Forming Bacteria. Academic Press, London.

3. McLean, E. and E.M. Donaldson. 1990. Absorption of bioactive proteins by the gastrointestinal tract of fish: A Review. J. Aquat. Anim. Health 2:1-11.

4. McLean, E. and R. Ash. 1987. Intact protein (antigen) absorption in fishes: mechanism and physiological significance. J. Fish Biol. 31(A):219-223.

5. Evelyn, T.P.T., G.R. Bell, L. Prosperi-Porta and J.E. Ketcheson. 1989. A simple technique for accelerating the growth of the kidney disease bacterium *Renibacterium salmoninarum* on a commonly used culture medium (KDM2). Dis. Aquat. Org. 7:231-234.

TABLE 1. Data is quantified per gram from each feed and feed component tested. **cfu/g** = total colony forming units per gram sample cultured on TSA at 28°C; **Spore Formers/g** = cfu/g of spore-forming organisms; **ru/g** = DFAT reactive units per gram sample; **DFAT (NFHRL)** = NFHRL FITC conjugated *R. salmoninarum* antisera; and **DFAT (Comm)** = commercially prepared antisera. Components which are highlighted contained spore forming bacteria which cross reacted with commercial antisera as well as NFHRL antisera.

Feed Sample	Total cfu/g	Spore Formers/g	DFAT(NFHRL) ru/g	DFAT(Comm) ru/g
#3 Salmon Diet	No Data	$8x10^3$	$2x10^6$	$1.6x10^5$
#2 Salmon Diet	$1x10^5$	$5x10^4$	$1.7x10^6$	$3x10^3$
Salmon Brood	$1x10^5$	$2x10^5$	$4.3x10^6$	$1.6x10^4$
3/32 Trout	$2x10^7$	$6x10^4$	$3.7x10^6$	$6.3x10^4$
3/16 Trout	$6x10^5$	$1x10^6$	$1x10^6$	0
#1 Trout	No Data	$1x10^4$	$4.4x10^6$	0
Blood Flour	$1.8x10^5$	$1.5x10^4$	$2.5x10^5$	0
Wheat Midds	$1.2x10^6$	0	$3x10^7$	$4.6x10^4$
Herring Meal	$1.5x10^4$	$1x10^4$	$3.3x10^6$	$3.9x10^5$
Fish Meal	$1.8x10^5$	$1x10^5$	$2.4x10^7$	0
Blood Meal	$4x10^5$	$8.5x10^4$	$1.3x10^7$	$3.5x10^5$
Soy Flour	$3x10^2$	0	$6x10^3$	0
Soy Meal	$8x10^4$	0	0	0
Shrimp Meal	$1.6x10^6$	$1.6x10^6$	$2.8x10^6$	0

Editors' Message

Randy MacMillan has retired from his post as the editor of the Fish Health Section Newsletter and we would like to applaud him for the fine work he has done in that role over the last 3 years. Thank you for your time and effort.

Your new editors are Chris Wilson and Leni Oman. Our addresses are as follows:

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We welcome your contributions, letters, and comments. If possible, please submit your documents in WordPerfect 5.1 on a 3 1/2" or 5 1/4" disk to facilitate processing. If you would like your disk returned, enclose an unsealed, self addressed disk mailer. Photographs are encouraged. As part of our editorial responsibilities we will run submissions through the RightWriter software to check grammar. We will be publishing the newsletter on a quarterly basis: January, April, July, and October, as time and submissions will allow. The deadline for submissions will be the 15th of December, March, June, and September, respectively.

This edition, Volume 3, will be the last for the year, due to inevitable delays in transferring materials, bulk mailing permits, new printers etc. We have attempted to maintain the existing format for this edition, but expect to have a different format for the new volumes in 1993.

We look forward to hearing from you.

Leni & Chris

FHS President's Message

The post of president provides a brief honor for which I am thankful but more importantly, it presents a significant opportunity. With each change of FHS president or other elected officer we have a renewed opportunity to steer the Fish Health Section towards it's mission. Briefly summarized, our objectives are to foster fish health by promoting effective fish health protection practices. This is achieved through our personal association with each other, dissemination of research and other educational material, and cooperation with government and private groups also interested in developing sound fish health programs.

AFS Fish Health Section members are participating in several external programs. The federal Joint Subcommittee on Aquaculture (JSA) has established several work groups or task forces. One task force is addressing various aspects of quality assurance with particular emphasis on therapeutants. The Fish Health Management Task Force initiated a National Aquatic Animal Health Strategy effort that will examine standardized technical procedures, professional standards, extension services, various fish health issues, drugs and biologicals, best management practices, and fish health regulations. Within these efforts there is ample opportunity for Fish Health Section participation.

The Fish Health Section is also engaged in several efforts. The revision of the "Procedures for the Detection and Identification of Certain Fish Pathogens" (the 'Blue Book') is a monumental task and is nearing completion. The Technical Procedure Committee will review the book shortly. The next annual meeting of the FHS will be held July 20-22, 1993 in Denver, Colorado. In 1994 the International Symposium on Aquatic Animal Health will be held in conjunction with our annual meeting in Seattle, Washington. FHS Committees are actively planning these two meetings to ensure their

(**President's Message**, continued)

success. An ad hoc committee on Aquatic Animal Welfare and another on the role of veterinarians in fish health has been formed to recommend FHS policy. The Professional Standards Committee is developing a continuing education proposal. The Long Range Planning Committee has been charged with examining our mission for the future and the role of the fish health professional in aquatic animal health management in the 21st century. I encourage everyone to participate in these discussions as well as the federal initiatives.

Congratulations to the new officers of the FHS and thank you to those willing to run for office. Communication during the last election was not as effective as it should be or will be in the future. I apologize for any misunderstanding that occurred. Several comments were received regarding the fairness of the election because of the female-to-male ratio amongst the candidates. The FHS Bylaws are quite clear in stating that the five member Board of Certification be balanced between Certified Fish Health Inspectors and Certified Fish Pathologists. Nominees for vacancies on the Board will alternate between the two groups. The focus of this election was to balance the membership on the Board. Nominees were solicited regardless of gender, but rather qualification. However, I do thank those who sensitized us to this issue. The FHS does not discriminate on the basis of gender or race. Our focus has always been and will continue to be on professional qualifications.

There are several national issues that the fish health community is dealing with. If we do not participate in the process as individuals or with the FHS, these issues may be decided for us. I encourage all to participate and make your views known. Volunteers may contact any member of the Executive Committee or Standing Committee chairpersons for specific opportunities. Please contact me directly if you have any concerns or ideas that will make our Fish Health Section more effective.

Randy MacMillan, President

UPCOMING EVENTS

1993 Fish Health Section Annual Meeting

The 1993 annual meeting of the Fish Health Section will be held at the Stouffer Concourse Hotel in Denver, Colorado on July 21-23, 1993. This will be a joint meeting with the Midwest Fish Health Workshop group. Dennis Anderson and Pete Walker are handling time and place arrangements. Joe Marcino is handling program arrangements. Start making plans to join us in beautiful Colorado. This meeting could launch a great vacation!

Dennis Anderson

Western Fish Disease Conference

Washington Department of Fisheries is hosting the 34th Western Fish Disease Conference June 14-16, 1993. The meeting will be at Port Ludlow, Washington and will include solicited and contributed papers on all aspects of fish health and the 1st annual WFDC golf tournament. To receive future mailings and call for papers, please contact Bob Rogers, Washington Department of Fisheries, P.O. Box 43154, Olympia, WA 98504-3154. (206) 902-2669.

FHS AFS International Symposium on Aquatic Animal Health

September 4-8, 1994. Seattle, WA. The Fish Health Section will host an international symposium on aquatic animal health. The symposium will be co-sponsored by the Asian Fisheries Society, the European Association of Fish Pathologists, the Japanese Society for Fish Pathology, the U.S. Dept. of Agriculture, and the U.S. Fish & Wildlife Service. The meeting will include sessions on the development of national health strategies, the development and implementation of national and international aquatic animal health regulations, fish diseases, immunology, toxicology/ecotoxicology, neoplasia/proliferative disorders and stress.

Contact Dr. John Rohovec, Dr. Ron Hedrick, or Dr. Jim Winton for more information.

(UPCOMING EVENTS, continued)

ExpoPESCA '92

December 2-5, 1992. Santiago, Chile. Latin America's "Total Fish Show" for fishing, fish processing, seafood, and aquaculture industries. Contact:

Sue Hill
Expo PESCA '92
Emap Heighway Ltd.
MEED House
21 John Street
London WC1N 2BP
ENGLAND

World Aquaculture '93

May 26-28, 1993. Torremolinos, Spain. The conference will be a global forum for evaluating the achievements and discussing the perspectives and constraints of aquaculture worldwide. This is the first call for papers. Contact:

EAS Conference Secretariat
Coupure Rechts 168
B-9000 Gent, Belgium
Tel: +32-91-237722
FAX: +32-91-237604

International Symposium on the Carp

September 6 - 9, 1993. Budapest, Hungary. The Symposium will deal with all aspects of production and management of carp, including the species in the wild. For more information, contact:

The Carp Secretariat
Mrs. G. van der Linden
Bernhardstraat 33
7491 EA DELDEN
The Netherlands

PASSAGES

Vicki Blazer, 1991-1992 Section President, joined the staff of the National Fish Health Research Laboratory, Kearneysville, WV the first of June 1992. She filled the position of Histology Section Leader vacated by Roger Herman when he was selected as Laboratory Director.

Dr. Stephen G. Newman has been hired by IBL Equities Ltd. as the Director of Research. He will also serve as President and CEO of IBL's new subsidiary, International Biotechnologies, Ltd. He may be reached at the following address:

International Aquaculture Biotechnologies, Ltd.
Suite 1280-400 Burrard Street
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New addresses:

Martin Chen
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AWARDS SOLICITATION

The Awards Committee is soliciting nominations from the Fish Health Section membership for the 1993 S.F. Snieszko Distinguished Service Award and the 1993 Special Achievement Award.

The S.F. Snieszko Award is the highest award given by the Section to recognize fish health scientists for outstanding contributions to the profession. Individuals to be considered for this award must be nominated by a current member of the Section. Persons making nominations should obtain six letters of recommendation from fish health professionals that support the nominee's dedication to research, teaching and/or service to the field of fish health. The six letters along with a curriculum vitae for the nominee should be sent along with the letter of nomination. Nomination packages should be sent to the Awards Committee prior to February 1, 1993.

The Special Achievement Award is to provide timely recognition for one-time accomplishment that have a significant impact on the management or control of fish health problems. This award may be given for 1) a unique contribution to the fish health field (such as a new diagnostic tool, a new technique to control disease, etc.), 2) a significant research accomplishment, or 3) outstanding leadership in resolving a major fish health problem. The achievement must meet high standards of science and survive peer review. Individuals to be considered for this award must be nominated by a current member of the Section. The letter of nomination should clearly state 1) the accomplishment; 2) the significance of the accomplishment to the field; 3) the implication of the accomplishment to aquaculture (local, regional, national, or worldwide). Copies of any articles or other documents relating to the work should be included. Nominations for the Special Achievement Award should be made within one year of the accomplishment and may be submitted to the Chairman of the Awards Committee at any time.

These awards are an important part of our Fish Health Section and our chosen profession. Peer recognition for dedication, hard work, and professionalism is important to all of us. While compiling nominations may take a little time away from our individual dedication and hard work, it is an integral part of our professionalism to recognize appropriate achievements.

For submitting nominations or further information, contact:

Peter W. Taylor, Chairman
Awards Committee, FHS
Southeastern Fish Cultural Laboratory
Route 3, Box 86
Marion, AL 36756
(205) 683-6199

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Fish Health Section Newsletter

The Fish Health Section Newsletter is a quarterly publication of the Fish Health Section of the American Fisheries Society. Submissions of any length on a topic of interest to fish health specialists are encouraged with the understanding that material is not peer reviewed. Submissions should be addressed to the editiors or to a member of the publications committee.

Editors:	
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