



Fish Health Section Newsletter

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WORKSHOP PRODUCTIVE

The Second Biennial National Workshop of the Fish Health Section of the American Fisheries Society was held August 24-26 at the Radisson Hotel in Denver. The meeting culminated a summer series of excellent regional fish health gatherings across the country by bringing together 107 fish health specialists with a wide diversity of knowledge and interests for three full days of exceptionally productive technical sessions.

In the opening session FHS President Don Amend traced the historical development and outlined the diverse interest areas of the Fish Health Section. Dr. J. Cameron Stevenson, President of the American Fisheries Society, complimented the Section on its growth and vitality and proceeded to point out its significance to the current changes in the structure and growth of the parent Society.

Following the opening remarks non-concurrent technical sessions on Tropical and Ornamental Fish Diseases, Warmwater Fish Diseases, and Marine Fish and Shellfish Diseases were held. The second day of the meeting was filled with sessions on Coldwater Fish Diseases, Feral Fish Diseases and Their Transmission in Nature, Fish Immunology, and the Development of Bacterins and Vaccines for Use in Immunization of Fish. The last day of the meeting included papers on various aspects of Nutrition and Toxicology and the Epidemiology of Fish Diseases. Professional interest in all of the sessions and papers was characterized by a full house, spirited discussion of the papers from the floor, and a free and productive exchange of knowledge, theories, and opinions that often carried on late into the night.

The workshop gathering was also used to get the membership together to carry on many items of important Section business all of which is expanded upon in other sections of this NEWSLETTER. In summary, the term of office for elected positions was changed to coincide with that of the parent Society and the office of Vice President was changed to one of President Elect. Annual dues for Section membership will be increased for the first time since the Section was begun, going from \$2.00 to \$5.00 annually starting in 1977. Professional certification as a Fish Health Inspector for the purpose of doing disease certification work is finally available through the Section. The FHS/AFS "Blue Book" on fish disease detection and identification will be brought up to date in many areas with the addition of a supplement to be mailed to all members. Many other committees within the Section outlined their progress and activities to date. The significance of the ground work being done today by these people was most evident and should yield important rewards to the Section membership in the future.

Future plans tentatively call for the proceedings of the Workshop to be published as individual papers in a special single issue of the Transactions of the American Fisheries Society following final editorial preparation and peer review. Abstracts are currently available by writing directly to the respective authors.

Dr. Don Lewis, Chairman of the *ad hoc* Program Committee, and the many other members of the Section who worked so hard to put the 1976 Workshop together are highly commended for a job well done. As always, the uncompromising strength and vitality of the Fish Health Section continues to come forth.

Mail Election Ballot inside on page 17

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Aquatic Animal Health *An Editorial Comment*

VIEWS ON CONTROLLING VIRAL INFECTIONS AND DISEASES OF SALMONIDS

Since several North American hatcheries, still operating today, began rearing salmonids before this century began, and since numbers of such hatcheries and production demands on them have increased greatly since the early 1900's, it would appear that salmonid culture in North America is well established as a means of helping to provide fish for sport and recreation, as well as food, over and above what the "un-artificial" capabilities are now and in the future.

In general, the "unnatural" situation created by intensive culture of animals favors outbreaks of infectious diseases that threaten the cultured specimens. Intensive fish culture is no different and, thus, fish disease control (including control of virus caused diseases of salmonids) must be practiced as a means of complimenting fish culture. Fish disease control practiced on fish hatcheries to strengthen fish culture can also benefit our fishery resources since we know the ultimate niche of our cultured specimens will often coincide with that of our natural ones.

There is enough information available to indicate that IPN, IHN, and VHS aren't on the worldwide rare and endangered species list but not enough to promote a totally objective appraisal of how severely fishes in North America are being affected by viruses. The bulk of case history information on salmonid virus diseases probably lies in unpublished records of numerous hatchery owners, managers and hatchery biologists. Printed material on actual numbers of fish losses or monetary losses to virus diseases is extremely



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The NEWSLETTER of the Fish Health Section of the American Fisheries Society is published four times annually in accordance with Section objectives and mailed to the Section membership in good standing at the time of publication. The use of company or registered trade names does not constitute an endorsement but serves only to keep the members informed. Contributions to the NEWSLETTER are encouraged and should be sent to one of the following Committee members no later than the 15th of the month preceding the date of publication to be included in the next quarterly issue. The Newsletter Committee members include:

- Dr. Robert A. Busch (editor), Rangen Research Hatchery, Route 1, Hagerman, Idaho 83332
- Dr. Brian Allee, New Business Research, Weyerhaeuser Co., 3400 13th Ave. S.W., Seattle, Washington 98134
- Dr. John Gratzek, Department of Medical Microbiology and Veterinary Medicine, University of Georgia, Athens, Georgia 30602
- Dr. Glenn L. Hoffman, Fish Farming Experiment Station, P.O. Box 860, Stuttgart, Arkansas 72160
- Dr. Donald V. Lightner, Environmental Research Laboratory, Tucson International Airport, Tucson, Arizona 85706

difficult to find and may not exist for more than a few cases.

The general feelings expressed by many fish pathologists at meetings and in informal gatherings over the past several years are that IPN virus doesn't seem to kill many fish any more and IHN is pretty well limited to the Pacific Coast of North America currently. VHS hasn't been found in North America and the fairly recently isolated *Herpesvirus salmonis* has, thus far, been isolated from only one location in North America, the Winthrop National Fish Hatchery.

From "picking of grapes from the vine" and from personal experience, it is my view that IPN isn't the serious threat I once thought it to be, IHN is causing serious problems along the Pacific Coast but is not established anywhere else in North America and, therefore, doesn't cause problems in such areas, VHS isn't known to exist in North America, and *H. salmonis*, while associated with high post-spawning broodstock losses at Winthrop, cannot presently be considered a serious problem in North America.

So, what do I see as the reasons why virus diseases in salmonids don't seem, to me, to be a big problem in North America, in general, at this time? I'm still trying to determine if I think it's because of, or in spite of, what we've done. Amend (J. Fish. Res. Bd. Canada, 33(4), 1976) has recently discussed prevention and control of virus diseases of salmonids and pointed out that the approaches have been: 1. preventing contact of virus and host, 2. environmental manipulation, 3. immunization, 4. chemotherapy, 5. development of disease resistant stocks, and 6. identifying physiological parameters which allow fish to resist disease. While all of these approaches have been practiced, attempted, manipulation, 3. immunization, 4. chemotherapy, 5. development of disease resistant stocks, and 6. identifying physiological parameters which allow fish



to resist disease. While all of these approaches have been practiced, attempted, or researched, the one practiced the most has been preventing contact of virus and host. Is this approach working? Yes, I feel that it has probably reduced the levels of infection that would likely be present today if laws and regulations restricting the movement of virus infected fish hadn't been in effect. And yes, I feel that reduction of infection levels is related to reduction of disease outbreaks. However, as Amend points out, errors in inspection/certification programs are likely to occur. Also, as long as it is desirable to culture fish that are susceptible to viral diseases, it is going to be impossible to avoid all contact of pathogen and host.

No, I'm not leading up to the "live with it" concept in general, as I feel monitoring of salmonids for virus agents and restriction of stock movements to avoid contact must always remain a part of fish disease control. However, I do feel that some of our efforts in virus infection control have slowed our efforts in other areas of disease control that might have been providing substantial benefits already. Much time and effort is being consumed each year in surveying hatchery populations of fish that have never been virus infected and haven't been exposed to virus infected fish since their last screening. Might this time be better spent testing and investigating other means of disease control such as chemotherapy, immunization or stress alleviation?

Much of the reason for continually controlling viral infections on hatcheries seems to stem from lack of knowledge on how stocking of infected fish affects feral fish in receiving waters. Instead of checking hatchery fish that have no epizootiological link with viruses of concern, might we be further ahead to concentrate this effort on determining if infected stocked fish do adversely affect feral fish they come into contact with? Some data is now being gathered in this regard and it is likely the number of such studies will increase in the future.

There is currently more apparent interest in developing fish virus vaccines than ever before and I feel we should start preparing for ways of utilizing vaccines in fish disease control programs by reviewing our knowledge, thoughts and opinions on monitoring programs, pathogen containment and eradication, the basic natural equilibrium that tends to occur between host and pathogen, and any intrinsic values that might be possessed by virus carriers. How do disease outbreak potentials and likelihood of outbreak severity change with changes in our approach or methods? Which methods provide the greatest benefits in terms of fish quality, fish quantity and cost in the hatchery as well as protection of natural fish stocks?

I do not doubt that virus containment and eradication will continue to play a role in disease control programs for fish but I see that role diminishing if immunization, chemotherapy or stress alleviation prove more effective. Strict avoidance of virus contact has been our best, if not our only means of trying to control viral diseases in many cases in the past but I feel we need to continue to increase our efforts to find better, or at least alternative means, of control for the future. If we can come up with suitable alternatives to the "backhoe to glory" and "pass the chlorine jug" approaches, I can't help think we'll be better off for it.

Dennis E. Anderson
930 Lane Street
Fort Morgan, Colorado 80701

Note - This editorial was condensed from a paper given by Mr. Anderson at the Second Biennial Fish Health Section Workshop this summer in Denver, Colorado. It was invited for presentation here due to the timely and controversial nature of the subject. It is also hoped that its presentation here will help to clarify any misunderstanding remaining from the Denver meeting as to its content or purpose. -Editor-

COMMITTEE NEWS & REPORTS

-EXECUTIVE COMMITTEE-

ACTION TAKEN AT BIENNIAL WHORSHOP MEETING The Executive Committee of the Section met for two evenings during the Second Biennial Workshop in Denver to take action on several pieces of Section business. Of particular interest was the decision to increase the annual dues from the current rate of \$2.00 to \$5.00 annually. This is the first increase in dues for the Section since its beginning four years ago and reflects the significant in services to the membership.

The Committee also stipulated that the officers elected for 1977 only serve a ten month term until September of 1977 and at that time the change in terms of office whould be instituted to coincide with the parent Society, i.e. September to September. The position of Vice President was also changed to the position of President-elect to conform to parent Society procedures and allow for a smoother and more effective changeover in administrations. (for comment or further information, contact Dr. Donald F. Amend, President, FHS/AFS, Tavolek Laboratories, Inc., 2779 152nd Avenue, N.E., Redmond, Washington 98052)

-MEMBERSHIP AND BALLOTING COMMITTEE-

REPORT ON CURRENT MEMBERSHIP ROLL AND RECRUITMENT EFFORTS At the Biennial National Workshop of the Fish Health Section, the Membership and Balloting Committee reported that the Section presently has 238 individual members and 7 library members. Among their activities for the past year, the Committee has been active in reviewing the status of members and non-members, conducting elections, preparing a letter of welcome for all new members, and preparing a promotional brochure on the Section for mailing to appropriate colleges and universities to encourage a wider student membership. (for comment or further information, contact Dr. Gary Wedemeyer, Chairman, Membership and Balloting Committee, FHS/AFS, Wester Fish Disease Laboratory, Naval Support Activity, Bldg. #204, Seattle, Washington 98105)

-NEWSLETTER COMMITTEE-

FHS/AFS NEWSLETTER TO GO FIRST CLASS The Executive Committee of the Fish Health Section recently voted to fund first class postage for mailing of the quarterly FHS/AFS NEWSLETTER. It was noted that first class mailing would be a significant advantage over the present bulk rate in terms of speeding delivery of timely items and official Section business such as elections. The Executive Committee also took action to establish a special library subscription rate equal to the regular membership fee to allow libraries to receive the FHS/AFS NEWSLETTER without the required membership in the parent American Fisheries Society. Bob Busch, Editor of the NEWSLETTER reports that the size of the publication has increased over the past two years on an average of 60%. This growth is not only reflected in size but also in style and breadth of interest areas represented. It is an accurate barometer of the vitality and direction of the Section. Quarterly press runs have grown to over 300 copies with distribution around the world including behind the iron curtain. The publication has become an accepted "window" on the fish health profession and related developments in North America. Printed space has been divided into: Section business, 35%; editorials and cartoons, 13%; disease diagnosis and surveillance, 11%; professional meetings, 10%; parasitic diseases, 8%;

bacterial diseases, 5%; treatment and control, 3%; immunization and immunology, 3%; toxicology, 2%; personal and professional items, 2%; legal and legislative items, 1%; stress and physiology, 1%, virology, 1%; nutrition, 1%; and the remainder to miscellaneous items. The composition of the Newsletter only reflects interests and activity of the membership as expressed through the submission of materials for publication. If any individuals or interest areas feel slighted, it is only because they themselves have not made an effort to contribute materials. (for comment or further information, contact Dr. Robert A. Busch, Chairman, Newsletter Committee, FHS/AFS, Rangen Research Hatchery, Route 1, Hagerman, Idaho 83332)

-NOMINATING COMMITTEE-

CANDIDATES FOR SECTION OFFICER ELECTIONS NOTED The following list of candidates for office in the annual elections of the Fish Health Section has been nominated by Hal Wolf and the Nominating Committee. These officers will be serving only a ten month term in 1977 to bring the Section into phase with the parent Society and other Sections. The new office of President Elect has been added to replace the previous Vice Presidential position. The President Elect from this election for 1977 will then automatically be installed as the Section President for 1978.

Article IV, Section 4. of the FHS By-Laws states that officers shall be elected by a simple majority of the mail ballots returned to the Chairman of the Membership and Balloting Committee by the 15th of December with at least one-third of the active membership of the Section participating. Mail ballots for this election are found on the second to last page of this NEWSLETTER. Please vote and return your mail ballot today.

For the office of President to serve a single ten month term of office, Mr. James W. Warren has been nominated as the sole candidate. Jim is well known to the fish health profession as a charter member of and driving force within the Section since its beginning. Jim is active in the fields of clinical disease diagnosis and certification of fish diseases in his capacity as a Hatchery Biologist with the U.S. Fish and Wildlife Service in Genoa, Wisconsin. He has also played an active role in the design and implementation of fish disease control legislation in both the United States and Canada.

Candidates for the office of President Elect are Mr. Dennis E. Anderson and Dr. John A. Plumb. Mr. Anderson is a clinical diagnostic virologist at the Fish Disease Control Laboratory, U.S. Fish and Wildlife Service, Fort Morgan, Colorado. Andy has been active in the Fish Health Section in a variety of capacities since its inception including editor of the NEWSLETTER and is noted for his candid understanding of the profession, particularly in terms of its practical aspects. Dr. Plumb is Chairman of the Department of Fisheries and Applied Aquaculture at Auburn University and a noted authority on the diseases of warmwater fishes. John has been an active member of the Fish Health Section, serving in a variety of elected and appointed capacities. He is also most active in research pertaining to channel catfish virus disease and the protective immunity of catfish.

Dr. Richard A. Holt and Dr. Robert E. Olson have been nominated for the office of Secretary-Treasurer. Rich is a long standing member of the Section who is presently working as a research biologist with the Oregon Department of Fish and Wildlife in Clackamas. Bob is the resident expert on the parasites of Pacific salmon with the Department of Zoology of Oregon State University at the Newport Marine Science Center.

The two present members of the Nominating Committee are automatically up for election as Chairman of that Committee for the next year. Doug Mitchum is a research Fish Pathologist with the Wyoming Game and Fish Department Research Laboratory in Laramie. Don Horak is a nutrition expert with the Colorado Fish

and Game Department's Fisheries Research Station at Fort Collins.

(submitted by Mr. Hal Wolf, Chairman, Nominating Committee, Fish Pathology Laboratory, 2111 Nimbus Road, Rancho Cordova, California 95670)

-PROFESSIONAL STANDARDS COMMITTEE-

CERTIFICATION OF FISH HEALTH INSPECTORS BECOMES A REALITY

Dr. Richard A.
Heckman, Chair-

of the Professional Standards Committee and the Executive Committee of the Fish Health Section put the finishing touches on the procedures for the certification of Fish Health Inspectors through the Fish Health Section of AFS during the Biennial Meeting in Denver this summer. The Professional Standards Committee has been busy working out guidelines for application to the Section for certification as well as contacting state and federal agencies around the world on acceptance of the FHS list of Certified Fish Health Inspectors.

The Executive Committee voted to accept the revised packet of forms and procedures for certification as recommended by the Professional Standards Committee. It also instructed the Committee that it not be mandatory that the applicant be a member of the Fish Health Section of the American Fisheries Society. It was the Executive Committee's feeling that professional competence should be recognized regardless of professional affiliation and that non-members would recognize the value of membership and join the Section of the basis of its merits.

One Hundred and Fifty dollars will be borrowed from the general fund of the Section to initially finance the activities of the Board of Certification and the Fish Health Inspector certification procedure. This money will be paid back at the earliest possible date from revenues generated by the certification fee and all future money taken from such fees will be held separately for activities related to certification.

The forms of application for Certification of Fish Health Inspectors are presently available by writing to:

Dr. Richard A. Heckmann, Chairman
Professional Standards Committee, FHS/AFS
153 WIDB, Zoology Department
Brigham Young University
Provo, Utah 84602

(for comment or further information, contact Dr. Heckmann) See page 10 of this issue for related information on the Certification process. (ed.)

-TECHNICAL PROCEDURES COMMITTEE-

REVISION OF FHS/AFS "SUGGESTED PROCEDURES" MANUAL

Rapid progress in the
development of diagnostic

technique and our understanding of various diseases of fishes have necessitated the updating of the FHS/AFS *Suggested Procedures for the Detection and Identification of Certain Infectious Diseases of Fishes*. Paul Janeke and the Technical Procedures Committee have been active preparing the revisions based upon professional opinions solicited from the membership and a review of the current literature. The revisions will include a new section on *Herpesvirus salmonis*, addition of Colorado to the known range of CCV, additional information on the non-pigmenting and biochemically variant forms of *Aeromonas salmonicida*, additional references on procedures for detecting asymptomatic infections or prior exposure to the etiological agents of *A. salmonicida*, *Flexibacter columnaris*, IPN virus, and the Enteric Redmouth and Bacterial Kidney Disease organisms, and information regarding the

availability of diagnostic antisera for *Edwardsiella tarda* and two serotypes of *Vibrio anguillarum*.

The Enteric Redmouth section will be revised to note the addition of seven states and one province to the known geographical range, addition of the atlantic salmon to the known host range, as well as new information on its biochemistry and confirmatory identification. Indirect fluorescent antibody procedures will be described for ERM and Bacterial Kidney Disease. The basic indirect fluorescent antibody technique test procedures as well as those for slide agglutination and double immunodiffusion will also be revised. New Jersey will be added to the known geographical range of *Myxosoma cerebralis* and Idaho to that of *Ceratomyxa shasta*. Chum salmon will be added to the known host range of *Ceratomyxa shasta*. A standardized procedure for antibiotic disc sensitivity testing will also be included.

The Executive Committee recently instructed the Technical Procedures Committee to designate David McDaniel as the editor and list the publication date as 1974. This action was taken to help clarify citation of the publication in the literature. The above revision will come out in the form of a supplement to be mailed in the near future to the holders of the manual. A completely revised and rewritten second edition, including changes in pagination, should be forthcoming in two to three years.

The Technical Procedures Committee is also looking at suggested procedures for PPLO detection, integrated diagnostic procedures for Gram negative bacteria, a directory of specialized laboratories, a field comparison of the two suggested procedures for the detection of *Myxosoma cerebralis*, and the inclusion of definitive photographs and photomicrographs. Suggestions and further input from the membership are invited. (for comment or further information, contact Mr. Paul Jancke, Chairman, Technical Procedures Committee, Fish Disease Control Laboratory, P.O. Box 917, Fort Morgan, Colorado 80701)

-Treasurer's Report-

WHO'S WHO OF FHS DELINQUENT IN PAYING DUES

Mr. Ivan McElwain, treasurer of the Fish Health Section

reported at the Second Biennial Workshop that the organization presently has 192 paid members and that 94 of these members are new this year which indicates the tremendous rate of growth the Section is undergoing. However, on the minus side of the ledger, Ivan indicated that there are presently 99 members whose membership dues for 1976 are delinquent and that the list of delinquent dues reads like a who's who of the fish health profession. It was noted that this money is badly needed at the present time for Section activities and it is hoped that the situation will be righted in the very near future. To help the delinquent members identify themselves, a red circle has been drawn around their mailing label on this issue of the NEWSLETTER. (for comment or further information, contact Mr. Ivan B. McElwain, Sec.-Tres., FHS/AFS, P.O. Box 75, Lamar, Pennsylvania 16848)

-AD HOC GLOSSARY OF FISH HEALTH TERMS COMMITTEE-

WORK ON GLOSSARY ENTERS FINAL STAGES OF PREPARATION

Dr. George Post reports that the Glossary of

Fish Health Terms, a project undertaken by the Section during the 1974 Denver Workshop, is now approximately 50% complete in terms of subject matter. Several very important contributions still have yet to be received from people who originally volunteered to cover these areas. No limnological terms have been submitted. Terms on names of diseases (and synonyms), epizootiology, bacteria, viruses, physiology and, to a limited degree, anatomy are missing.

According to Dr. Post, over 1,200 terms have been defined and are on

magnetic cards (with most of the typographical errors removed) in the Department of Microbiology at Colorado State University. Those who volunteered to contribute should get their list of definitions to George as soon as possible so that they may be transposed to magnetic cards. Please search the above list of missing term areas to see if your contribution is in press. Anyone interested in helping to complete one or more of the missing areas or anyone who would like to help review the final manuscript should contact Dr. Post. Let's get this valuable project completed for everyone's use. (for comment or further information, contact Dr. George Post, Department of Microbiology, Colorado State University, Fort Collins, Colorado 80523)

-AD HOC LEGISLATIVE LIAISON COMMITTEE-

COMMITTEE ACTIVE IN ESTABLISHING LIAISON WITH THE VETERINARY
FIELD AND THE VARIOUS VETERINARY PRACTICE ACT PROGRAMS

Dr. Richard
Stroud and
the Legislat-

ive Liaison Committee have been active surveying the veterinary medicine community, national veterinary organizations, and regulatory agencies to establish a working liaison with the fish health profession and FHS/AFS concerning the recognition and acceptance of the broad identification of a "Fish Health Specialist". The Committee surveyed states with regard to accommodating non-DVM "Fish Health Specialists" in the State Veterinary Practice Acts and obtained opinions, rulings, correspondence and other information for consolidation and channeling to the Professional Standards Committee for their reference and future action. Dick reports that at the present time the states are hesitant to make a definitive statement as to whether or not they will allow non-DVM "Fish Health Specialists" to practice fish medicine. A wide variety of responses were obtained but it is not felt that there is yet sufficient data to make a definitive recommendation to the Section concerning the matter. It is also noted by Stroud that the National American Veterinary Medical Association does not include "fish" as a recommended species included under their purview in their model Veterinary Practices Act *per sae*. The International Association for Aquatic Animal Medicine, a veterinary association dealing mainly with marine mammals has also been solicited to review model Veterinary Practices Acts for their comments.

President Don Amend has asked the Professional Standards Committee to proceed with all possible haste and discretion to develop procedures for the registration of "Fish Health Specialists" through the Fish Health Section based upon the findings of the Legislative Liaison Committee. It is hoped that this effort will demonstrate that legitimate competence in the fish health field exists and is dually documented and self-regulated by the Section. This information will then be presented to the various State Veterinary Examining Boards, the AVMA, and related regulatory agencies and professional organizations to solicit support for our program. (for comment or further information, contact Dr. Richard Stroud, Chairman, ad hoc Legislative Liaison Committee, Department of Veterinary Medicine, Oregon State University, Corvallis, Oregon 97331)

-AD HOC NOMENCLATURE OF FISH PATHOGENS COMMITTEE-

NEW AD HOC SECTION COMMITTEE FORMED FOR NOMENCLATURE

Dr. Donald F. Amend,
President of the Fish

Health Section has recently formed a new *ad hoc* Committee on the Nomenclature of Fish Pathogens. Dr. S. F. Snieszko has been appointed chairman of the group whose membership includes Dr. Graham Bullock, Dr. Trevor Evelyn, Dr. Don Lewis, and Dr. Emmett Shotts. The purpose of the new committee will be to help remove the current confusion in the taxonomy of the Aeromonas,

Myxobacteria and Bacterial Kidney Disease fish pathogens. In this regard they will be working closely with the authoritative Bergey's Manual of Determinative Bacteriology and other such reference publications to represent the findings and position of the fish health field. (for comment or further information, contact Dr. Stanislas F. Snieszko, Chairman, Nomenclature of Fish Pathogens Committee, Eastern Fish Disease Laboratory, Leetown, Route 1, Box 17A, Kearneysville, West Virginia 25430)

PROFESSIONAL NEWS & VIEWS

CERTIFICATION AS FISH HEALTH INSPECTOR AVAILABLE Certification of qualified applicants as Fish Health

Inspectors for the purpose of doing infectious disease certifications on fish, fish products, and hatcheries as may be required by law is now available through the Fish Health Section of the American Fisheries Society. Applications will be evaluated by the FHS/AFS Board of Certification and will be weighted with approximately 35% for academic training and 65% for actual work experience and demonstrated proficiency in screening for diseases. The forms of application include sections on 1) academic training which stresses course work in areas associated with infectious diseases and pathology; 2) other training including on-the-job experience, workshops, short courses and etc. giving proficiency in virology and tissue culture, bacteriology, parasitology, histopathology, serology, and immunology; 3) work experience; 4) references familiar with your abilities, background, and experience in fish health including letters of recommendation; 5) familiarity with the recent literature including journals you currently subscribe to, journals available where you work, journals you read regularly in addition to the above, and publications.

Forms of application along with guidelines and procedures for the certification of Fish Health Inspectors through the Fish Health Section are available from the Chairman of the Professional Standards Committee:

Dr. Richard A. Heckmann, Chairman
Professional Standards Committee, FHS/AFS
153 WIDB, Zoology Department
Brigham Young University
Provo, Utah 84602

Completed forms of application along with supportive documents and required letters of recommendation should be forwarded directly to the Chairman of the Board of Certification:

Dr. Fred P. Meyer, Chairman
Board of Certification, FHS/AFS
P.O. Box 862
La Crosse, Wisconsin 54601

DELAYED CPE NOTED FOR VIRAL DISEASES During a recent inquiry by the Technical Procedures Committee of the FHS concerning viral diagnostic techniques, respondents noted several cases of delayed CPE development during routine diagnostic examinations. Diane Elliott of Tavolek Laboratories, Inc. and Dan Mulcahy of the Western Fish Disease Laboratory both reported situations where samples being assayed for IHNV on RTG-2 and FHM cell lines were negative for viral CPE at 10 to 14

days. In both cases, blind passages were conducted and typical IHNV CPE developed in both cell lines. At least one of these situations involved salmonids exhibiting gross clinical and histological signs of IHN. Similar circumstances were reported for CCV epizootics by John Plumb at Auburn University. In some cases, however, CCV CPE in BB cells was not noted until even the second blind passage.

Preliminary results of Dan Mulcahy's current studies also indicates that the time during the spawning cycle when gonadal fluids are collected for IHNV assay may be critical to the efficiency of detecting the virus presence. (for comment or further information, contact Mr. Paul W. Janake, Chairman, Technical Procedures Committee, P.O. Box 917, Fort Morgan, Colorado 80701)

ERM IN NORTH CAROLINA Enteric Red Mouth Disease was isolated for the first time in North Carolina in April, 1976. This outbreak was in a commercial hatchery producing only rainbow trout. The disease was confined to only one raceway containing 70,000 fish averaging 5" in length. Losses were about 1,000 fish per day until treatment was started. Sulfamerazine at 6.6 g/100 kg and furizolidone at 4.4 g/100 kg of fish per day for 10 days effectively reduced daily losses to what was considered normal. Apparently, ERM has now spread throughout this particular hatchery system and prophylactic treatments at a reduced level of drugs are given every 3 weeks for 3-4 days. That owner stated that with treatment the fish production this summer has been very good - probably because with this treatment, endemic furunculosis is under control.

During July of this year ERM was diagnosed in rainbow trout at the Pisgah Forest National Fish Hatchery, North Carolina. In the beginning, only 7-8" fish in two raceways at the bottom end of the hatchery were infected. The fish turned dark in color, went off feed, and became lethargic. Losses were only 100 fish per day out of 12,000 fish in both raceways. This outbreak has now spread to other raceways of rainbow trout from 5" in length to larger future brood stock 9-12" in length. Losses are still low but continuous. About 30 to 40 of the future broodstock fish are being lost daily out of 4,000 fish. However, when ERM infected fish are stressed the losses shoot up. In one instance, 50% of fish transported from the hatchery to a stocking site an hour driving distance away were lost. At the present time some form of treatment should be considered. Just which drugs will be used is still undecided. (for comment or further information, contact Mr. Charles F. Carlson, Hatchery Biologist - Area, Pisgah Forest National Fish Hatchery, P.O. Box 158, Pisgah Forest, North Carolina 28768)

REPORT ON AN OUTBREAK OF ENTERIC RED MOUTH DISEASE IN ATLANTIC CANADA

Enteric Red Mouth Disease was diagnosed in fish stocks belonging to Cape Breton Marine Farming Ltd. during a routine examination by the Fish Health Diagnostic and Control Unit, Federal Fisheries and Marine Service, Halifax (Maritime Region) in early June of this year. This is the first known occurrence of ERM in Atlantic Canada.

The disease was discovered at the saltwater acclimation site in the second of two 80,000 lots of rainbow trout that had been imported to supplement the supply of fish from the company's own hatchery. They had originated from a facility certified not to harbour several designated fish pathogens, including the one responsible for ERM. It is currently believed that the infection was picked up in transit by road. At the time of examination they were undergoing a 10-day acclimation schedule in land-based pools whose effluent discharged close to a pontoon wharf in the saltwater lagoon. Moored alongside the wharf were net cages containing some 115,000 marketable rainbow trout of local origin that had been overwintered at the site. The recently imported fish were list-

less and disinterested in feed; however, the mortality rates were not alarming although the moribund specimens were found to be heavily infected with the ERM bacterium. The local rainbows that had overwintered at the pontoon, and which had not been treated with antibiotics for over a year were examined at the same time, and at the same rate, and no fish was then found to be infected. By the time identification of the disease agent had been completed, the offending fish had been moved to the grow-out site at Seal Island, where they joined two lots of locally hatched rainbows and the first of the imported shipments, all of which had preceded them through the acclimation process. Examination of all fish lots at this site revealed that fish from both imported shipments were infected but none from the two lots hatched locally. A week or so later, however, the latter were found to have become infected as had the marketable trout back at the acclimation site in the saltwater lagoon.

In a decisive bid to eradicate the disease, 350,000 fish were destroyed during the week of June 28 - July 2. With their disposal, the great bulk of the reservoir of the bacteria had been eliminated; however, it was clearly recognized that this action, drastic as it was, may well have been too late if the native fish of the Bras d'Or Lakes had become infected. A plan to capture and destroy native fish inhabiting the vicinity of the cages was immediately instituted in a further attempt to eradicate the disease. These were fish, escapees and natives, that fed on the excess food available in that area. Representative samples of the many such fish netted, mostly perch and herring but also a fair proportion of rainbow trout, failed to produce any ERM isolates. The sites and equipment were disinfected to the extent that this could be reasonably accomplished, and subsequently a monitoring programme has been set up to determine the effectiveness of the eradication attempt. Seven cages, each containing 10,000 6" rainbow trout, unacclimated to saltwater, were set out at the two sites on July 27. Sampling a week later, when the fish, in all probability, were still suffering the stress of direct transition to saltwater, failed to show the presence of the ERM bacterium. A second sampling, after four weeks of exposure, is under way at the time of writing.

The outbreak of ERM has been a decided setback to Cape Breton Marine Farming Ltd. Their planned production this year was for 750,000 fish; however, with the destruction of 350,000 fish (including valuable brood stock) the sacrifice of valuable growing time to clean-up operations, it will be impossible to market any fish this year. Although no final figures are available on the cost of this incident, company officials have estimated the net worth of the destroyed stock alone to be greater than \$250,000. However, great as has been the cost to the company, the total cost to the whole region stands to be much greater if the eradication attempt, the results of which are still uncertain, should ultimately prove to have been unsuccessful. The primary concern of the Fisheries and Marine Service with this hazard, has been with an eye to the future, not only of mariculture in Atlantic Canada, which shows great promise and potential, but also with the future of the wild fish population of the area, that can be reasonably expected to have little or no resistance to an alien pathogen. (for comment or further information, contact Dr. Robin M. MacKelvie, Fisheries and Marine Service, Halifax Laboratory, P.O. Box 429, Halifax, Nova Scotia, B3J 2R3, CANADA)

LABORATORY TESTS OF SEVERAL CHEMICALS AS PREVENTATIVES OF ICH DISEASE

There are several chemicals reported in the literature as cures of Ich infestations. Many of these various treatments were evaluated for their efficacy and minimum doses required to effectively kill freeliving stages of the parasite were established. The results of the tests should aid fish culturists in deciding the rates of chemicals to be used as preventatives.

Continuous infestations of Ich were maintained by a modification of the method originally described by Beckert, 1967. The Ich parasite was initially taken from an oscar (*Astronatus ocellatus*) from a local pet shop. Channel catfish (*Ictalurus punctatus*) of 3-5 inches and known to be Ich free were used to evaluate the treatments. Individual treatments were added to the water containing non-immune, Ich-free fish followed by the addition of heavily Ich infested fish. If no new Ich infections occurred then the chemical was successful in breaking the cycle of the parasite.

Chloramine T at 3-5 ppm daily, malachite green at 0.02 ppm daily, quinine bisulfite at 1 ppm daily, quinine sulfate at 1 ppm daily, sodium chloride at 0.2% and a temperature elevation to 85° F. all resulted in no new infestations. Acriflavine, chlortetracycline, chloramphenicol, copper sulfate, formalin, calcium hypochlorite, methylene blue, potassium dichromate, quinacrine hydrochloride, and a temperature elevation to 80 F. all failed to control new infestations at the dosage applied.

This material was taken from a paper presented at the 1976 Fish Farming Conference, Texas A&M University. Reprints are available from S. K. Johnson, Extension Fish Disease Specialist, Texas A&M University, College Station, Texas. Request reprint No. FDDL-F10.

GLENN HOFFMAN ASKS - IS *Ornithodiplostomum ptychocheilus* A PATHOGEN??

On July 29, 1976 Glenn examined some fathead minnows (*Pimephales promelas*) taken from a bait

minnow rearing pond. The previous week, fish from this pond had been placed in holding tanks where most of them died in 4 days, cause of death not determined. There were sparse numbers of *Dactylogyrus bychowski* and *Trichodina* sp. on the gills of the fish he examined. There was also a tremendous number of *Ornithodiplostomum ptychocheilus* cysts in the cranium. One greatly emaciated fish had a few ectoparasites but the mass of *O. ptychocheilus* cysts was so great that it extended forward into the area of the olfactory lobes and there were many cysts throughout the head. Several fish had severe exophthalmia caused by the large masses of cysts in the orbit.

It is difficult to assess the damage done by this and similar metacercarial infections. It is known that experimental infections with large numbers (200) of certain cercariae will kill small fish, and large accumulations of *Nanophyetus salmincola*, and sometimes *Posthodiplostomum minimum*, will kill fingerlings. In conclusion it is apparent that it is logical to be aware of potential *O. ptychocheilus* and other metacercarial epizootics and be prepared to recommend snail control measures.

For comment of further information contact Dr. G. L. Hoffman, U.S. Fish and Wildlife Service, Fish Farming Experimental Station, P. O. Box 860, Stuttgart, Arkansas 72160.

WHIRLING DISEASE CONTROL REPORTS DELAYED

Two research reports concerning the control of whirling disease

(*Myxosoma cerebralis*) and authored by G. L. Hoffman, J. J. O'Grodnick, and M. E. Markiw were accepted for publication by the Journal of Fish Biology (England), but due to an unforeseen delay caused by a backlog in manuscripts, the authors and the publisher have agreed to allow these timely abstracts to be presented here:

Effects of drying and disinfection with hydrated lime or chlorine by G. L. Hoffman and J. J. O'Grodnick.

Thorough air drying of contaminated mud killed the spores of *Myxosoma cerebralis*. Treatment of simulated earthen ponds with hydrated lime

with up to 4550 g/m² on the wet mud did not kill all the spores. Treatment of simulated earthen ponds with up to 1200 ppm chlorine did not kill all of the spores, however, treatment of contaminated water with 10 ppm chlorine did kill the spores.

Effect of heat on the spores as determined by methylene blue staining by G. L. Hoffman and M. E. Markiw.

Methylene blue staining (0.98%) was used to determine the efficiency of heat treatment in killing spores of *Myxosoma cerebralis*. Nearly all spores heated at 90 C for 10 min and 70 C for 100 min became stained, giving presumptive evidence that they were killed.

For comment or further information, contact Dr. G. L. Hoffman, U. S. Fish and Wildlife Service, Fish Framing Experimental Station, P.O. Box 860, Stuttgart, Arkansas 72160.

NEW PARASITIC PROTOZOA ABSTRACTING SERVICE The publishers of the time-tested Helminthological Abstracts are now abstracting articles on parasitic protozoa. The new journal is PROTOZOOLOGICAL ABSTRACTS, published by Commonwealth Agricultural Bureau, Central Sales Branch, Franham House, Farnham Royal, Slough SL2 3BN, England at \$50 for the first year if ordered before April 1, 1977, and \$100 thereafter. If this publication is comparable to their Helminthological Abstracts, it will be the most complete abstracting service available on parasitic protozoa. (For comment or further information, contact Dr. G. L. Hoffman, U.S. Fish and Wildlife Service, Fish Farming Experimental Station, P. O. Box 860, Stuttgart, Arkansas 72160)

CRAYFISH DISEASE RESEARCH UNDERTAKEN The Monterey Bay Research Institute is currently conducting research on the diseases of crayfish. They are also attempting to put together a living crayfish museum of all crayfish species. In this regard, the Institute would greatly appreciate receiving any infected or mutated crayfish specimens from FHS members for clinical examination. They are also interested in receiving a few live specimens from different areas around the country that represent specie and subspeciation of the crayfish. (for further information or to submit specimens, contact Dr. C. Jean Poulos, Director of Research, Monterey Bay Research Institute, 2700 Chanticleer Avenue, Santa Cruz, California 95065)

FDA OPENS LINES OF COMMUNICATION Following the recent surge of activity concerning the clearance of chemotherapeutic agents for fish, a new awareness by fish culturists of current developments in the area of fish disease treatment and a summer of productive professional meetings on the general subject, individuals within the Food and Drug Administration having a sincere interest in the area and needs of the fish health field have been identified. Dr. Howard Meyers and Dr. Beverly Covey have offered to gladly answer questions, provide information, references, or give referrals to more appropriate sources of information concerning chemicals used in the fish culture field that fall under their jurisdiction. These people may be contacted as follows:

Dr. Howard Meyers, DVM
Food and Drug Administration
Bureau of Veterinary Medicine
5600 Fisheries Lane (HFV-214)
Rockville, Maryland 20852
(301) 443-3183

Dr. Beverly Covey, DVM
Food and Drug Administration
Bureau of Veterinary Medicine
5600 Fisheries Lane (HFV-138)
Rockville, Maryland 20852
(301) 443-3410

MEETINGS & MISCELLAN Y

NORTHWEST FISH CULTURE CONFERENCE DECEMBER 1-2 The 27th annual meeting of
of the Northwest Fish
Culture Conference is scheduled for December 1-2 at the Blue Lakes Inn in
Twin Falls, Idaho. According to Dr. Bill Klontz, chairman of this year's
meeting, registration will begin on Tuesday, November 30 with the meetings
running through Thursday December 2. Several sessions on Fish Disease
Prevention and Control are planned as well as sessions on Fish Genetics,
Hatchery Fish Diets, Hatchery Water Discharge Quality, Fish Hatchery Design
and Renovation, and several sessions on fish culture in general. Due to
the close proximity of the meeting to the commercial trout culture operations
in the Snake River canyon, several members of the industry will be available
to provide tours of their facilities including egg incubation, grow-out,
harvesting, and processing. For further information, contact Dr. G. W.
Klontz, Fishery Resources Program, University of Idaho 83843.

PROCEEDINGS OF III INTERNATIONAL WILDLIFE The Proceedings of the Third
DISEASE CONFERENCE NOW AVAILABLE International Wildlife Disease
Conference edited by L. A. Page is
currently available from Plenum Publishing Company, New York, N.Y. 10011. The
686 page volume costs \$49.50 but is available to members of the Wildlife Disease
Association for \$37.00.

Included in the Proceedings is the symposium titled Diseases of Fishes as
chaired by Dr. G. L. Hoffman. The fish disease symposium covered most aspects
of infectious diseases of fish: N. Fijan, Veterinary Faculty, Heinzlive 55,
Zagreb, Yugoslavia, Advances in knowledge of viral diseases of fish; W. Ahne,
Institute of Zoology and Hydrobiology, University of Munich, Germany, Biological
properties of a virus isolated from grass carp (*Ctenopharyngodon idella* Val.);
G. L. Hoffman, U.S.F.W.S., Stuttgart, Arkansas, Protozoan diseases of fresh-
water fishes: advances and needs; E. B. Shotts and S. F. Suiieszko, College of
Veterinary Medicine, University of Georgia, Athens and Eastern Fish Disease
Laboratory, Kearneysville, West Virginia, Selected bacterial diseases; W. A.
Rogers, Department of Fisheries, Auburn University, Auburn, Alabama, Helminthic
diseases of North American freshwater fishes; O. N. Bauer and G. L. Hoffman,
Zoological Institute, Academy of Sciences, Leningrad, USSR and U.S.F.W.S.,
Stuttgart, Arkansas, Helminthic range extension by translocation of fish; G.
Malmberg, Zoological Institute, Stockholm, Sweden, Diagnostic problems in
connection with fish diseases caused by monogenoideans; Z. Kabata, Pacific
Biological Station, Nanaimo, British Columbia, Canada, A rational look at
parasitic copepoda and branchiura. For comment or further information, contact
Dr. G. L. Hoffman, U. S. Fish and Wildlife Service, Fish Farming Experimental
Station, P. O. Box 860, Stuttgart, Arkansas 72160.

WESTERN DIVISION OF AFS INCLUDES TECHNICAL SESSIONS The Western Division
OF INTEREST TO THE FISH HEALTH PROFESSION of the American
Fisheries Society held

a most informative annual meeting in Sun Valley, Idaho, July 26-29, 1976.
Dr. Ron Goede, current president of the Division and active Fish Health
Section member, put together an excellent program for the occasion. Technical
sessions of particular interest to the fish health professional included the
Environmental Physiology of Fishes chaired by Dr. Gary Wedemeyer and Fish
Culture and Health chaired by Mr. David Erickson. Topics and speakers were:

What kind of physiology information is needed by resource managers?
Dr. Jay Watson, U.S. Fish and Wildlife Service, P.O. Box 3737,
Portland, Oregon 97208

The stress concept in fisheries: Implications in environmental
monitoring. Dr. Carl Schreck, Oregon Cooperative Fishery Research Unit,
Oregon State University, Corvallis, Oregon 97331

Physiological disturbances in fish useful as an early warning that
adverse environmental alterations are occurring. Dr. Lynwook Smith,
Fisheries Research Institute, University of Washington, Seattle,
Washington 98105

Affects of heavy metals on salt water adaptation and migration of
coho salmon. Dr. Harry Lorz, Oregon Fish and Wildlife Department,
Corvallis, Oregon 97331

Problems associated with the physiological monitoring of fish populat-
ions using field sampling techniques. Dr. Richard Wydoski, Utah
Cooperative Fishery Research Unit, Utah State University, Logan, Utah
84322

sent for rep.
Historical View of commercial fish production and outlook for the
future. Mr. Robert Erkins, Buhl, Idaho 83316

Mariculture in perspective. Dr. Jack Donaldson, Oregon Aqua Foods,
Newport, Oregon.

sent for
Ornamental Fish Industry. Dr. Herbert R. Axelrod, T.F.H. Publications,
Inc., Neptune, New Jersey 07753.

The papers will be published in Volume 56 of the Proceedings of the
Western Association of State Game and Fish Commissioners. Copies of
individual presentations can be obtained directly from the author.

JOHN SCHACHTE BECOMES ASSOCIATE FISH PATHOLOGIST IN NEW YORK Mr. Robert H.
Griffiths,

Superintendent of Fish Culture for New York State has recently announced that
Dr. John H. Schachte, Jr. was recently appointed to the vacant Associate Fish
Pathologist position in the New York State Department of Environmental Con-
servation. John is located at the Rome Fish Pathology Laboratory and will be
responsible for fish health control programs in New York's hatchery system.
He will direct the development of a statewide control program through the
promulgation and implementation of regulations to prevent the introduction and
dissemination of certain serious fish diseases.

Dr. Schachte is a native of South Carolina and in 1963 graduated from
Clemson University with a B.S. degree in Biology. Following his discharge as
a Captain from the U.S. Army in 1969, he entered Auburn University in Alabama.
In 1972 he received his M.S. degree from Auburn University and in 1976 his Ph.D.
degree. Both graduate degrees were granted in Fish Pathology. John's Ph.D.
research involved the development and testing of a polyvalent vaccine against
two bacterial fish pathogens using three routes of administration; injection,
oral and immersion. Fish disease control by immunization is a rapidly
developing technique and John brings to the job a high degree of expertise in
this field. New York State is proud to have him on the Bureau of Fisheries
staff. (for further information, contact Dr. John H. Schachte, Rome Fish
Pathology Laboratory, Rome, New York 13440)

BOOK REVIEW: DULIN - DISEASES OF MARINE AQUARIUM FISHES *Dulin, Mark P.*
1976. Diseases
of marine aquarium fishes. T.F.H. Publications, Inc., Neptune City, N.J.
07753. 128 pages. \$4.95. This book, the first of its kind, written primarily for the marine fish fancier, is intended to help: 1) prevent diseases by proper management and, 2) successfully diagnose and treat diseases then they are present. Included are chapters on: 1) Health related aspects of setting up a marine aquarium, 2) Fish anatomy, 3) Epidemiology, 4) Prevention, 5) Post-mortem examination, 6) Diagnosis and treatment, and treatment charts, conversion charts, and a glossary of terms.

It might be noted that correctly the term epizootiology refers to man while the term epizootiology is used in reference to animals including fish. Because professional help is usually not available directly to the aquarist, the author attempts to help diagnose disease problems by gross observations. The reader will probably benefit from this help but in many instances, professional help may still be needed. Ten of the illustrations concern freshwater fish parasites instead of marine forms; the reasons should have been explained. Although only selected examples of pathogens are illustrated, it would have been helpful to give the species names in the captions. Masoten, not Dylox, is cleared for aquarium fish use. The author should explain that Furanace is used for bacterial infections of fungus infested fish. Furanace is not included in the section on bacterial disease treatments. Not mentioned is the fact that if sand/gravel nitrifying filters are used instead of activated charcoal in water re-use systems, some therapeutants can be added.

In spite of these minor criticisms, I think marine aquarists and disease specialists will find this book helpful. (for comment or further information contact Dr. Glenn L. Hoffman, U.S. Fish and Wildlife Service, Fish Farming Experimental Station, P.O. Box 860, Stuttgart, Arkansas 72160)

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MAIL YOUR COMPLETED BALLOT TO: Dr. Gary Wedemeyer, Chairman
 Membership and Balloting Committee, FHS/AFS
 Western Fish Disease Laboratory
 Naval Air Support Activity, Bldg. #204
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if your name and address mailing label on this issue of the FHS/AFS NEWSLETTER is circled in red, you have not paid your 1976 Section dues according to our records. If not paid, your name will be removed from our mailing lists and this will be the last issue of the newsletter that you will be receiving. There are presently over 90 unpaid members from last year that fall into this category. This money is badly needed so please use the application blank provided below and renew your membership in the Fish Health Section. Please, do it now!!

Membership in the Fish Health Section of the American Fisheries Society is available to and encouraged for all persons interested in aquatic animal health and furthering the stated objectives of the Section. By charter, Fish Health Section membership is open only to individuals who are members in good standing of the parent American Fisheries Society. AFS membership applications are available from the Secretary-Treasurer or Chairman of the Membership and Balloting Committee.

Please fill out the attached blank for either new or renewal membership. Annual dues in the amount of \$2.00 are payable by check or money order made out to the Fish Health Section/AFS. Mail your completed application and dues payment to:

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Fish Health Section/AFS
P.O. Box 75
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-1976-

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Dr. Robert A. Busch, Editor
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