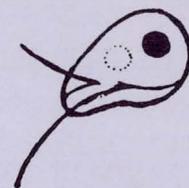


FISH HEALTH SECTION

A S F

NEWS LETTER



Volume 12, Number 3

July, 1984

FISH HEALTH PROTECTION IN THE PACIFIC NORTHWEST

Jim Warren, U.S. Fish & Wildlife Service, Vancouver, WA.

Pacific Northwest fish pathologists, hatchery administrators and field personnel have struggled to control fish diseases for fifty years or more. In late 1983, with the support of the Columbia River Basin Fish and Wildlife Council, a group of federal, state, private and Indian tribal representatives laid the groundwork for the creation of a broad-based Pacific Northwest Fish Health Protection Committee (PNFHPC). The PNFHPC represents a new approach to dealing with old, deeply entrenched fish disease problems affecting a complex fishery resource comprised of significant anadromous fish populations and the largest commercial trout egg and market fish production operations in the world.

The complexity of Pacific Northwest fish disease problems occurring in a shared resource, over an extended period of time, overtakes the disease containment and control capabilities of individual agencies or organizations. Shared waters, migratory fish stocks and scarce management and research dollars dictate the pooling of information and effort to set mutually agreed-upon goals and priorities. The appearance of the PNFHPC on the Northwest scene will not provide the immediate solution to these longstanding problems but the committee can lead to important changes in the perception of disease control by key participants and contribute to more consistent and widespread application of technical information in an integrated program.

Several basic principles must be taken into account when organizing voluntary interorganizational fish health protection programs for major geographic areas. Included are:

- Broad representation, from the earliest possible time, is of critical importance. Too often, benevolent "white hatted" governmental fisheries personnel meet to make important decisions affecting private sector or Indian interests without providing for their participation. Fish disease control programs have been no exception. Full and equal participation by all parties is a basic principle that must be included if a fish health protection program is to make good progress.
- Effective communications between all interested parties is essential. Support can only come from those who know what to support and why. Communications between governmental and non-governmental groups is especially important because informal communications often take place between governmental representatives as a consequence of other opportunities to meet or speak together.
- Jurisdictions must be respected. A comprehensive basin-wide or regional fish health protection program must rely on the cooperating parties for the implementation of disease control program elements. The fish health protection program devised and adopted by the cooperating parties can best serve as a "model", or in an advisory capacity, to provide direction for the development of local policies, programs and regulations. It can be used as a "yardstick" by which the cooperators can determine their progress toward meeting the standards or goals set by the group or compact. Flexibility and local interpretations must be allowed for as cooperators strive to reach agreed-upon objectives.

- The strategy of consensus has proven useful in dealing with controversial issues in many situations. Progress may be slow when decisions must be reached by consensus because issues must often be dissected into parts the group can deal with and reassembled into components that may be quite different from what was originally expected. The result is agreement among participants.
- Finally, a positive approach helps stimulate progress. All co-operators and interested observers must be advised of the advancements made through implementation of the recommended program. This helps to build confidence in the program and often motivates a review of efforts within organizations that may not have progressed as rapidly as others.

These were some of the considerations as the steering committee drafted the goals and charter for the PNFHPC in November, 1983.

The first meeting of the full committee was held January 24-25, 1984 in Portland, OR. Highlights of that meeting included:

- Adoption of an edited charter for the PNFHPC which saw the withdrawal of the Canadian delegation (because of distance and cost factors they felt would bar their full participation as members) and the extension of the Area of Concern to the Snake River tributaries in Wyoming, Utah and Nevada.
- Election of PNFHPC officers:
Kevin Amos, WDF - 1984 Chairman
Dave Ransom, OR private sector - 1984 Vice-Chairperson and 1985 Chairperson-Elect
Jim Warren - Executive Secretary serving indefinitely at the pleasure of the committee
- Distribution of a DRAFT Fish Health Protection Policy for the Pacific Northwest for review and comment.

Following the meeting, Chairman-elect Kevin Amos appointed subcommittees to begin work on the design of a fish health database system, incorporating editorial comments into a final draft fish health protection policy, and the development of a comprehensive fish disease prevention and control program.

These subcommittees met during March and April, 1984, along with special work groups devoted to developing a disease classification system, technical lab procedures, and the basic components of the comprehensive plan. Out of this work a system for identifying and prioritizing research studies can be developed, as well as a method for identifying fish cultural procedure and facility changes needed to enhance fish health.

Although work has just begun, a spirit of cooperation and active support exists already. Difficult projects lie ahead but the pool of willing talent in the Pacific Northwest is fully commensurate with the staggering array of problems to be solved. The next meeting of the Pacific Northwest Fish Health Protection Committee is slated for September in Olympia, WA. A clearer view of the direction and momentum of the program may emerge from that meeting.

FHS OFFICERS AND COMMITTEES 1983-84

EXECUTIVE COMMITTEE

Voting Members

Glenn Hoffman, Chairman and President, FHS
Trevor Evelyn, President-Elect
Emmett Shotts, Immediate Past President
Doug Anderson, Secretary-Treasurer
Jim Warren, Chairman, Nominating Committee

Non-voting Members (Chairmen of Standing Committees)

John Rohovec, Newsletter and Publications Committee
Tom Schwedler, Awards Committee
Howard Jackson, Membership and Balloting Committee
Paul Janeke, Professional Standards Committee
Kevin Amos, Technical Procedures Committee

STANDING COMMITTEES

Nominating

Jim Warren,, Chairman (elected)
John Schachte
Diane Elliott

Newsletter and Publications

John Rohovec, Chairman
Dave Ransom
Jim Winton
Tom Wellborn
Jack Gratzek

Membership and Balloting

Howard Jackson, Chairman
Ron Goede

Technical Procedures

Kevin Amos, Chairman
Emmett Shotts
Ray Brunson
Ken Johnson
Ellis Wyatt

Professional Standards

Paul Janeke, Chairman
Jim Carlisle
Doug Mitchum
Dave Ransom
Bev Larson

Finance

Doug Anderson, Chairman
Howard Jackson (Membership)
John Rohovec (Newsletter)

Awards

Tom Schwedler, Chairman
Emmett Shotts (two years)
Dennis Anderson (three years)

BOARD OF CERTIFICATION

(Elected)

Doug Mitchum, Chrm. (3 years)
Tom Wellborn (1 year)
Jim Warren (2 years)
Gary Camenisch (2 years)
Kevin Amos (3 years)

AD HOC COMMITTEES

(Appointed)

Archives

Joe Sullivan, Chairman

Bylaws

Emmett Shotts, Chairman
Jim Warren
Fred Meyer

Directory

Rowan Gould

Fish Health Evaluation

Ron Goede, Chairman
others to be selected

International Meeting

Dick Heckmann, Chairman
Bill Rogers
Leo Margolis
Barry Hill
Dave Conroy

Program

Glenn Hoffman, Chairman
Ken Johnson

Time and Place

Drew Mitchell, Chairman
Billy Griffin
Jimmy Camper

FROM THE EDITORS

The editors would like to acknowledge the support they have received. The number of high quality reports that we have received from the membership has made our task somewhat easier. We appreciate your interest in the Section and encourage continued submission of newsworthy articles. The other members of the publication committee, Tom Wellborn and Jack Gratzek, have worked diligently and are to be commended.

In our initial issue we indicated that we would reserve space in the Newsletter for thought provoking, unique, or controversial issues to be discussed. The "Special Contributions" section is available for these topics and we solicit submissions for this part of the Newsletter. Surely there are issues about which you are concerned and wish to air your opinion. Please help us in this area.

It has come to our attention that the Newsletter has not been received by some of the membership. We receive mailing labels from the parent society who informs us that those who are delinquent in dues payment are not included in the mailing list. If you, or any colleague, have not received recent issues of the Newsletter, please contact the AFS (phone (301) 897-8616).

If you want back issues of this volume, please contact one of us. Three issues have been published for volume 12. From our investigation into why some individuals are not receiving the Newsletter, we became aware of a somewhat distressing fact: Our current membership is 376 which is a decrease from more than 500 members.
DPR, JSR, JRW

PASSAGES

Keith A. Johnson has moved from Connaught Laboratories Ltd. to assume a position in the Southern Southeast Regional Aquacultural Association, P.O. Box 6916, Ketchikan, AK 99901. Phone (907) 225-9506.

Tom Schwedler has moved from Mississippi to assume a position at Clemson. He is an assistant professor and an extension fisheries and aquaculture specialist. His new address is Department of Entomology, Wildlife and Fisheries, Clemson University, Clemson, SC 29631. Phone (803) 656-3111.

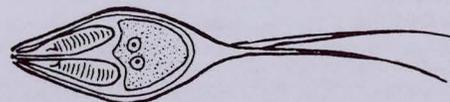
David Becker, 55, a professor at the University of Arkansas was killed March 16, 1984, when a light plane in which he was a passenger crashed. Dave was a pathologist who was interested in the effects of reservoir impoundment on fish parasites.

POSITION ANNOUNCEMENT

Assistant Fish Pathologist. Anadromous, Inc., a salmon ocean rancher located in Oregon, is seeking an enthusiastic, motivated individual, pursuing a career in fish pathology. Send resume and salary requirements to Anadromous, Inc., c/o John Cvitanich, 500 S.W. Madison, Corvallis, OR 97333.

FHS-LITTLE ROCK

The plans for the Fish Health Section joint workshop with the Midwest Fish Disease Group have been finalized. The program of this meeting, which has been dedicated to Doc Snieszko, has been distributed to the membership. The organizers of the workshop are Glenn Hoffman, Ken Johnson, Drew Mitchell, Billy Griffin, and Jimmy Camper. They have worked hard to make the FHS-Little Rock meeting a success.



BY-LAWS COMMITTEE REPORT

Emmett Shotts, Chairman

The By-laws Committee is considering a number of changes and would like the membership to review those which follow.

Proposed Changes in the By-Laws of the Fish Health Section, AFS:

Current reading:

Section 5. Officers: The officers of the Section shall be a **President**, a **President-Elect**, and a **Secretary-Treasurer**.

a. All officers shall be elected by mail ballot, as provided below, for a term of one year and shall serve without salary or other compensation from the Society or Section.

b. No member shall hold the same office, except that of Secretary-Treasurer, for more than one consecutive term.

c. Candidates for office shall be nominated by the Nominating Committee.

d. In the event of a vacated position, the Executive Committee shall appoint a qualified replacement to complete the unexpired term.

Proposed reading:

Section 5. Officers: The officers of the Section shall be a **President**, a **President-Elect**, and a **Secretary-Treasurer**.

a. All officers shall be elected by mail ballot as provided below for terms extending from September to September and shall serve without salary or other compensation from the Society or Section unless specifically authorized by a mail ballot of the Section membership.

b. Except for the office of Secretary-Treasurer, no member shall hold the same office for more than one consecutive term; the incumbent for the Office of Secretary-Treasurer may serve two consecutive terms.

c. Terms of office shall be as follows:

- President - one year
- President Elect - one year
- Secretary-Treasurer - three years per term

d. Candidates for office shall be nominated by the Nominating Committee.

e. In the event of a vacated position, the Executive Committee shall appoint a qualified replacement to complete the unexpired term.

Current reading:

Section 8. *Standing Committees:* The President shall appoint Section members in good standing to the following Standing Committees, whose activities shall not duplicate nor conflict with committee work or projects of the Society:

Current reading:

a. *Nominating Committee:* The Nominating Committee shall consist of a Chairman and two members. The Chairman shall be elected by the membership, by mail ballot, in the regular election. The candidates shall be the two appointed committee members currently serving. In the event that one or both committee members decline or cannot become candidates for the chairmanship, the Executive Committee shall select consenting qualified candidates.

Proposed reading:

a. *Nominating Committee:* The Nominating Committee shall consist if a Chairman and two members elected by the membership, by mail ballot, in exception of the 1984-1985 election when one member shall be elected for three years and one for two years. The third member of the committee shall be elected for a one-year term from the two incumbant members and shall serve as Chairman. Each year thereafter one new member shall be elected to the committee. The Chairman shall be the senior member on the committee. In the event that the senior person is unable or unwilling to serve, the president shall name the next in line as Chairman.

The Nominating Committee shall nominate a slate of at least two candidates for the office of President-Elect, Secretary-Treasurer, and for membership on the Board of Certification for an annual election. Nominations of FHS members in good standing may be submitted prior to March 15 to the Nominating Committee Chairman. Nominating petitions must be signed by at least ten Section members in good standing and have the consent of the nominees to be considered by the Nominating Committee. The Chairman of the Nominating Committee shall check the eligibility of all nominees with the Membership Committee before the official ballot is prepared.

Current reading:

h. *Records and Archives Committee:* This committee will consist of a Chairman and two members. Its responsibility shall be to compile and maintain a chronological historic record of the activities of this Section together with documents and/or other materials significant to the evolution and history of the Section. It shall be this committee's duty to obtain the minutes of business meetings, programs and proceedings of Section meetings, annual membership list, certification approvals and any other data of significance.

Proposed reading:

h. *Archives Committee:* The Archives Committee shall consist of a Chairman and two members selected by the President. Appointments shall be for a term of three years, with the exception of the 1984-85 year when one member shall be appointed for three years, one for two years, and one for one year. Each year thereafter, the President shall appoint one new member to the Committee. The Chairman shall be the senior member on the Committee. In the event that the senior person is unable or unwilling to serve, the President shall name the next-in-line as Chairman.

The Archives Committee shall maintain permanent records of all activities and actions of the Section, including the constitution and by-laws, elections, rosters of officers, membership, meeting sites, awards, publications, photographs, affiliations, and such other business that has historical significance subject to the approval of the Executive Committee. This committee shall also establish a permanent site for the repository of materials and make arrangements for housing the archives. An up-to-date record of current materials in the archives shall be filed annually with the President and Secretary-Treasurer of the Section.

Section 8. Standing Committees.

Current reading: None

Proposed reading:

8. *Time and Place Committee:* The Time and Place Committee shall consist of a Chairman and two members selected by the President. Appointments shall be for a term of three years, with the exception of the 1984-85 year when one member shall be appointed for three years, one for two years, and one for a one-year term. Each year thereafter, the President shall appoint one new member to the Committee. The Chairman shall be the senior member on the Committee. In the event that the senior person is unable or unwilling to serve, the President shall name the next-in-line as Chairman.

The Time and Place Committee shall be responsible annually for submitting to the Executive Committee a list of several appropriate cities where the annual or biennial meeting of the Section might be held and to make a recommendation for the site of the next meeting. The Committee shall be responsible for developing information on each city, for obtaining invitations from individuals willing to serve as local arrangement host(s), and for ascertaining whether available facilities are adequate. The Committee shall also work closely with other Sections of AFS and Regional groups of the FHS concerning joint meetings and shall observe any negotiated agreements between the FHS and such groups concerning joint meetings. The Committee shall also maintain a record of meeting sites over the preceding ten years.

ANEMIA OF COHO SALMON IN OREGON

Rich Holt

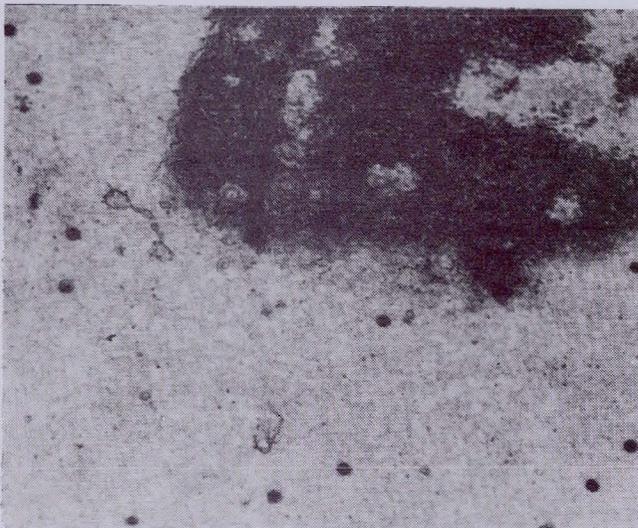
Oregon Department of Fish and Wildlife
Department of Microbiology
Oregon State University
Corvallis, OR 97331

John Rohovec

Department of Microbiology
Oregon State University
Corvallis, OR 97331

We have observed several serious losses of juvenile and yearling coho salmon in which the fish were severely anemic. There are similarities in these outbreaks but there appear to be at least two different diseases. In the first, which has been observed at least once at each of three Oregon coastal hatcheries since 1980, very unusual disease signs are encountered. Juvenile coho begin to die about 15 minutes after feeding. The moribund fish appear lighter in pigmentation and their gills turn nearly white. These animals often have fresh food in their stomachs. Changing the diet has not alleviated the problem. When the caudal peduncle is severed to collect blood, very little fluid can be obtained and hematocrits are usually less than 13%. Mortality ranges from 1-6% and usually occurs in August and September when water temperatures are warmest and water flows lowest. Studies are in progress to determine if this disease has an infectious etiology. The possibility of non-infectious causes such as copper toxicity and bacterial toxins are also being explored.

A different type of anemia of yearling coho was observed at three Columbia River hatcheries this spring. At one site the fish had a high incidence of external fungus which occurred near the dorsal or caudal fin or on the snout, and the affected fish were distributed along the sides of the raceways. At this site and at others where this disease occurred, *Cytophaga psychrophila* and *Renibacterium salmoninarum* were detected in many of the anemic fish. Unlike the disease seen at the coastal hatcheries, much fluid could be collected after severing the caudal peduncle, and these fish did not die after feeding. Giemsa stains of blood smears revealed the presence of erythrocytic inclusions similar to those seen by Steve Leek and Jim Wood in fish showing similar signs. Blood samples examined by electron microscopy showed virus particles in many of the RBC's. These particles are morphologically distinct from those causing what is currently known as VEN. The most striking difference is the size. The particles which we observed were only approximately 80 nm in diameter. We are currently examining other stocks of yearling fish suffering from chronic bacterial or fungal infections to determine if they also are infected with an erythrocytic virus. Attempts to transmit this disease in the laboratory are also in progress.



Electron micrograph of erythrocyte containing viral particles

TOXIC METHEMOGLOBINEMIA AND HIGH NITRITES

John R. MacMillan

Area Extension Fisheries Specialist
Extension Wildlife and Fisheries
Stoneville, MS 38776

Nitrite induced toxic methemoglobinemia (brown blood) has been well documented. In this regard the chloride to nitrite ratio appears extremely important for determining the percentage of hemoglobin molecules in erythrocytes affected. Channel catfish, *Ictalurus punctatus*, are very sensitive to nitrite induced methemoglobinemia. A 3:1 chloride to nitrite ratio is thought to be effective for preventing significant stress and mortality from brown blood. Increasing clinical evidence, however, indicates this ratio may be inadequate for farm raised channel catfish in Mississippi.

If brown blood occurs, and a 3:1 chloride to nitrite ratio is established, within 24 hours the brown blood will be reversed. When temperatures are cold, it may require a longer period for reversal. In nearly 100% of the brown blood cases examined at the MCES diagnostic laboratory, bacterial infections or heavy parasite infestations occur within 2 weeks. These sequelae are particularly difficult to alleviate and 10-15% of the fish in a pond may die as a result. Stress and its physiologic manifestations are the presumed cause of these diseases.

In a significant number of investigations, the 3 chloride to 1 nitrite ratio does not adequately reverse the brown blood. Frequently a 5:1 or 6:1 ratio must be obtained before the brown blood returns to its normal red appearance. Fish may or may not be anemic.

Additionally, even though catfish producers may obtain presumptively adequate chloride levels in pond water, whenever nitrite levels do rise, significant mortalities may ensue. An evaluation in nitrites themselves correlates with increased mortality and seems independent of grossly detectable brown blood. It is known that a 3 chloride to 1 nitrite ratio does not totally eliminate brown blood but merely diminishes the percentage of methemoglobinemia and anoxic stress on fish to a tolerable level. Whether those fish subjected to minimal levels of methemoglobinemia are further compromised by additional physiologic stressors is not known. The presence of nitrites may only correlate with other more significant perturbations in water quality which affect fish health. Research is being conducted at the Delta Branch Experiment Station, Stoneville, Mississippi, to further elucidate these problems.

SALMINCOLA CALIFORNIENSIS CONTINUES THE MARCH EASTWARD

G.L. Hoffman, Fish Pathologist, USFWS,
Fish Farming Experimental Station, Stuttgart, AR

In 1978 (FHS/AFS News 7(2):7) I made a brief note of the migration of this tenacious gill and mouth parasite of rainbow and steelhead trout. Apparently *S. californiensis* is native to the geographical area of the original native stocks of *Salmo gairdneri* (Western US; as far east as the Snake River drainage). In the 60's it had been seen by Jimmy Camper in Missouri. I saw it in Arkansas in 1977 and West Virginia in 1979. Now it has almost reached the East Coast, having been found by Ed Washuta in a private trout hatchery in New Jersey. How does it migrate? Certainly it can be transferred on live fish. Ed and I suspect that it can also be transferred with trout eggs. Until someone proves otherwise we will presume that this has been, at least in part, the mode of its transfer.

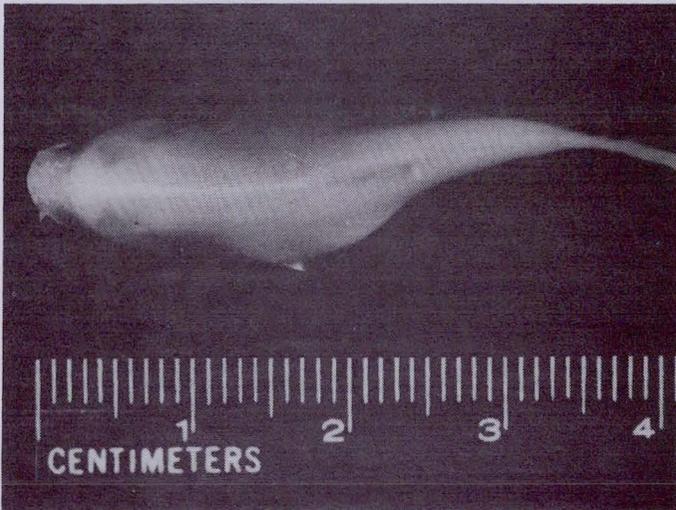
It is not a panicky situation, but those having *Salmincola californiensis* should not ship live eggs or fish to places where *S. californiensis* does not already exist.

GOLDFISH PATHOGEN (*MITRASPORA CYPRINI*) IN THE UNITED STATES

G.L. Hoffman, Fish Pathologist, USFWS,
Fish Farming Experimental Station, Stuttgart, AR

Mitraspora cyprini (Protozoa: Myxospora) infects the kidney(s) unilaterally or bilaterally of goldfish at least in Japan and the United States (Hoffman, G.L. 1981, *Parvicapsula* sp. and *Mitraspora cyprini* (Myxosporae), new to North America. Fish, Pathogens and Environment in European Polyculture, Proc. Internat. Seminar, Szarvas, Hungary: 184-197). It also infects European carp (*Cyprinus carpio*) in Europe (Lom, J & Iva Kykova 1981, loc. cit. above). Infection produces progressive bilateral or unilateral kidney papillary cystic hyperplasia and edema of goldfish almost to the point of bursting the fish. I know of no other unilateral kidney involvement like this. The disease in carp is not so pronounced. The first published report came from Japan (Fujita 1912, Zool. Anzeiger, Leipzig 39:259-262) followed by life cycle studies (Ahmed, A.T.A. 1973, J. Med. Sci. & Biol. 26:87-101). The disease is verified by finding typical spores in wet mounts.

After publishing the above 1981 report I discovered two earlier cases in my notes -- from goldfish from Pennsylvania in 1962 and Georgia in 1974. Our records also include California (Mike Kent), Maryland, Missouri, North Carolina, and in February, 1984. Drew Mitchell found it in Arkansas goldfish. Little is known of the epizootiology, but drying of ponds between crops with application of hydrated lime, as for salmonid whirling disease, should help. The extensive culling as practiced by goldfish producers also probably help reduce the incidence.



Goldfish infected with *Mitraspora cyprini*

GAS BUBBLE DISEASE ON THE BIG HORN RIVER, MONTANA

Jim Peterson
Montana Dept. of Fish, Wildlife and Parks

Brown trout in the Big Horn River of Montana are being severely affected by gas supersaturation caused by a reregulation dam on the river. Large brown trout are most severely affected with over 80% incidence in fish over 14" long. Less gas bubble disease was noted in rainbow trout. Total gas saturation ranges from 110% - 130% below the dam. This saturation level persists for at least three miles downstream. Plans are underway to study the impact of the gas saturation problem and to try to eliminate it.

STATUS OF RO5-0037 IN THE IR-4 PROGRAM

M.H. Bebeau, College of Veterinary Medicine
Delta Branch Experiment Station, Stoneville, MS

Since the USDA Interregional Research Project #4 (IR-4) objectives were expanded to include minor and specialty animals drugs, research has been underway to obtain FDA clearance of the potentiated sulfonamide RO5-0037 for catfish. Most of the environmental studies have been completed and the data are being prepared for submission to FDA. A recent development is the inclusion of data to support clearance of the drug to treat systemic *Edwardsiella ictaluri* infections in catfish. Dose titrations and field trials to test efficacy are currently underway. The drug manufacturer, fish farmers and researchers at Mississippi State University are working cooperatively to supply data for IR-4. Hoffman-La Roche, the drug company sponsor, has recently submitted several of the data packages supporting the New Animal Drug Application pertaining to salmonids.

A BACTERIAL DISEASE OF GULF KILLFISH (*FUNDULUS GRANDIS*) REARED IN BRACKISH WATER PONDS

John P. Hawke
Alabama Marine Resources Division
Claude Peteet Mariculture Center
Gulf Shores, AL 36542

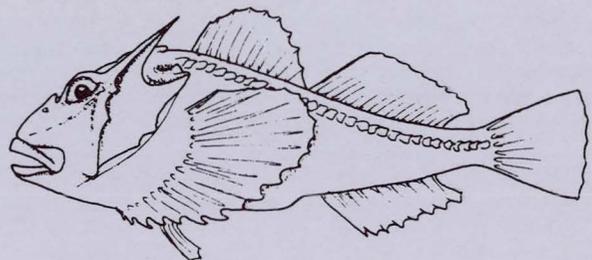
A bacterial disease of Gulf killfish (*Fundulus grandis*) is currently being characterized from cases occurring at the Claude Peteet Mariculture Center in experimental lots of fish and from live bait holding facilities in the coastal Alabama area. Outbreaks of the disease have occurred in minnows trapped in Louisiana and transported to holding facilities in Alabama. However, the range of occurrence is unknown at this time.

Clinical signs of the diseases are exophthalmia, ascitic fluid in the visceral cavity, lepidorthosis, swelling and hemorrhage on the ventral surface in the area of the genital opening make it typical of a dropsy-like condition. Clinical signs are more pronounced in females and are often accompanied by premature release of eggs.

The causative organism is a non-motile, Gram-negative, rod-shaped bacterium that is somewhat fastidious in its growth requirements. It is best isolated on blood agar (5% sheep blood) and requires 72 hours incubation at 25°C to form visible colonies. It requires salt in the growth medium but is not halophilic. Based on preliminary biochemical testing it appears most closely related to bacteria in the genus *Alcaligenes*.

Mortality from the disease in the spring of 1983 was accompanied by rapidly increasing temperatures and rapidly decreasing salinities. The disease has occurred in fish being reared at salinities ranging from 2-12 ppt.

Work on histopathology and additional characterization of the causative organism are currently in progress.



FISH HEALTH NEWS FROM SOUTH DAKOTA

Richard C. Ford
Coldwater Fisheries Biologist
3305 West South Street, Rapid City, SD 57701

At Cleghorn Springs Hatchery in South Dakota after recirculating water we began to experience problems with gas bubbles in many of our fish; brown trout were particularly susceptible. We assumed the problem was due to the recirculating system. We found 110% saturation of total gases and 120% of nitrogen in our spring water, while recirculated water was at 104%.

At Blue Dog, our warmwater hatchery, we experienced problems with iron precipitation, which was particularly acute after going through the heat pump. Fry would die within 18 hours of hatching if not put on another water source. We are installing a pressure filter, similar to a sand filter, which would remedy the problem.

AMYLOODINIUM CONTROL

Dr. Ken Johnson
Department of Wildlife and Fisheries Sciences
Texas A & M University
College Station, TX 77843

Research and hatchery production of the red drum (*Sciaenidae*) is on the increase in Texas. A major obstacle (perhaps the major obstacle) to production of this species and other marine finfish around the world is *Amyloodinium ocellatum* (Brown 1931). In recent work at our laboratory several herbicides, a disinfectant and dilution with fresh water were tested with 50-75mm sciaenids for control of the marine parasites, *Amyloodinium ocellatum*. A chelated copper compound, copper sulfate, and benzalkonium chloride were effective. Simazine, endotholl, (Hydrotholl and Aquatholl), diuron, and fresh-water dilution were not effective. The chelated copper compound was safer and effective over a wider range than copper sulfate, and benzalkonium chloride appears promising as a copper substitute. For more information write to Dr. Ken Johnson and ask for publication No. FDDL-M5.

BRIEF REPORTS

If you feel your "ICH" problem is tough to treat, try this comparison on for size: Jim Wood, WA Dept. Fisheries, has a 9-acre site which requires thirty-two 55-gal. drums of formalin administered over a 3-day period.



Rumor has it that Bill Kontz is thinking of applying for a grant to study PKD in buffalo chips. Anonymous.



A recently completed experiment indicated that Pacific herring (*Clupea harengus pallasi*) did not produce humoral agglutinin against *Vibrio anguillarum* at 5 weeks after intraperitoneal injection of the homologous bacterin in Freund's complete adjuvant. Water temperature was approximately 9°C. Bell and Traxler, Pacific Biological Station, Nanaimo, B.C.



Renibacterium salmoninarum grown on Evelyn's KDM2 with 0.01M of each of the organic buffers (pH 6.5, tested singly) ACES, ADA, BES, HEPES, MOPS and PIPES showed no improvement of growth over KDM2. Two buffers, ADA and PIPES, caused depression of growth, depending as usual on size of inoculum. Bell and Traxler, Pacific Biological Station, Nanaimo, B.C.



Phenylethanol does not appear to be a useful agent for the selective culturing of KDB in the presence of *A. salmonicida*. Bell and Traxler, Pacific Biological Station, Nanaimo, B.C.



Trevor Evelyn, as an invited speaker, presented a review paper on *Vibrio* vaccine at a Symposium of the Office of International des Epizooties in Paris, France in February. The entire proceedings of the "Symposium on Fish Vaccination" will be published. Bell and Traxler, Biological Station, Nanaimo, B.C.



Dick Heckmann has abstracts pertinent to fish diseases from the May meeting of the Rocky Mountain Conference of Parasitologists. *Cystoopsis acipenseri* in the white sturgeon, parasites of the mottled sculpin, treatment of the eye fluke *Diplostomum spathaceum*, and anisakids in cod fillets are the topics covered. Write to Dr. Richard Heckmann, Dept. of Zoology, Brigham Young University, Provo, UT.

A computerized simulation program, called AQUA, which is designed to sharpen the skills of fish health management trainees is available from the Idaho Water and Energy Resources Research Institute, University of Idaho, Moscow, Idaho 83843. It is compatible with an Apple IIe and IIc and an IBM-PC. The cost for the complete package until 30 September 1984 is \$85. G.W. Klontz, Department of Fish and Wildlife Resources, University of Idaho, Moscow, ID 83843.



A new product to reduce the "grunge" in large ponds and raceways was tested and the results were successful. The product is ABA (Aqua-Bacta-Aid) and is available from Water Quality Science Inc., Post Office Box 646, Moorehead, MS 38761. Our testing demonstrated clearly that 1 mg/l two to three times weekly every 2-3 months cleaned ponds much less expensively than did cleaning by hand. Also occurrences of external parasitisms and systemic bacterial infections were significantly reduced. G.W. Klontz



Respiratory diseases - particularly environmental gill disease (IGD) - are a significant problem this time of year in spring chinook and rainbow trout hatcheries. Our studies indicate the best treatment is prevention - but, if that fails - then the following steps are suggested. (1) either do not feed the fish for 3-4 days or reduce the ration by two-thirds for a week; (2) reduce the pond population; (3) clean the ponds; (4) apply either Chloramine-T or Cutrine at the appropriate dosages via drip for 60 minutes; (5) reinstitute the feeding regimen. G.W. Klontz



Aqueous extracts of Oregon Moist Pellet inhibited growth in vitro of *R. salmoninarum* but not of *A. salmonicida*. Gordon Bell, Pacific Biological Station, Nanaimo, B.C.



Steelhead at the Puntledge River Hatchery, Vancouver Island, B.C., which were affected by PKD in 1983 were released in May, 1984. There has been no reoccurrence of the disease among fish held at ambient temperatures or in a sample held at 15°C for one month. However, the PKD organism has been detected in juvenile coho held at the hatchery. Gordon Hoskins and Dorothee Kieser, Pacific Biological Station, Nanaimo, B.C.

BKD IN MIGRATING SALMON SMOLTS

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Oregon Department of Fish and Wildlife biologists trapping downstream migrant spring chinook smolts at Little Goose Dam on the lower Snake River felt they were seeing more fish than normal with exophthalmia and hemorrhaging during the collection period this spring. Thirty fish, most showing external abnormalities, were selected and examined by the O.D.F.W. Pathology Section on April 19, 1984. The external and internal pathology was consistent with bacterial kidney disease (BKD) pathology and 19 of 30 fish were heavily infected with *Renibacterium salmoninarum* as determined by Gram stain. The remaining 11 were examined by the direct fluorescent antibody method and were negative. No other bacterial or protozoan fish pathogens were detected. Viral examinations of each individual fish yielded no evidence of any fish virus.

The advanced BKD pathology in the 19 infected fish suggests they probably would have succumbed during, or soon after, transport by barge or truck. More significantly, fish so heavily infected would provide a tremendous reservoir of infection for healthy fish during the trapping, holding and transport process. These observations indicate that if collection and downriver transport of many different stocks, both hatchery and wild, is to continue, an additional level of responsibility is placed on pathologists, culturists, and management personnel to insure release of fish in the best possible health.

TWENTY-FIFTH ANNUAL WESTERN FISH DISEASE CONFERENCE

The 25th Annual Western Fish Disease Conference will be held at Oregon State University in Corvallis on June 27-29. The program includes papers on various aspects of fish health including those concerning protozoan, fungal, bacterial, and viral diseases and methods for their control. The conference will be attended and papers will be given by scientists from Japan, Hungary, and Canada, as well as from the Pacific Northwest. Many of the individuals who attended the initial meeting will be present.

PROLIFERATIVE KIDNEY DISEASE WORKSHOP

On March 28-29, 1984, the International Aquaculture Research Center (IARC) hosted a workshop on proliferative kidney disease. The workshop, which was conducted by Jim Chacko of the University of Idaho and Charlie Smith of the U.S.F.W.S. Bozeman Development Center, offered a technical forum on PKD detection, diagnosis, and epizootiology. The attendees included approximately thirty fish health practitioners from the western United States. The participants were presented information about the outbreaks of PKD in Idaho, California, and British Columbia. These epizootiological descriptions were given by Smith and Chacko, Ron Hedrick and Mike Kent of U.C. Davis, and Gary Hoskins of the Fisheries and Oceans Pacific Biological Station, B.C. Canada.

Training sessions were conducted and the participants were able to prepare, stain and examine slides of infected kidneys. This "hands-on" experience was valuable, and an appreciation was gained for the techniques used for PKD diagnosis. It also became evident that diagnosis of this disease is sometimes difficult and to certify fish as PKD-free is not presently feasible.

BOOKS OF INTEREST

A Checklist of Parasites of California, Oregon, and Washington Marine and Estuarine Fishes. M.S. Love and M. Moser. NOAA Technical Report NMFS SSRF-777, NOAA, Rockville, MD 20852. 1983. 576pp. No charge.

Here, in one volume, is a listing of the published records of parasites infecting marine or estuarine fishes of the west coast of the United States. The authors have included worldwide reports from outside this range if the fish is found within it. Particularly numerous in this respect are the citations from the U.S.S.R., Japan and British Columbia. The completeness of the work is further enhanced by the inclusion of anadromous fish species and their landlocked forms. While not every report of a specific parasite on a particular host is given, the authors have selected one or more citations for each occurrence. The volume is logically organized beginning with the main body of the work, the host-parasite listings. Under the genus and species of each host are subheadings for the class or subclass, family, and genus and species of the various parasites. For each parasite, the original describer or redescriber, year, geographic location, site of infection on the host, reference citation and any supplanted nomenclature are given. This main section is followed by a very useful parasite-host cross-index, an extensive bibliography and the host index. In spite of the intimidating mass of material in this volume, once the organization is understood, the book is remarkably easy to use and will be an important reference in the library of anyone interested in the parasites of marine, estuarine and anadromous fishes of the eastern Pacific Ocean. Limited numbers of this technical report are available at no charge to state and federal agencies and individual copies may be obtained from D822, User Services Branch, Environmental Science Information Center, NOAA, Rockville, MD 20852.

Antigens of Fish Pathogens. D.P. Anderson, M. Dorson and Ph. Dubourget, Eds. Foundation Marcel Merieux, 17 Rue Bourgelat, 69002 Lyon, France. 1983. 274pp. \$50.00.

This book is the product of an international symposium held in 1982 titled *Antigens of Fish Pathogens: Development and Production for Vaccines and Serodiagnostics* and contains the text of the 14 papers and abstracts of the 9 posters presented at the meeting. The authors were given a standard outline and asked to develop a review of a specific disease or pathogen. This outline included the nomenclature of the organism, history, incidence and distribution, etiology, pathogenesis and epizootiology, diagnosis, treatment, prevention and control, and a bibliography. The use of this broad outline means that the majority of the work has little to do with antigens, serology, vaccines, or serodiagnostic reagents; however, it must be recognized that only a limited amount of research has been done on the antigenic makeup of some of the pathogens included in the symposium.

The diseases or disease agents and the authors included in the symposium are: infectious pancreatic necrosis, M. Dorson; channel catfish virus, J.A. Plumb and D.A. Jezek; viral hemorrhagic septicemia, P. de Kinkelin; infectious hematopoietic necrosis, B.L. Nicholson; spring viremia of carp, R. Bootsma and Ebregt; *Aeromonas hydrophila*, S.G. Newman; *Aeromonas salmonicida*, W.D. Patterson; *Flexibacter columnaris*, D.F. Amend; Edwardsiellosis, W.A. Rogers; *Pasteurella piscicida*, R.A. Robohm; bacterial kidney disease, G.W. Klontz; enteric redmouth disease, R.A. Busch; vibriosis, G.L. Tebbit and T.D. Goodrich; and trypanoplasmosis, E.M. Burreson. The chapters vary greatly in completeness and in emphasis, many being excellent but others resembling outlines and expanded abstracts. The text of the discussion of each paper is included and often contains much useful information. The poster sessions were nearly all related to immunology but their abstracts take only 6 pages of the book.

In spite of the fact that the book is expensive, contains many typographical or typesetting errors and has less emphasis on immunology than the title implies, some of the chapters represent the best reviews currently available for certain disease agents. The book also contains much new information with some of the references from 1982. The book is recommended for those libraries and agencies wishing to add important new reference material and for those researchers interested in recent reviews of the major diseases of fish. Those wishing an in-depth review of the antigens of a specific fish pathogen should examine a copy before purchasing this book.

James R. Winton

FISH HEALTH NEWSLETTER

The Fish Health 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 and should be addressed to one of the editorial staff or to a member of the publication committee.

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