Bibliography of Whirling Disease in Salmonids

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1st Draft

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BIBLIOGRAPHY: WHIRLING DISEASE OF SALMONIDS

1.) **Anonymous.** 1988. Whirling Disease Management in North America, an Emergency Conference. Denver, CO. April 12-14, 1988. Fish Disease Subcommittee Colorado River Wildlife Council.

2.) **Carifa, J.** 1995. State seeks U.S. help to study whirling disease. Billings Gazette. April 13, 1995. 4B.

3.) **Corneillie, S., C. Agius & F. Ollevier.** 1990. Comparison of the fatty acid profile of wild caught fingerlings and yolk sac sea bass *(Dicentrarchus labrax)* larvae with cultured healthy larvae and larvae suffering from Whirling Disease. Belg. J. Zool. 120: 157-164.

4.) **El-Matbouli, M. & R. Hoffmann.** 1989. Experimental transmission of two *Myxobolus* spp. Developing bisporogeny via tubificid worms. Parasitol. Res. 75: 461-464.

5.) **El-Matbouli M. & R.W. Hoffmann.** 1991. Effects of freezing, aging, and passage through the alimentary canal of predatory animals on the viability of *Myxobolus cerebralis* spores. J. Aquatic Animal Health. 3: 260-262.

6.) **El-Matbouli, M., R.W. Hoffmann & C. Mandok.** 1994. Light and electron microscopic observations ont he route of the triactinomyxon-sporoplasm of *Myxobolus cerebralis* from epidermis into rainbow trout cartilage. J. Fish Biol. In press

7.) **Garden, O.** 1992. The Myxosporea of fish: A review. Br. Vet. J. 148: 223-239.

8.) **Ghaffar, F.A., G. El-Shahawi & S. Nass.** 1995. Myxosporidia infecting some Nile fishes in Egypt. Parasitol. Res. 81: 163-166.

9.) **Ghittino, P. & E. Vigliani.** 1978. Myxosomiasis of trout: An old parasitosis which is still topical. Part 1. Riv. Ital. Piscic Ittiop. A. XIII: 15-20.

10.) **Griffin B.R. & E.M. Davis.** 1978. *Myxosoma cerebralis:* Detection of circulating antibodies in infected rainbow trout *(Salmo gairdneri)*. J. Fish Res. Board Can. 35: 1186-1190.

11.) **Halliday, M.M.** 1973. Studies of *Myxosoma cerebralis*, a parasite of salmonids. Nord. Vet.-Med. 25: 349-358.

25.) **Kent, M.L. & L. Margolis.** 1994. The demise of a class of protists: taxonomic and nomenclatural revisions proposed for the protist phylum Myxozoa Grasse, 1970. Can. J. Zool. 72: 932-937.

26.) **Kent, M.L., L. Margolis, D.J. Whitaker, G.E. Hoskins & T.E. McDonald.** 1994. Review of Myxosporea of importance in salmonid fisheries and aquaculture in British Columbia. Folia Parasit. 41: 27-37.

27.) **Kole, B.** 1995. Whirling disease threatens top trout waters in the U.S. Bozeman Daily Chronicle. March 16, 1995. p. 17-18.

28.) **Lom, J.** 1987. Myxosporea: a new look at long-known parasites of fish. Parasitol. Today. 3: 327-332.

29.) **Lorz H.V., A. Amandi, C.R. Banner & J.S. Rohovec.** 1989. Detection of *Myxobolus (Myxosoma) cerebralis* in salmonid fishes in Oregon. J. Aquatic Animal Health. 1: 217-221.

30.) **Lorz, H.V. & A. Amandi.** 1994. VI. Whirling disease of salmonids. *In:* FHS/AFS Blue Book. 7 p.

31.) **Markiw, M.E. & K. Wolf.** 1974. *Myxosoma cerebralis*: Comparative sensitivity of spore detection methods. J. Fish Res. Board Can. 31: 1597-1600.

32.) **Markiw, M.E. & K. Wolf.** 1978. *Myxosoma cerebralis:* Fluorescent antibody techniques for antigen recognition. J. Fish Res. Board Can. 35: 828-832.

33.) **Markiw, M.E. & K. Wolf.** 1983. *Myxosoma cerebralis* (Myxozoa: Myxosporea) etiologic agent of salmonid whirling disease requires tubificid worm (Annelida: Oligochaeta) in its life cycle. J. Protozool. 30: 561-564.

34.) **Markiw M.E.** 1986. Salmonid whirling disease: dynamics of experimental production of the infective stage - the Triactinomyxon Spore. Can. J. Fish Aquat. Sci. 43: 521-526.

35.) **Markiw M.E.** 1989. Salmonid whirling disease: myxosporean and actinosporean stages cross-react in direct fluorescent antibody test. J. Fish Dis. 12: 137-141.

36.) **Markiw, M.E.** 1991. Whirling disease: earliest susceptible age of rainbow trout to the triactinomyxid of *Myxobolus cerebralis*. Aquaculture. 92: 1-6.

50.) **Webb, Y.G.** 1991. Whirling disease: Dizzying disease makes life difficult for DWR hopes of containing it to a small area dashed. Utah Fishing. pp. 6-7.

51.) **Wilson, C.** 1993. Whirling discovered at new sites in Utah. Ichthyogram. 4: 1-5.

52.) **Wolf, K. & M.E. Markiw.** 1976. *Myxosoma cerebralis*: *In vitro* sporulation of the myxosporidan of salmonid whirling disease. J. Protozool. 23: 425-427.

53.) **Wolf, K. & M.E. Markiw.** 1984. Biology contravenes taxonomy in the Myxozoa: New discoveries show alternation of invertebrate and vertebrate hosts. Science. 225: 1449-1452.

54.) **Wolf, K. & M.E. Markiw.** 1985. Salmonid whirling disease. U.S. Fish and Wildlife Service. Fish Diseasse Leaflet 69. National Fisheries Center, Leetown. National Fish Health Research Laboratory. 12 p.

55.) **Wolf, K. & M.E. Markiw.** 1986. Salmonid whirling disease: *Tubifex tubifex* (Muller) identified as the essential oligochaete in the protozoan life cycle. J. Fish Dis. 9: 83-85.

56.) **Yasutake, W.T. & H. Wolf.** 1970. Occurrence of whirling disease of trout in Western United States. J. Fish Res. Board Can. 27: 955-956.

57.) **Yokoyama, H., K. Ogawa & H. Wakabayashi.** 1991. A new collection method of actinosporeans - A probable infective stage of myxosporeans to fishes - from tubificids and experimental infection of goldfish with the actinosporean, *Raabeia* sp. Gyobyo Kenkyu. 26: 133-138.

BIBLIOGRAPHY: WHIRLING DISEASE: RELATED TOPICS

1.) **Ahamed, M.T. & M.F.A. Mollah.** 1992. Effects of various levels of wheat bran and mustard oil cake in the culture media on tubificid production. Aquaculture. 107: 107-113.

2.) **Aria, H.P. & D.R. Mudry.** 1983. Protozoan and metazoan parasites of fishes from the headwaters of the Parsnip and McGregor Rivers, British Columbia: A study of possible parasite transfaunations. Can. J. Fish Aquat. Sci. 40: 1676-1684.

3.) **Arkoosh, M.R. & S.L. Kaattari.** 1991. Development of immunological memory in rainbow trout *(Oncorhynchus mykiss)* I. an immunochemical and cellular analysis of the B cell response. Dev. Comp. Immunol. 15: 279-293.

4.) **Ashmawy, K.I., S.A. Abu-Elwafa, E.A. Iman & Y.Z. El-Otifi.** 1989. Description of newly recorded myxosporidian protozoa of freshwater fishes in Behera Province, Egypt. J. Egypt Vet. Med. Assoc. 49: 43-53.

5.) **Bly, J.E. & L.W. Clem.** 1991. Temperature-mediated processes in teleost immunity: in vitro immunosuppression induced by in vivo low temperature in channel catfish. Vet. Immuno. Immunopath. 28: 365-377.

6.) **Camargo, J.A.** 1992. Structural and trophic alterations in macrobenthic communities downstream from a fish farm outlet. Hydrobiol. 242: 41-49.

7.) **Camargo, J.A.** 1992. Temporal and spatial variations in dominance, diversity and biotic indices along a limestone stream receiving a trout farm effluent. Water Air Soil Pollution. 63: 343-359.

8.) **Courtney, C.C. & B.M. Christensen.** 1991. The response of *Tubifex tubifex* (Oligochaeta: Tubificidae) to a second infection with *Glaridacris catostomi* (Cestoidea: Caryophyllaeidae). J. Helminthol. Soc. Wash. 58: 118-121.

9.) **Davidson, G.A., A.E. Ellis & C.J. Secombes.** 1991. Cellular responses of leucocytes isolated from the gut of rainbow trout, *Oncorhynchus mykiss* (Walbaum). J. Fish Dis. 14: 651-659.

10.) **Dorris, M., B. Chevassus & C. Torhy.** 1991. Comparative susceptibility of three species of char and of rainbow trout X char triploid hybrids to several pathogenic salmonid viruses. Dis. Aquat. Org. 11: 217-224.

11.) **Dykova, I. & J. Lom.** 1982. Sphaerospora renicola n.sp., a myxosporean from carp kidney, and its pathogenicity. Z. Parasitenkd. Parasit. Res. 68: 259-268.

22.) **Kent, M.L., D.J. Whitaker & L. Margolis.** 1993. Transmission of *Myxobolus arcticus* Pugachev and Khokhlov, 1979, a myxosporean parasite of Pacific salmon, via a triactinomyxon from the aquatic oligochaete *Stylodrilus heringianus* (Lumbriculidae). Can J. Zool. 71: 1207-1211.

23.) **Lazim, M.N. & M.A. Learner.** 1987. The influence of sediment composition and leaf litter on the distribution of tubificid worms (Oligochaeta): a field and laboratory study. Oecologia. 72: 131-136.

24.) **Lecocq-Xhonneux, F., M. Thiry, I. Dheur, M. Rossius, N. Vanderheijden, J. Martial & P. De Kinkelin.** 1994. A recombinant viral haemorrhagic septicaemia virus glycoprotein expressed in insect cells induces protective immunity in rainbow trout. J. Gen. Virol. 75: 1579-1587.

25.) **Lom, J. & J.R. Arthur.** 1989. A guideline for the preparation of species descriptions in Myxosporea. J. Fish Dis. 12: 151-156.

26.) **Mangel, M.** 1994. Life history variation and salmonid conservation. Conserv. Biol. 8: 879-880.

27.) **McArthur, C.P. & S. Sengupta.** 1982. Antigenic mimicry of eel tissues by a myxosporidian parasite. Z. Parasitenkd. 66: 249-255.

28.) **McDonald, T.E.** 1983. *Ceratomyxa shasta* Noble, 1950 (Myxozoa: Myxosporea) present in the Fraser River system of British Columbia. Can. J. Zool. 61: 1991-1994.

29.) **Mefee, G.K.** 1992. Techno-arrogance and halfway technologies: salmon hatcheries on the Pacific coast of North America. Conserv. Biol. 6: 350-354.

30.) **Mitchell, L.G.** 1989. Myxobolid parasites (Myxozoa: Myxobolidae) infecting fishes of western Montana, with notes on histopathology, seasonality, and intraspecific variation. Can. J. Zool. 67: 1915-1922.

31.) **Myers, J.M. & W.K. Hershberger.** 1991. Early growth and survival of heat-shocked and tetraploid-derived triploid rainbow trout *(Oncorhynchus mykiss).* Aquaculture. 96: 97-107.

32.) **Newbound, G.C., R.J.F. Markham, D.J. Speare, S.M. Saksida, B.M. Despres, B.S. Horney, F.S. Kibenge, J.A. Sheppard, G.M. Wright & M.L. Kent.** 1993. Production of monoclonal antibodies specific for antigens derived from tissue of chinook salmon *(Onocorhynchus tshawytscha)* affected with plasmacytoid leukemia. Am. J. Vet. Res. 54: 1426-1431.

43.) **Thomas, P.T. & P.T.K. Woo.** 1990. *In vivo* and *in vitro* cell-mediated immune responses of rainbow trout, *Oncorhynchus mykiss* (Walbaum), against *Cryptobia salmositica* Katz, 1951 (Sarcomastigophora: Kinetoplastida). J. Fish Dis. 13: 423-433.

44.) **Weider, L.J.** 1992. Allozymic variation in tubificid oligochaetes from the Laurentian Great Lakes. Hydrobiologia. 234: 79-85.

45.) **Weins, G.D. & S.L. Kaattari.** 1991. Monoclonal antibody characterization of a leukoagglutinin produced by *Renibacterium salmoninarum*. Infection Immunity 59: 631-637.

46.) **Wyatt, E.J.** 1978. A new host and site of infection for *Myxobolus kisutchi* and host record for *Myxobolus insidiosus*. J. Parasitol. 64: 169-170.

47.) **Yokoyama, H., K. Ogawa & H. Wakabayashi.** 1993. Involvement of *Branchiura sowerbyi* (Oligochaeta:Annelida) in the transmission of *Hoferellus carassii* (Myxosporea:Myxozoa), the causative agent of kidney enlargement disease (KED) of goldfish *Carassius auratus*. Gyubyo Kenkyu. 28: 135-139.

48.) **Zapata, A.G., A. Varas & M. Torroba.** 1992. Seasonal variations in the immune system of lower vertebrates. Immuno. Today. 13:142-147.