



Ontario Animal Health Network (OAHN)

Aquatic Animal Health

July to December 2017, Report #4

This report is a communication for aquaculture producers in the province of Ontario, compiled by the Ontario Animal Health Network (OAHN).

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Aquatic Veterinary Services Disease Summary

There were a number of diagnoses during the period of July to December 2017 in aquaculture production in Ontario. These diagnoses were primarily cold water disease (*Flavobacterium psychrophilum*) and columnaris disease (*Flavobacterium columnare*). Aquaculture veterinary case load decreased heading into the colder months. The majority of the concerns observed on fish farms in Ontario have been non-infectious and related to environmental conditions.

Provincial Update

Disease Surveillance

Fish species cultured in Ontario are susceptible to a wide range of bacterial pathogens. Surveillance activities in 2017 across variety of environments including cage-based aquaculture farms, and tank-based hatcheries and grow-out facilities identified a number of emerging pathogens, including branchial copepods and epitheliocystis caused by a β -proteobacteria.

Epitheliocystis can affect fish worldwide in both fresh and salt waters. The term is used to describe a characteristic lesion consisting of hypertrophied epithelial cells containing intracellular bacterial microcolonies (¹Contador et al. 2015). Epitheliocystis was identified previously in Ontario lake trout raised for stocking and in 2017, it was found in rainbow trout in a commercial aquaculture operation.

¹Contador E. et al. 2015. Epitheliocystis in lake trout *Salvelinus namaycush* (Walbaum) is associated with a β -proteobacteria. Journal of Fish Diseases. doi:10.1111/jfd.12369



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Provincial Update (continued)

Consultation on Proposed Amendment to the Livestock Medicines Act Regulation 730

Due to concerns with rising antimicrobial resistance, Health Canada is taking steps to limit access to antimicrobial drugs. In particular, it is moving all medically important antimicrobial (MIAs) drugs to the Prescription Drug List (PDL) so that they can only be obtained with a prescription. This will affect around 300 veterinary drugs, some of which are currently sold pursuant to the Livestock Medicines Act (LMA). Health Canada anticipates implementing the federal changes by December 2018 and has just recently closed their public consultation process on this change.

To align with the federal changes, the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) is proposing to make changes to Regulation 730 under the LMA, including no longer allowing the sale of medically-important antimicrobials from provincially licensed Livestock Medicines Outlets. The draft regulation was posted for 60 days for public comment and closed on January 15, 2018. All comments received during the consultation period will be reviewed and considered to finalize the regulatory amendments.

Federal Update

Koi Herpesvirus Disease in British Columbia

The Canadian Food Inspection Agency (CFIA) has confirmed the presence of koi herpesvirus disease (KHVD) in cultured koi carp (*Cyprinus carpio koi*) in British Columbia. This is the first detection of KHVD in BC by the CFIA, but the disease has been previously detected in Manitoba and Ontario. This particular case was associated with an import of koi from Israel by a wholesaler who distributed fish to greenhouses, pet stores and garden centres within BC. As a result of this detection, the importation of all susceptible species of aquatic animals from Israel for the aquarium trade and outdoor pond use will be suspended until further notice. KHVD poses no risk to human health or food safety; however, this virus can infect other susceptible species and is reportable under Canada's [Reportable Diseases](#) Regulations.

Whirling Disease

The CFIA has carried out sample collection in collaboration with the provincial governments and Parks Canada in the province of Alberta and British Columbia. This surveillance will be continuing in 2018 in these provinces and other western provinces. The purpose of this surveillance is to determine the distribution of the disease in Canada.

Risk Mapping

The CFIA is producing, in collaboration with various stakeholder data input, risk maps to determine regions (watersheds) of greater risk for disease occurrence for its regulated and other diseases of concern. These maps are posted on the aquatic network group member page. <https://www.cahss.ca/groups/aquatic/>. To become a member of the network please contact aquasurv@inspection.gc.ca.

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Your OAHN Fish Network Team:

Co-leads:

Dr. Marcia Chiasson (OMAFRA) and Dr. Veronique LePage (Private Practice)

Members:

Steve Naylor and Dr. Tim Pasma (OMAFRA)

Kerry Hobden (MNR)

Dr. Ed Creighton (CFIA)

Dr. Hugh Cai (Animal Health Lab)

Dr. Roz Stevenson (University of Guelph)

Gord Cole, Kana Upton and Arlen Taylor (Industry Representatives)

Coordinator:

Dr. Melanie Barham

Update on the OAHN Research Project: Antimicrobial Resistance in Ontario Aquaculture

The intent of the project was to gain a baseline understanding of the degree of antimicrobial resistance in common bacterial pathogens in the Ontario aquaculture industry. The importance of acquiring and tracking this type of data over time includes developing disease prevention programs in order to decrease the use of therapeutants in food fish, tracking resistance to therapeutants and adapting treatment protocols.

Fish were collected from commercial aquaculture farms and from government hatcheries run by the MNR. In most cases, whole fish specimens were submitted to the Animal Health Laboratory for bacterial culture. In some cases, archived isolates from prior MNR testing were submitted. Bacterial cultures were routinely cultured on agar and were then identified. Those considered primary fish pathogens were further tested for minimum inhibitory concentrations (MICs) which is the lowest concentration of an antimicrobial that will inhibit the visible growth of a microorganism after overnight incubation. MICs are used by diagnostic laboratories mainly to confirm resistance.

A total of 55 fish specimens and 34 bacterial isolates were tested. Bacterial isolates were cultured from 54 of the 55 sample submissions. *Flavobacterium* spp. was isolated from 54.5% of the fish specimens and *Aeromonas* spp. was isolated from 29.1% of the samples. Other bacterial pathogens, including *Edwardsiella* spp., *Streptococcus* spp., *Vibrio* spp. and *Yersinia* spp. were detected infrequently and ranged from 1.8% to 5.5% of fish samples.

In Ontario, four antibiotics are currently approved for use in food fish (florfenicol, oxytetracycline, sulphadimethoxine and sulphathiazole). Sulphathiazole is no longer available as suppliers are not carrying it and sulphadimethoxine is being phased out in 2018. This leaves limited options for fish farmers to use for the treatment of bacterial diseases in fish. While the MIC results are presented for all antibiotics tested, the focus is on the three drugs currently used in Ontario - florfenicol, oxytetracycline, and sulphadimethoxine.

Of the *Aeromonas* spp. tested, *A. salmonicida* and *A. hydrophila* were the most common species isolated. *A. salmonicida* is an etiological agent for furunculosis, a disease that causes hemorrhages, muscle lesions, inflammation of the lower intestine, spleen enlargement, and death in freshwater fish populations. *A. hydrophila* can cause hemorrhagic septicemia, where reddening, hemorrhaging, and ulcers can be observed on the fish. Stress and overcrowding are common causes of both furunculosis and hemorrhagic septicemia. One hundred percent of *A. salmonicida* (n = 13) and *A. hydrophila* (n = 10) isolates were susceptible to florfenicol.

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Update on the OAHN Research Project: Antimicrobial Resistance in Ontario Aquaculture (continued)

The results for oxytetracycline were different, where 54% of *A. salmonicida* isolates (n = 7) were sensitive and 46% (n = 5) were resistant to the antibiotic. Eighty percent of *A. hydrophila* isolates (n = 8) were sensitive to oxytetracycline, one isolate was intermediate and one was resistant.

Of the *Flavobacterium* spp. tested, *F. columnare* and *F. psychrophilum* were the most common species isolated. *F. columnare*, the causal agent of columnaris disease, may result in skin lesions, fin erosion and gill necrosis, with a high degree of mortality. *F. psychrophilum* is the etiological agent of cold water disease and fry syndrome in rainbow trout and may cause mortalities greater than 50% among infected fish. *Flavobacterium* spp. isolates were sensitive or intermediately sensitive to treatment by florfenicol and oxytetracycline.

Anecdotal reports have indicated an increase in *Yersinia ruckeri* detections in Ontario and other areas bordering on the Great Lakes (personal communication, Great Lake Fish Health Committee). *Y. ruckeri* the causative agent of enteric redmouth disease in fish. Most of the *Y. ruckeri* isolates were sensitive or intermediate for both florfenicol and oxytetracycline with only four isolates that were resistant.

The information gathered during the two year study has a number of applications. In the short term, funding through this project assisted in the establishment of veterinarian-client-patient relationships where none existed previously. Additionally, as a quantitative method of susceptibility testing, MIC results help determine which class of antibiotic is most effective. This information can lead to an appropriate choice of an antibiotic that will increase chances of treatment success and help in the fight to slow antibiotic resistance. In the present study, the MIC results were able to direct treatment in real-time. In some cases, farm operators initiated treatments with oxytetracycline and found the treatments to be ineffective. Following test results indicating the bacteria were resistant to oxytetracycline, they were able to switch to florfenicol.



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Email: oahn.fish@uoguelph.ca