

Aquataalk

AQUACULTURE NEWS AT THE UNIVERSITY OF GUELPH

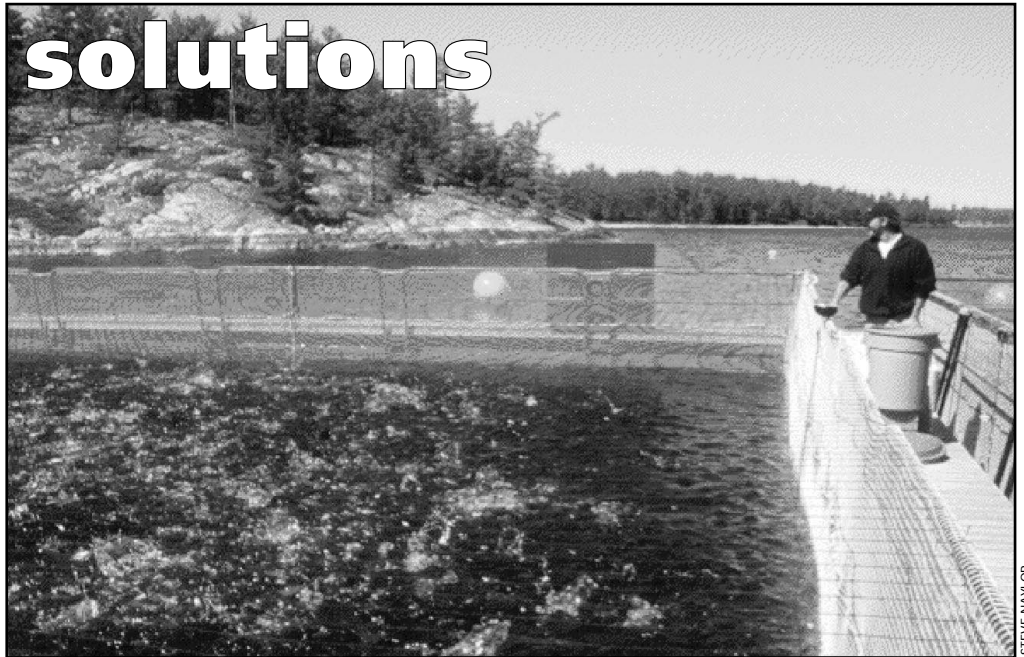
Open to solutions

New technology further enhances natural aquaculture systems

BY LIANNE APPLEBY

Open-water aquaculture environments — those in natural lakes and oceans — already offer sustainable production advantages over the closed tank-based operations found in inland fish farming. Now, University of Guelph researchers are casting their nets even further, helping Great Lakes fish farmers curb potential nutrient pollution problems before they occur.

Prof. Richard Moccia and PhD student Gregor Reid of the Department of Animal and Poultry Science are developing technology for monitoring water quality changes in these aquaculture environments, such as the Great Lakes, where site-specific sampling is a challenge. The researchers' technology will help fish farmers measure subtle nutrient



Jason Hughson feeds a cage of rainbow trout at an aquaculture site at North Wind Fisheries Ltd. New technology being developed at the University of Guelph will help ensure that the most effective nutrient management strategies are used in these cage-based facilities.

changes in the surrounding water. That way, they can respond readily to environmental situations that might arise, such as eutrophication (excessive algae and plankton growth) in the water, caused by excessive nutrient loading.

"The fresh waters in Ontario are finely balanced ecosystems," says Moccia. "They respond quickly to changes in nutrients, and excessive amounts can produce undesirable but reversible environmental changes."

Ontario's Ministry of the Environment has created provincial water quality objectives to ensure that Great Lakes watersheds are protected and that open-water phosphorus concentrations are maintained below acceptable levels. Moccia and Reid are creating hardware and software computer models to make monitoring

open-water nutrient contents easier, to ensure that safe levels are maintained.

By continuously measuring nutrient levels in a specific area over time, the researchers will be able to predict when cage-based facilities might need to use altered nutrient management strategies. This could mean changing feeding regimens, producing fewer fish or even moving the farm to a more suitable location.

The technology is just one part of a broader research initiative to develop computer models that predict waste production from farmed fish. Fish nutritionists Profs. Young Cho and Dominique Bureau are developing fish feeds that are more digestible and produce less fecal waste. When used

SOLUTIONS continued on page 4

Inside...

- Extending support***2**
- Arctic charr grows up*....**3**
- Fish Bits*.....**4**

Extending support to aquaculture



The Aquaculture Centre offers the tools producers need to succeed

DAVE BEVAN

Kris Chandroo of the Aquaculture Centre conducts low-level phosphorus analysis for a cage-aquaculture farm in Ontario.

BY KRISTY NUDDS

When Tom Cornett, manager of Moose Mountain Fisheries near Sudbury, wanted to improve his technique of successfully removing eggs from his Arctic charr broodstock, he knew where to turn for advice; the Aquaculture Centre (AC) and the Alma Aquaculture Research Station (AARS) at the University of Guelph. "I gained first-hand knowledge on some of the tricks and techniques I should use," says Cornett. "Alma was instrumental in ensuring a successful egg take during the last breeding season."

The AC is an integrated part of the larger aquaculture program that exists through a long-standing partnership between the University of Guelph and the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA). The program involves new technology implementation, applied fish production research and a research station as well as a variety of industry support services. It also provides graduate-level education

and certificate training courses.

But program co-ordinator Prof. Richard Moccia says problem solving for the industry may be the most important part of the program.

"The Aquaculture Centre provides a wide variety of services that can assist producers with the everyday challenges they face at the farm level," says Moccia. "It also provides information to the public and for those wishing to get started in the industry or learn more about it."

The AC has offered both veterinary and non-veterinary support services. The veterinary component has supplied diagnostic services such as fish health examinations, water-quality analysis, treatment strategies and pathogen isolation techniques for producers. Non-veterinary services such as the distribution of fact sheets, personal consultation, and educational workshops are different in scope, but nonetheless crucial for the development and success of fish farms, says Moccia.

The AC publishes fact sheets and other media releases that keep pro-

ducers, government agencies and the general public informed about recent developments in the industry. Many of the materials are available online. It also offers troubleshooting advice for producers via phone, and e-mail consultations with experts regarding issues such as nutrition, legislation, technical problems and farm management. As well, the Centre conducts workshops and training programs for producers, and assists them with the transfer of new technologies and other research advances from the AARS to the farm.

Moccia says an important part


of his involvement with the AC includes getting industry and government groups to reach accord.

"There are many growing pains in the industry as it matures, so we try to offer unbiased advice to both parties, hoping they can work together to advance the industry," says Moccia.

Producers say the system is working. Rosa Jacques, who operates Jacques Trout Farm near Tillsonburg with her husband Aime, says the AC is vital for the industry's success.

"The support and attitude of the AC means a lot to us when we run into problems," says Rosa Jacques. "We wouldn't be where we are today without it."

"The AC has always provided good advice and information when I needed it," says Don Burd, owner of Burd's Fishing. "It helps to have that expertise available."

More information on the services offered by the Aquaculture Centre can be found on their website <http://www.aps.uoguelph.ca/~aquacentre>. 

Today's special: Arctic charr

Improved growth rate is essential if more farm-raised charr is going to find its way to consumers

BY BETH LINTON

The delicious pale pink flesh of farmed Arctic charr won't see widespread market penetration unless growth rates can be improved in domestic stocks. To that end, University of Guelph researchers are working on diets to minimize the time it takes charr to reach the table.

Prof. John Leatherland, Biomedical Sciences, and masters student Colin Cameron, are collaborating with Thierry Boujard of Institut National de la Recherche Agronomique (INRA), the government agricultural research agency in France. They're working to develop more sensitive ways of assessing indicators of growth response of the fish in order to assist with more rapid development of improved diet formulas.

The current method uses the long-term growth of charr as the measure, and it takes too long to determine the diets' effectiveness. It's also very expensive.

Instead, the researchers want to speed up the process by investigating how changes in the concentrations of specific hormones found in the blood are related to growth rate. This should improve the ability to evaluate the efficacy of specific diets using shorter term feeding trials.

"It took many years to develop the current diets for rainbow trout," says Leatherland. "We hope that this new blood analysis technique will speed the testing of diets for newly introduced species, such as Arctic charr, and for other new species of fish being raised on fish farms throughout Ontario."

One of the reasons that charr are being used for the study is because the fish is an up and coming species for the aquaculture industry in Ontario. The fish are only native to the most northerly parts of the province near James Bay, but not in the populous south where most aquaculture occurs. By raising charr close to large, diverse

markets in southern Ontario, farmers can reduce transportation costs and offer consumers a fresh, delicious and affordable alternative to rainbow trout and other farmed species.

"There is a market for new aquaculture species such as arctic charr which are well received by the consumer," says Leatherland. But farmers need a way to raise them more profitably. Traditional methods of determining which diet produces the highest growth rate involves varying diets in their lipid, protein, and carbohydrate content, feeding them to the targeted species and monitoring their long-term growth responses

Researchers, though are looking for quicker ways to develop these diet formulas. Blood analysis is now in its initial stages, and is being conducted in laboratories at the University of Guelph.

To completely understand the feeding habits of Arctic charr and develop a basic, standardized feeding regime, Leatherland and his colleagues are also studying how and when the fish eat, and the best mode of food delivery.

This research is sponsored by the Ontario Ministry of Agriculture, Food and Rural Affairs and the Natural Sciences and Engineering Research Council.

MARTIN SCHWALBE



Colin Cameron is helping to develop a new blood analysis technique that will speed the testing of diets for newly introduced species, such as Arctic charr, on Ontario fish farms.




in conjunction with Moccia and Reid's water quality monitoring systems, the information gathered will help cage-based aquaculture co-exist with natural ecosystems and ensure their sustainability.

Moccia says sustainability is vital to the industry. Pushed by growing fish consumption and declining natural fish stocks, aquaculture is the fastest-growing sector of agriculture. Over the last decade, global aquaculture has expanded an average of 11 per cent a year and is expected to continue this growth over the next decade.

Canada has been part of that trend. Here, the industry value has skyrocketed to more than \$500 million in 2000 from just \$7 million in 1984. The production, supply and industry sectors now provide jobs for close to 5,200 Canadians.

These trends point to a bright future, but only if fish farmers continue to operate responsibly, says Moccia. "With the implementation of enhanced nutrient control strategies in cage-based aquaculture, our aquatic ecosystems — not just in the Great Lakes area — can be effectively managed as a multi-use resource for Ontarians."

This research is sponsored by the Ontario Ministry of Agriculture, Food and Rural Affairs, Environment Canada, the Department of Fisheries and Oceans, the Ontario Ministry of Natural Resources and Martin Mills Inc. 



Guelph hires new faculty

The University is pleased to announce that Prof. John Lumsden will join the Department of Pathobiology in April, 2002 as an Associate Professor in Comparative Pathology - Fish. Lumsden will play an important role in rebuilding the U of G's fish pathology capacity as well as being active in the OMAFRA-U of G Aquaculture Program.

Alma recirculation retrofit

The Alma Aquaculture Research Station has received funding from the Canadian Foundation for Innovation to construct warm-water recirculation facilities. This will permit research studies on an expanded list of species relevant to Ontario's aquaculture industry such as tilapia and yellow perch.

Production exceeds 4,000 tonnes


BY RICHARD MOCCIA AND DAVID BEVAN

Ontario fish farmers produced 4,000 tonnes of rainbow trout and approximately 200 tonnes of tilapia and Arctic charr for the table market in 2000. An additional quantity of several other finfish were also produced for the recreational

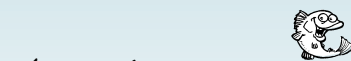
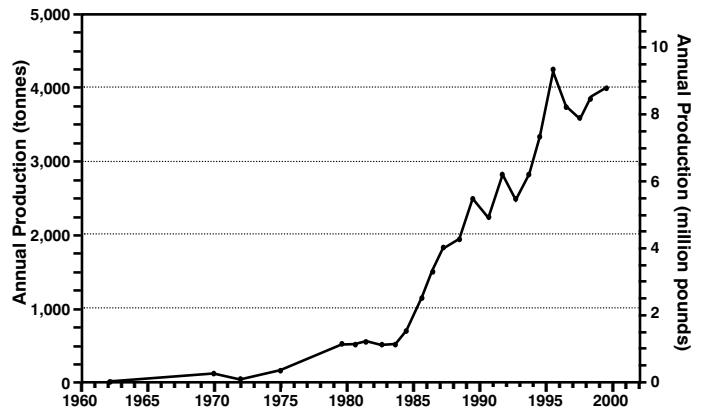
fishing sector. Ontario's aquaculture industry now has a value exceeding \$65 million and provides more than 500 person-years of employment. Nearly three-quarters of the industry's production comes from cage aquaculture farms in Northern Ontario.

Several challenges confront the Ontario aquaculture industry including technical constraints to more effective water use and waste management, and regulatory issues involving environmental impacts and property rights. High energy

and feed costs also dominate the unit cost of production similar to other regions in Canada that produce trout and salmon.

The potential for Ontario's aquaculture industry remains optimistic however. Solutions to many of the technical constraints are constantly emerging, market demand for fish is healthy and growing, and there are early signs of an economic upswing in Ontario which should benefit the industry. Overall, the aquaculture sector still has many prime opportunities for development. 

Ontario trout production from 1962 until 2000



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