AQUATALK

AQUACULTURE NEWS AT THE UNIVERSITY OF GUELPH

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Let the sun shine in ...

Solar heat energizes Ontario fish farms

BY JENNY TYE
OFFICE OF RESEARCH

A warmer southern climate won't give American fish farmers an unfair advantage over Ontarians any longer. Recent developments in solar energy collection could shorten fish production by months, boosting the province's aquaculture industry.

U of G Prof. Richard Moccia, Animal and Poultry Science and coordinator of the Alma Aquaculture Research Station, is evaluating a new solar water heating system expected to give Ontario fish farmers a cost-effective way to diversify and increase fish production.

"Ontario fish farmers are constrained by the provinces's cool water temperatures," says Moccia. "But we're hoping that solar heating can solve some of the problem by taking two or three months off a species' growth time, allowing Ontario farmers to be more competitive with the U.S."

Typically, fish farmers collect water from a local lake, river or groundwater source and route the water into indoor fish housing units. However, fish grow most productively only within a certain temperature range. Water that's too cool will slow the fishes' growth, whereas water that's too warm can reduce growth rates by stressing the fish, impair feed efficiency and precipitate disease. Fish farmers can benefit greatly by regulating water temperatures to provide the fishes with an optimal living and growing environment, as well as minimize bacterial growth, disease and mortality in the fish population.

TRINA KOSTER

Prof. Rich Moccia is studying the advantages of solar energy use in aquaculture.

Heating the water environment around a fish can increase its metabolic rate and feed consumption, thereby increasing its growth rate. This ultimately reduces the time to produce marketable size fish.

American companies that collect their water from warmer sources can choose to farm a greater variety of species and enjoy higher production rates and larger profits since the fish can be sent to market sooner.

The only effective way for Ontario fish farmers to heat large amounts of water is by using fossil fuels, natural gas, propane or waste heat from other industrial sources. However, the cost of such an endeavor can significantly outweigh any profits which may be earned by speedy fish production.

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Consumer watch

Guelph researcher senses a change

BY JENNY TYE
OFFICE OF RESEARCH

When it comes to fish, a U of G researcher says Canadians come to their senses.

Prof. Tanya MacLaurin is using her unique food science expertise to influence the future of aquaculture by learning how to better meet consumer demands. MacLaurin, from the School of Hotel and Food Administration, recently finished a four-month study evaluating the preferences of Guelph's fish consumers. Her results show that consumers need a little more TLC.

"Compared to other animal food products, Canadians are very selective when it comes to eating fish," says MacLaurin. "Most people enjoy fish only if it has a very particular appearance, aroma, texture, and flavour. As well, many are conscious about the source and preparation of fish purchased. This study shows that, perhaps, consumers desire more product information and preparation assistance when it comes to fish."

MacLaurin wanted to gather more information about selected fish species and what value-added fish products consumers prefer. By targeting their senses, she determined consumer acceptance and preference of selected fish species, as well as for individual fish characteristics—such as aroma, flavour, texture and overall acceptability. Such specific information will enable the aquaculture industry to focus their efforts on the production of fish and fish products that consumers really want to buy.

TRINA KOSTER

Prof. Tanya MacLaurin's speciality is sensory evaluation of food products like salmon.

Results from her study show that, on the whole, consumers:

- Want to know what water source the fish were grown in and have a desire to purchase Canadian grown fish;
- Prefer to prepare meals from fresh boneless fillets using included cooking recipes or suggestions, rather than to purchase highly processed fish products; and
- Prefer rainbow trout over other fish species in the study based on aroma, texture, flavour and overall acceptability.

In this study, MacLaurin conducted focus groups to gain an understanding of the factors which influence an individuals consumption. Data was gathered from both frequent and infrequent fish consumers to learn why they did (or didn't) purchase fish regularly, what sensory characteristics are most important to consumers in their purchase and ultimate consumption decision, and what value-added products would entice them to consume more fish.

She conducted three centrally located consumer panels in Guelph. Every participant in the study was asked to evaluate aroma, texture, flavour and overall acceptability of three different aquaculture raised fish species. The study focused on commercially available salmon, rainbow trout, and pigmented and unpigmented arctic char from the Alma Aquaculture Research Station.

Further to this, the consumers ranked, in order of buying preference, 12 value-added fish product concepts. The choices included fresh boneless fillets with and without recipes or cooking suggestions, ready-made heat-and-serve dinners, and processed fish products like fish nuggets. McLaurin also elicited consumers' opinions of how fish producers and marketers could entice the public to eat more fish.

Sue Buttenham, a sensory analysis specialist from the School of Hotel and Food management, helped MacLaurin compile the data. Data are currently being analyzed and will be released in the near future.

"I believe that the more consumption and perception information we know about aquaculture products, the more successful those products will be in the market," says MacLaurin.

This research is sponsored by the Ontario Ministry of Agriculture, Food and Rural Affairs.

FISH BITS

Did you know that the University of Guelph has a new M.Sc. program in aquaculture? It's among the first of its kind at a Canadian university, offering students interdisciplinary training in agri-food systems relating to aquaculture. Students gain marketable skills in project management, economics, legislation, technology-based systems and much more.

TRINA KOSTER

When it comes to research, Alma matters!

Alma from the air — Alma Aquaculture Research Station is the site of a plethora of fish-related research.

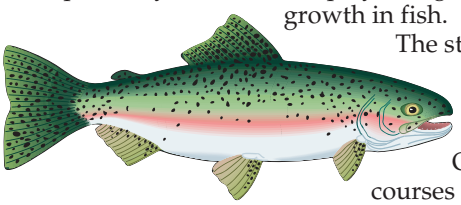
BY STEVE O'NEILL AND JENNY TYE

Where else could you discover moon phases affect fish feeding and growth...except at the Alma Aquaculture Research Station?

When biomedical science Prof. John Leatherland and his student Karen Farbridge made this discovery two years ago, they knew where to direct part of the credit.

"The Alma station is a tremendous resource for fish researchers at the University of Guelph," says Leatherland. "If we did not have access to such a facility, and the skilled and dedicated staff that run it, we certainly could not do the same scale of work that we presently do."

During a fish feeding and growth study at Alma, the researchers identified a 14-day cycle of maximum and minimum periods of fish growth and feed consumption and found that growth spurts take place during the full- and new-moon phases, while feeding takes place during the non-growth phases. Since the single biggest cost for commercial fish producers is fish feed, Leatherland anticipates that this research will help farmers significantly minimize waste by targeting feeding times when their stocks are in an eating, not growing phase.



Leatherland's project is one of many that the Alma station has hosted since its establishment in 1989. Funded through a 20-year development grant from the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA), the station houses large-scale fish holding facilities, an on-line laboratory, control rooms, offices and meeting rooms.

The Alma Aquaculture Research Station is focused on optimizing Ontario's fast-growing aquaculture industry by studying new fish varieties and improving familiar ones.

There are normally about a half-dozen projects underway at Alma at any time. Current ones include:

- A pilot study to examine the cost-benefit factors associated with using solar energy to heat water for aquaculture (see page 1);
- Feeding experiments to evaluate the use of inexpensive (and widely available) animal protein ingredients as a fish meal substitute in rainbow trout diets; and
- Studies to increase understanding of the role fish hormones play in regulating ovarian development and growth in fish.

The station has also expanded its scope to include such areas as legislation and education, acting as a quarantine unit for new fish varieties entering Ontario. As well, parts of two certificate courses and the U of G's M.Sc. program in aquaculture are staged there, as are industry workshops and product trials. For OMAFRA and the University, the station has become an integral part of technology transfer and training in the field of aquaculture.

Moccia says the Alma station's ultimate importance lies in its interdisciplinary nature. "Part of our purpose is to facilitate networking among researchers, government, personnel, students and industry. That's very necessary. In research, success requires collaboration, and the Alma station is an initiative to create a focal point for that activity."

In addition to OMAFRA's support, the Alma aquaculture research station receives funding and management support from the University of Guelph, private aquaculture companies and the Ontario Aquaculture Association.

Extending a helping hand to aquaculture

Alvis Fogels and Sue Barker know first-hand what a struggle it can be to get a fish farming business off the ground...but they also know about a support service they can access when the going gets tough.

Fogels and Barker, owners and operators of Springhills Trout Farm in Ontario's Grey County near Owen Sound, worked with U of G's aquaculture extensionists when they started their business in the 1970s, before the program was formalized. They recognize that without the support of this service, their business wouldn't be the success it is today.

"The help that this Guelph program is offering would be invaluable to any one starting out in aquaculture," says Fogels. "We know, first-hand, the difficulties which can be encountered when trying to get a livestock business off the ground. And even though our business is established now, it is comforting to know that both the diagnostic and non-diagnostic services are available because you can never predict when problems will arise."

The University of Guelph's aquaculture extension program is a resource tool for existing aquaculture businesses, as well as for those wishing to start out in the industry. The program offers potential solutions to a wide range of industry problems — including sick fish, legislative plights or technological hangups — through informative packages, workshops and consultation.

The fish diagnostic laboratory in the Ontario Veterinary College, managed by Prof. Hugh Ferguson, specializes in fish health services and is known worldwide among aquaculturists and aquariums (public and private) as the finest and fastest. Services include fish examinations, water-quality analysis, pathogen isolation, and even consultation over the phone. Diagnostic results are usually faxed to the farm owner within two days. After diagnosis, pathologists provide treatment strategies and help clients control the spread of the disease. It's the only lab in Ontario providing that kind of full service.

The diagnostic service offered at the university is complemented by non-diagnostic support services designed to address government policy, new technologies, systems, management and other issues facing this new sector of aquaculture. This component of the program focuses on distributing current information about these issues to the industry and public through workshops, conferences, fact sheets and media releases.

The non-diagnostic service, managed by Prof. Richard Moccia, also offers a variety of educational programs: this service assists aquaculturists in using new technology and it provides input into college aquaculture curricula. Currently, participation with the program serves to provide training of students in the new M.Sc. Aquaculture degree program.

As well, co-ordinators of the service conduct routine industry evaluations, provide legislative support that encourages sensible changes in favour of the industry, and serves as a liaison with government, public and private sectors. The program caters to broad industry demands, rather than focusing only on technology transfer at the primary producer level.

The aquaculture extension program is sponsored by the Ontario Ministry of Agriculture, Food and Rural Affairs.

AQUATALK reports on news from the University of Guelph/OMAFRA fish production research program. It is published three times a year by the Office of Research, University of Guelph, with the support of the University of Guelph/OMAFRA Aquaculture Extension Centre

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Anyone wanting to get started in aquaculture will be interested in the U of G's variety of one-day workshops focussing on farming systems technology, species suitable for culture, feeding, economics, marketing, legislative controls and future opportunities for aquaculture development. There are also workshops for those already involved in the industry, covering topics such as technology transfer, feeding strategies, fish health and water chemistry.

continued from page 1

Solar heating was explored by farmers in the past, but, at the time, the solar collector units did not collect energy from the sun efficiently. As well, the system's electronic control devices were very expensive, or not designed for the task.

CANMET, the Canadian Centre for Mineral and Energy Technology, has recently promoted the use of solar energy for aquaculture, encouraging the use of efficient heat capture units, inexpensive electronic control devices and the ability to reuse collected energy. The new system is now being tested for both production yield and cost-effectiveness at the Alma Aquaculture Research Station.

Moccia, the project leader, is involved with production and biological trials, such as feed utilization, growth performance of the fish, and changes in fish disease and mortality rates. Prof. Glenn Fox, Agricultural Economics and Business, will use Moccia's results to conduct an extensive cost-benefit analysis of the system. Allen Carpenter, an engineer with CANMET is also overseeing the project, and is a liaison with the solar energy industry.

This research is sponsored by the Aquaculture Industry Group, CANMET and the Ontario Ministry of Agriculture, Food and Rural Affairs.