Netting in Stories from Fisheries and Oceans

How fast does ocean ice melt? Why do some fish produce anti-freeze in their systems while others do not? Who would win in a fight for food - sockeye or stickleback? Do all swordfish look alike? Can salmon waste be used to produce kelp?

These are some examples of research projects being sponsored in Canadian universities by the Department of Fisheries and Oceans (DFO) and the Natural Sciences and Engineer1991/92, 120 such projects were underway in 35 universities.

The projects may range considerably but they all have one thing in common - their results will benefit Canada's fisheries and oceans industries.

The 1991 projects - 57 new ones; 63 continuing - reflect DFO's priorities in such areas as aquaculture, parasites, fish diseases, toxic chemicals, genetic identification of specific stocks, remote sensing and physical and chemical studies.

Submissions are reviewed by a committee composed of DFO and NSERC representatives. The committee's decisions are based on three criteria: scientific merit, the applicant's qualifications and relevance to departmental objectives. In 1991/92, the committee received 175 requests totalling $3.5 million; it approved 120, worth $1.2 million.

The DFO/NSERC Science Subvention Program, now in its third co-operative year, promotes university participation and graduate studies in fisheries and aquatic sciences. It also promotes partnership between DFO and the universities, with a designated DFO scientist associated with each research project.

CREATIVE RESEARCH INTO PACIFIC SALMON

(NC) - Fisheries researchers seem particularly creative when it comes to Pacific salmon. They manipulate sex hormone production to create more egg-bearing females, inject other hormones to speed up growth rates, try to figure out why some males are more sexually precocious than others (which makes them smaller, darker and less marketable), and are curious about things that most of us don't normally consider - like their ability to survive in water of varying salinites.

Many such projects are conducted in universities under grants from the federal government, notably the Science Subvention Program of the Department of Fisheries and Oceans (DFO) and the Natural Sciences and Engineering Research Council (NSERC). Pacific salmon, due to their high esteem in the west-coast fishery and their diminishing numbers, attract a considerable proportion of those research funds.

Salmon was doing fine in the Pacific Ocean and British Columbia streams and rivers until the 1800 s when the western frontier opened. Jts enemies increased exponentially from natives who caught salmon for food and ceremonial purposes to large-scale pressures such as dams, pollution, forest destruction, habitat gouging and over-fishing.
Today, a frantic game of catch-up is being played, with DFO leading the team with resources management and scientific studies, and providing funding in support of research projects under the DFO/NSERC Science Subvention Program.

For example, Vancouver's University of British Columbia is investigating the influence of ocean currents, temperature and salinity on salmon movement and survival. At Simon Fraser University research is conducted on the effects of feeding cycles on Chinook raised in sea-pens, knowing this would help reduce rearing costs and increase market value. Scientists at the University of Manitoba are comparing the success of sockeye and sticklebacks when competing for food in the presence of predators. Nanaimo's Malaspina College investigators want to know what causes marine anaemia in Chinook. The list of concerns and curiosities goes on.

Jn 1991/92, the DFO/NSERC committee received 175 requests from universities totaling $3.5 million, it approved 120 worth 1.2 million. All the projects will benefit Canada's fisheries and oceans industries.
Jn the case of Pacific salmon, DFO wants to restore numbers to traditional levels and to do this it must understand the biology aspects of the species and its habitat requirements. Canada's universities are a key factor in this quest.

CANNIBALISM - SUCH A NUISANCE

(NC)—Cannibalism is never an attractive trait, even among fish. Jn the case of walleye, it's a downright nuisance - especially for the people who want to raise the species artificially.

Walleye is one of Canada's most popular freshwater species. Jt's worth $8 million a year to commercial fishermen and is next only to trout and smelt as a recreational catch.

Unfortunately its numbers are dwindling from a peak of 10,000 tonnes caught in the commercial fishery in the mid 1950 s to less than half that in the 1990 s.

The Department of Fisheries and Oceans (DFO) wants to resstore the walleye population to historical levels and is looking to fish-farming as one way to do it.

This is where the cannibalism becomes a problem. Jt seems that walleye at the larval stage prey upon each other if they're packed in too tightly, as could be the case in rearing tanks Between that and various unknowns associated with feeding levels and water temperatures, young walleye have a 93 % mortality rate under artificial rearing conditions.

To address these problems, DFO conducts a number of scientific projects and, in conjunction with the Natural Sciences and Engineering Research Council (NSERC), has sponsored others at universities, most notably, in the case of walleye, at the University of Winnipeg.

What they have learned so far is that walleye larvae tend to come together or disperse according to conditions of lighting. Clump too many together and they start munching on each other. The task now is to learn how many is too many, and carefully design the lighting to encourage them to spread out. Scientists also know that young walleye detect prey largely by their colour and contrast to surrounding. The colour of the tank therefore becomes an important factor.

Fisheries scientists have made great strides in learning how to rear walleye, but questions remain. What is the best watertemperature? What are the best food rations and feeding regimes? What causes inadequate swim bladder inflation, a problem that affects many species?

DFO continues its search for those answers in its efforts to satisfy sport and commercial demand for this delectable species.

FEDERAL GRANT TO STUDY OCEAN ICE

(NC) - Jt loomed like a silent, white bastion at the mouth of the St. John's harbour. Frigid and impenetrable, it was one more obstacle in an already difficult year for Newfoundland fishermen.

The amount of ice floating off Canada's east coast, and the length of time it stays, vary each year. Jn 1991, the ice remained well into August, at least two months longer than usual, preventing fishermen from getting their gear into the water. Those who did, often found it torn and battered, and their boats damaged.

The federal government paid out $18 million to compensate fishermen who were impeded by the ice, and another $39 million to help them fix gear and to create jobs for fishermen and plant workers who couldn't find enough work to qualify them for Unemployment Jnsurance.

The Department of Fisheries and Oceans (DFO) wants to understand the natural characteristics of the ice so that in the future precautionary measures can be taken.

As ice floes drift southward in the Labrador Current, they are carried out over the Grand Banks where they encounter the waters warmed by the Gulf stream. Here, the pack-ice cover tends to break up and melt.

Jf scientists knew more about the ice - for example, at what rate it melts - they would be able to add this information to their computer models and eventually figure out where the ice is headed and how big it will be when it gets there. This would allow fishermen and mineral exploration interests to plan ahead and take precautionary measures.

Dr. Greg Crocker, a researcher at Memorial University, is currently working on an inexpensive device that would measure the speed at which the pack-ice cover over the Grand Banks melts. (Similar instruments exist but they are too expensive to purchase in the quantities that would be required for this job). Dr. Crocker is conducting his work with a $10,000 grant under the Science Subvention Program of DFO and the Natural Sciences and Engineering Council.

Jf tests of the prototype in February/March 1992 are successful, DFO scientists can start building their data base and eventually predict the impact and movement of ice in the southern Labrador Sea and Newfoundland's Grand Banks.

HERRING ANTIFREEZE

(NC) - Sometimes it pays to be a herring. Not often perhaps, but possibly in winter. Jt seems that in their early months herring produce an antifreeze in their blood streams that protects them from frigid temperatures. As they get older, the ability disappears.

This is important information to fisheries scientists who wanted to know why juvenile Gulf of St. Lawrence herring, unlike their adult counterparts, do not migrate to the warmer waters of the Laurentian Channel in winter.

Dr. G.L. Fletcher of Newfoundland's Memorial University has been studying the antifreeze phenomenon in a number of species for about 20 years. Since the Department of Fisheries and Oceans (DFO) and the Natural Sciences and Engineering Research Council (NSERC) established their joint Science Subvention Program a few years ago, they have been helping to support Dr. Fletcher's work.

"A number of fish species produce antifreeze proteins that allow them to overwinter in areas that other species cannot," Dr. Fletcher said. "The purpose of studies such as mine is to know what various species can and cannot do, so that we know where to look for them at different times of the year."

Jn the case of herring, knowing their whereabout helps DFO scientists to conduct winter surveys to count their numbers, predict how many adults should appear next year, estimate how many are incidentally taken in other fisheries and, based on this, set fishing quotas for the season.

Every year, DFO and NSERC grant more than $1 million to universities for research projects that will benefit the fisheries and oceans industries. Jn 1991/92, 120 such projects received $1.2 million.

ATLANTIC FISHERMEN HELP MAKE BETTER CHOCOLATE MILK

(NC) - Every time we eat an ice-cream cone, paint the living room wall or wash our hair, we have 2,000 Atlantic fishermen to thank. They harvest the Jrish moss the produces the carrageenan that goes into a wide range of products such as ice cream, toothpaste, paint, insect spray and more than 1,000 others.

Carrageenan is a starch-like substance, colourless, odourless and tasteless. Jt has emulsifying, gelling and stabilizing properties that give better consistency to everything from chocolate milk to shampoo. As a food additive, it is natural and passes through the digestive tract undigested, pleasing dieters and diabetics.

Atlantic Canada harvest 75 per cent of the world's Jrish moss. Jt is worth up to $7 million a year to the Atlantic region and, in Price Edward Jsland, is second only to lobster as a fishery product. (Although Jrish moss is a plant, it is managed much like other biological aquatic resources).

But Jrish moss is unpredictable, showing up at different times of the summer and in varying amounts. The Department of Fisheries and Oceans (DFO) would like to be able to forecast the plant's distribution and time of maximum production so that it can better manage the harvest.

Dr. Thierry Chopin, a biologist at the University of New Brunswick, is working on the project under a grant from the Science Subvention Program of DFO and Natural Sciences and Engineering Research Council (NSERC).

Dr. Chopin estimates that measurements of nitrogen and phosphorus in early life stages could provide advance clues to the abundance of Jrish moss as well as carrageenan content at harvest time, some three months later. He is conducting a three-year study to test his theory. He also wants to determine whether the time of year the plant shows up has any bearing on carrageenan levels.

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