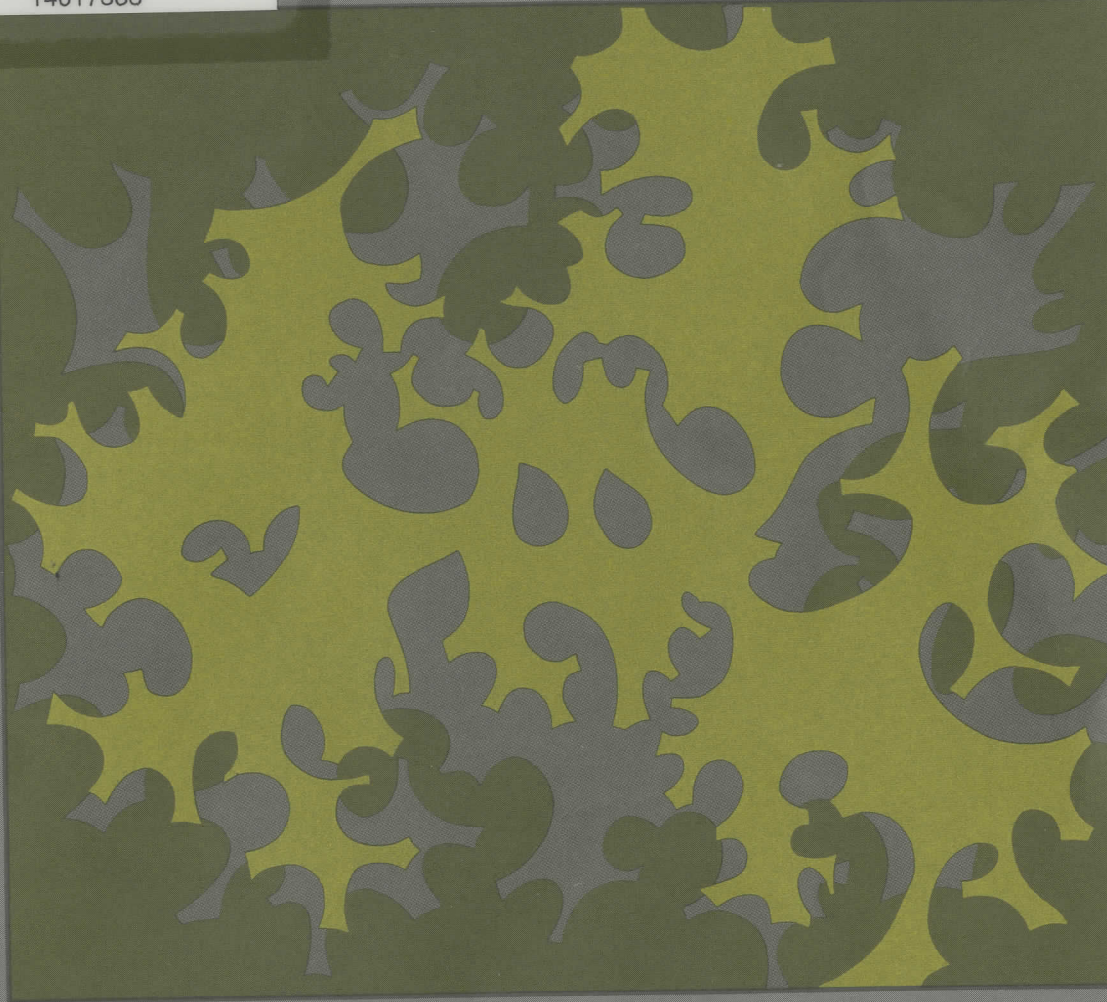


UNDERWATER WORLD

DFO - Library / MPO - Bibliothèque

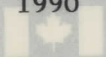


14017383



Irish Moss

QL
626
U52
No 9
1990



Fisheries
and Oceans

Pêches
et Océans

Canada

Irish Moss

Irish moss is a small unimpressive plant, but it looms large in the make-up of many of our favourite foods and useful products.

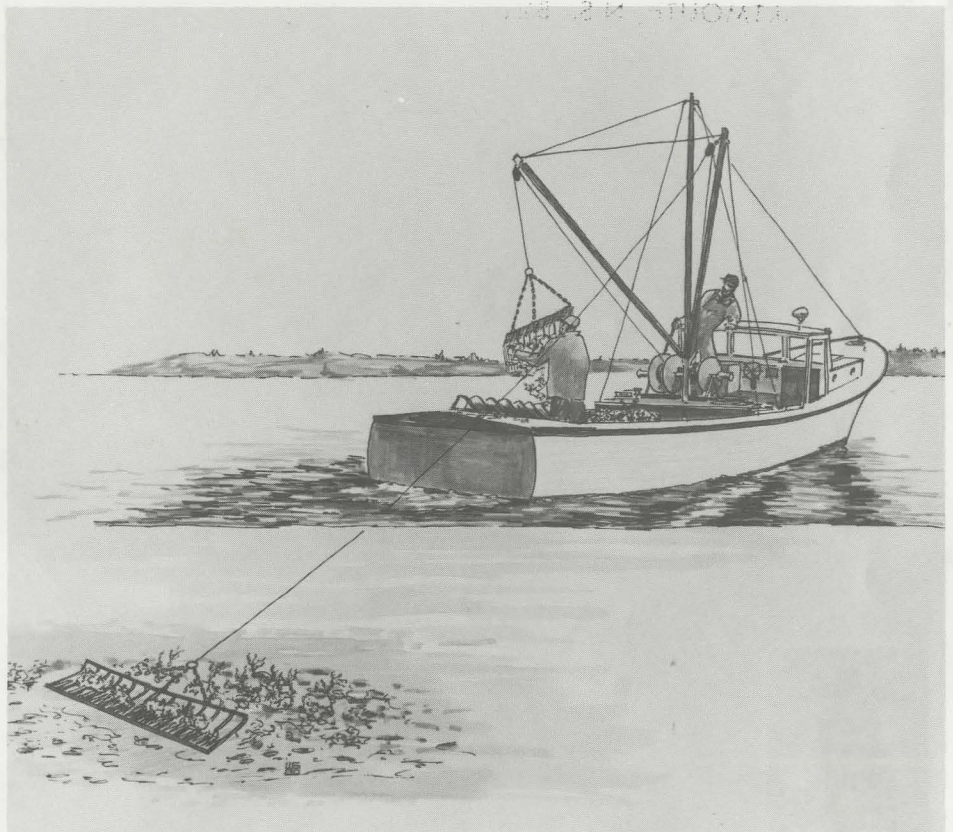
When we consume ice cream, chocolate milk, salad dressings, sherbet, flavourings, confectionery, beer — or use insect sprays, water based paints, shampoos, toothpaste or cosmetics, we're almost certain to be using carrageenan, a starch-like non-caloric substance extracted from Irish moss.

These are just a few of the thousand or more products that contain carrageenan, a very versatile extract with a wide variety of uses in human food production — especially dairy-based foods — and in industry. About 90 per cent of carrageenan is used by the dairy industry to thicken ice cream, milk shakes and puddings. In the making of ice cream, it prevents the formation of large ice crystals and produces a smooth mixture of creamy consistency.

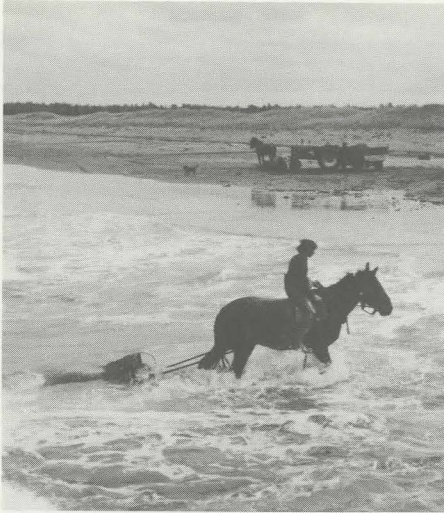
Among carrageenan's properties are its emulsifying, gelling and stabilizing abilities that make it such a versatile ingredient. As a food additive, it is natural and has the ability to pass through the digestive tract undigested, making it important to dieters and diabetics. It is also colourless, odourless and tasteless.

Where Found

Although Irish moss (*Chondrus crispus*) is found in other parts of the world such as Norway, the United Kingdom, France and Spain, the three Maritime provinces of Canada account for about three-quarters of the world's supply of this plant. In Prince Edward Island, which produces approximately half of the Maritimes' Irish moss, its economic value in the fishing industry is second only to lobster. Approximately 2 000 harvesters from 47 communities and nine counties take part in the harvesting of moss in the Maritimes.



Artist's Conception of Drag Raking.



Shore Harvesting by Horse and Scoop.

Irish moss, when properly processed, yields between 40 and 60 per cent of its dry weight as carrageenan. Total annual world production of carrageenan is approximately 11 500 metric tons (t). The United States leads the world, producing about 42 per cent of this amount. The combined production of Denmark, France and Spain makes up another 47 per cent, with Japan and the Phillipines producing the remainder. A newly-formed Canadian company constructed a small plant in western P.E.I. and went into production early in 1981.

The U.S. is also the world's leading consumer, using about 4 500 t per year, followed by Europe and Japan. When world demand for carrageenan became too high for the amount of Irish moss being harvested, a technique was developed to farm *Eucheuma*, a carrageenan-producing plant of the south Pacific. This venture has been very successful and in many instances has replaced carrageenan extracted from Irish moss. However, only carrageenan from Irish moss can be used in some products.

Description

Irish moss is a perennial plant — short, sturdy and rounded, with many branches near the top. It ranges in colour from yellowish green to brown to reddish purple, and grows attached to rocks to heights of three to seven inches. It is found from the low tide mark to approximately 30 feet of water. Ideal growing temperatures range from five to 15 degrees Celsius. Research has shown that Irish moss reaches maturity in three to five years from the spore stage, when a small seed-like structure is shed annually by the plant.

Where it is found in quantity, particularly off southwestern Nova Scotia, it forms a thick carpet over rocks and ledges. When exposed to currents and tides, it is stronger, has fewer impurities such as sand and other sea plants, and is referred to as "outside" moss. The "inside" moss, found in sheltered coastal areas, usually contains a greater amount of other plants and impurities when harvested.

The gathering of Irish moss is looked on as a fishing activity, since it is mainly harvested from the sea — primarily by lobster fishermen during the off season. It is regarded as a cash crop and in most cases is considered a secondary fishery performed with boats used for other purposes at other times of the year.

To the economy of the Maritimes, the value of Irish moss is significant. The annual harvest is worth from \$3 million to \$5 million. Recent studies have shown there is currently an annual potential of \$7 million.

Production and Harvesting

Prior to the 1970s, the production of Irish moss in the Maritimes was increasing. Since then, its production has fluctuated widely, with a high of 50 000 t in 1974 and a low of 25 000 t in 1977. Between 1971 and 1980, the average harvest was 33 000 t. Although over-harvesting or poor growing conditions have been blamed for poor crop years, it is possible that fungus or other diseases have affected production. Unfortunately, little is known at this time about diseases which attack Irish moss.

Harvesting takes place from early summer to late autumn, and is accomplished in the southern Gulf of St. Lawrence by dragging rakes along the ocean floor behind boats. Off southwestern Nova Scotia Irish moss is harvested from small dories by handraking; handrakes resemble garden rakes but have a five metre handle and the tines are made of boat nails placed seven mm apart.

Lobsters inhabit Irish moss beds at certain times of the year. Unfortunately, not enough is known of their seasonal movements, so that some lobsters are killed as a result of drag-raking. Although the financial rewards of Irish moss far exceeds the loss, steps have been taken, through federal marine plant regulations, to minimize these losses.

QL
626
452
No 9
1990



Drag Raking for Moss.

Proper raking permits the plant to be removed from the rock without damaging the root or the "holdfast" system from which future production develops. The "holdfast" system actually glues the plant to the rocks. Fisheries scientists have shown that in the southern Gulf up to 35 per cent of the plants in the dragraked harvest were attached to holdfasts and up to 60 per cent were immature. Minor modifications to the traditional dragrake design resulted in a significant reduction in the number of holdfasts and immature plants taken during harvesting. Recent studies may eventually lead to a design which will reduce the damage to Irish moss beds through dragraking.

Dragrake Banned

A great deal of controversy preceeded the 1977 banning of the basket dragrake, a device which measured approximately one metre by 2/3 of a metre and which was covered with wire mesh to form a basket. Those who advocated its use claimed that a large number of both undersized and mature lobsters were injured or killed by this harvesting device, particularly because of the number of rocks it gathered. Some lobsters were brought to the surface in the baskets and were

not returned to the sea. Subsequently, a new harvester was developed by federal researchers. The design was somewhat similar, but the basket was elevated on runners to avoid gathering rocks and lobsters.

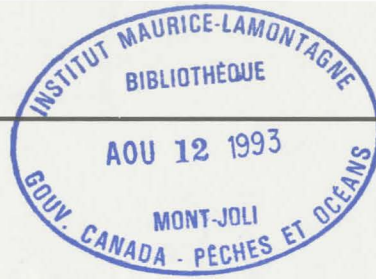
Sampling of hundreds of landings of Irish moss in the Maritimes in 1975 and 1976 showed that many immature plants (two years old or less) were being removed by handrakers. Scientists estimate the annual harvest could have been increased by 12 per cent if these plants had been left to mature. As a result, minimum tooth spacing for hand rakes was recommended at seven mm.

Spring weather conditions can adversely affect the moss season. If ice remains in late spring along the coast or in coves, it may scrape the bottom and remove many plants. Moss beds are slow to recover from this type of damage, as new plants have to be re-established from spores.

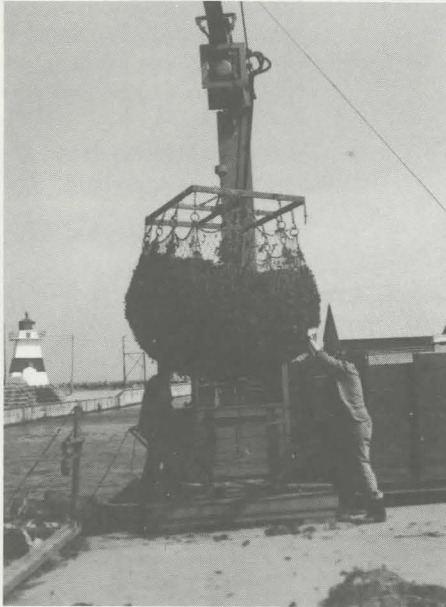
Moss is harvested in certain areas of the southern Gulf after tides, winds or storm action break the plants loose and toss them up on beaches. Storm-tossed moss has to be separated from the sand and stones which still cling to it. All moss must be dried immediately to prevent spoilage.



A Boat Load of Moss.



146537



Unloading Drag-Raked Harvest.

**THE LIBRARY
BEDFORD INSTITUTE OF
OCEANOGRAPHY
BOX 1006
DARTMOUTH, N.S. B2Y 4A2**

Drying the Moss

Up to 100 agents or buyers representing processing plants are scattered along the shore where harvesting takes place. They receive the moss at wharves and other locations and provide transportation to drying plants, although in some cases harvesters sell directly to plants. Artificial drying plants have been in use for some time, but the rising cost of energy has affected the price given to fishermen for wet moss. Consequently, more fishermen are now sun-drying their moss. A new system which uses wet moss in the production of carrageenan may eliminate the need for drying.

Production of Canadian Irish moss has grown from a small cottage industry in the 1930s, principally aimed at European markets, to an industry that is currently valued at many millions of dollars. Prior to 1940, it was collected in the Antigonish County area of Nova Scotia, where it was extensively used in the making of blanc mange desserts. Harvesting of moss became more extensive during the Second World War, when traditional sources of supply from Europe and Japan were no longer available to the United States where carrageenan was extracted.

The gathering of moss expanded rapidly in Canada between 1943, its first recorded year when the crop yielded 750 t valued at \$30,000 to fishermen — and 1974 when production was 50 401 t valued at \$5,850,000.

National Research Council scientists developed a method of growing a rapid developing strain of Irish moss in land-based seawater tanks. Two of the major buyers of Irish moss have spent six to eight years attempting to make the system economically viable. Present indications are that culturing will be very expensive.

A recent study of the Irish moss industry in the Maritimes recommends that a commission be created for the development and marketing of marine plants. The primary aim of this organization would be to market Irish moss so that maximum financial returns would be yielded to the harvester. The bright light on the horizon for the industry is the construction of a carrageenan extraction plant in Canada. If successful, it should lend stability to the future of mossaing in the Maritimes.



A Truck Load of Irish Moss.



Further Reading:

- DPA Consulting Ltd. 1979. Maritime Irish Moss: A Development Strategy for the 1980s.
- French, R.A. 1970. A Current Appraisal of the Irish Moss Industry.
- MacFarlane, Constance I. 1968. The Cultivation of Seaweeds in Japan and its possible Application in the Atlantic Provinces of Canada.

Underwater World factsheets are brief illustrated accounts of fisheries resources and marine phenomena prepared for public information and education. They describe the life history, geographic distribution, utilization and population status of fish, shellfish and other living marine resources, and/or the nature, origin and impact of marine processes and phenomena.

Others in this series:

Alewife
 American Eel
 American Oyster
 American Plaice
 American Shad
 American Smelt
 Arctic Char
 Arctic Cod
 Atlantic Cod
 Atlantic Fishing Methods
 Atlantic Groundfish
 Atlantic Halibut
 Atlantic Herring
 Atlantic Mackerel
 Atlantic Pelagic and Diadromous Fish
 Atlantic Salmon
 Atlantic Shellfish
 Atlantic Snow Crab
 Bluefin Tuna
 Capelin
 Cetaceans of Canada
 Crabs of the Atlantic Coast of Canada
 Dungeness Crab
 Grey Seal
 Haddock
 Harbour Seal in Canada
 Harp Seal
 Hooded Seal
 Lake Trout
 Lingcod
 Lobster
 Lumpfish
 Marine Fish Eggs and Larvae

Narwhal
 Northern Shrimp
 Pacific Herring
 Pacific Salmon
 Pollock
 Red Hake
 Red Sea Urchin
 Red Tides
 Redfish (Ocean Perch)
 Rockfish
 Roundnose Grenadier
 Sand Lance
 Sea Cucumber
 Sealing — A Canadian Perspective
 Sea Scallop
 Selected Freshwater Fish
 Selected Shrimps of British Columbia
 Soft-Shell Clam
 Spiny Dogfish
 Squid
 Thorny and Smooth Skates
 Trout in Canada's Atlantic Provinces
 Turbot (Greenland Halibut)
 Walleye
 White Hake
 Winter Flounder
 Witch Flounder
 Yellowtail Flounder

Text:

Wilf Bell
 Communications Branch
 Department of Fisheries and Oceans
 Ottawa, Ontario
 K1A 0E6

Published by:

Communications Directorate
 Department of Fisheries and Oceans
 Ottawa, Ontario
 K1A 0E6

DFO/4340 UW/9

© Minister of Supply and Services
 Canada 1990
 Cat. No. Fs 41-33/9-1990E
 ISBN 0-662-17442-9

Disponible en français