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Committees

REPORT OF THE ICES WORKING GROUP ON THE INTRODUCTION OF NON-INDIGENOUS MARINE ORGANISMS

Nantes, France, April 22-25, 1980

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SUMMARY

The ICES Working Group on Introduction of Non-Indigenous Marine Organisms held its 1980 meeting in Nantes, France, with 19 participants representing nine countries. Principal activities during the meeting centered on (1) responses to growing concerns about Pacific salmon introductions; (2) continuing problems with introductions of Pacific oysters; (3) expansion of introduced seaweed populations; (4) expansion and clarification of the ICES Code of Practice concerning introductions; and (5) preparation of a combined report on the status of introduced species in all ICES member countries.

(1) Pacific salmon introductions

A principal problem of the moment in several ICES countries concerns introductions of several species of Pacific salmon, particularly coho and pinks -- for cage culture and for future ocean ranching. The concerns expressed are: potential displacement of Atlantic salmon by interspecies interaction, in particular competition for food and spawning areas, and predation.

(2) Introduction of Pacific oysters

Pacific oysters (Crassostrea gigas) were imported to France as seed and adults from Japan and British Columbia in large quantities in the late 1960's and early 1970's. Inadequate set since 1976 may result in renewed importation, with coincident potential predator, pest, and disease problems.

(3) Expansion of introduced seaweed populations

Two introduced seaweeds have spread in French waters. Undaria pinnatifida has spread somewhat on the Mediterranean coast, and Sargassum muticum has spread eastward and westward from the Cherbourg Peninsula. S. muticum has also appeared on the Jersey Channel Islands.

(4) Expansion and clarification of the ICES Code of Practice

The Council approved at its 1979 Statutory Meeting a revised Code of Practice -- which calls for specific actions by member countries prior to introducing a non-indigenous species. One of the most common comments from the four parent committees of the Working Group (Mariculture, Environmental Quality, Shellfish, and Anacat) was that an expansion and clarification of the code was needed.

The Working Group addressed this problem and began drafting during the meeting three documents -- definition and description of terms, details relevant to shellfish introductions, and details relevant to salmon introductions. These documents, when completed, will form appendices to the Code of Practice.

(5) Preparation of a status report on introduced species

ICES in 1972 published Cooperative Research Report No. 32, prepared by the Introductions Working Group, which summarized the status of introduced species in all ICES member countries which had responded to a prepared questionnaire. The questionnaire was revised by the Working Group and distributed by the Secretariat in 1979, with the objective of updating the previous information about introductions.

A substantial amount of time was spent by the Working Group in discussing and assembling the information received thus far from member countries, and a draft document was initiated. The draft will be circulated for comments within the Working Group, and a preliminary copy should be available by the time of the 1980 Statutory Meeting.

Additionally, the Working Group will complete by October 1980 a compilation and summarization of all national laws of ICES countries concerning transfers and introductions of exotic species.

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Note: The Working Group would like to express its appreciation to Dr. Claude Maurin and the staff of the ISTPM at Nantes for hospitality and assistance during its 1980 meeting.

REPORT OF THE ICES WORKING GROUP ON THE INTRODUCTION OF NON-INDIGENOUS MARINE ORGANISMS

1.0 INTRODUCTION

The Working Group met at the ISTPM Laboratory, Nantes, France, between April 22-25, 1980. Those present were:

Dr. C. J. Sindermann (Chairman)	USA
Mr. A. Franklin (Secretary)	UK
Dr. P. von Banning	Netherlands
Dr. J. Carlton	USA
Dr. N. O. Christensen	Denmark
Dr. C. Duggan	Ireland
Dr. E. Egidius	Norway
Dr. H. Grizel	France
Dr. Y. Harache	France
Dr. V. Jacobsen	Denmark
Mr. A. Kiener	France
Dr. C. Maurin	France
Dr. R. Meixner	Federal Republic of Germany
Dr. A. L. S. Munro	UK (Scotland)
Dr. R. Perez	France
Dr. A. Rosenfield	USA
Dr. T. Rowell	Canada
Dr. D. Solomon	UK (England and Wales)
Mr. D. Reyss	France

Apologies for absence were received from Dr. Dybern (Sweden) and Dr. Gibson (Ireland).

Terms of reference for the Working Group, as outlined in Council Resolution 1971/2:7 and 1978/2:28 were reviewed, as were Council Resolutions 1979/4:6 (concerning Oncorhynchus introductions), 1979/4:10 (requesting that member countries complete the introductions questionnaire), and 1979/4:11 (concerning national regulations). Copies of these terms of reference are attached as Appendix 10.1.

In response to comments regarding definitions of such terms as "non-indigenous" and "introductions", the Secretary pointed out that the recommendation had been made that the name of the group should be altered (as outlined on page 2 of the 1979 report) but had not yet been acted upon. It is therefore recommended to the parent committees and the Council that the name of the group should in future be "ICES Working Group on Introductions and Transfers of Marine Organisms".

It is further recommended to the parent committees and the Council that the word "revised" should be dropped from the description of the ICES Code of Practice, which should be referred to as "The ICES Code of Practice, adopted by the Council, October 1979". A footnote should be added to the effect that the code is regularly revised and the most up-to-date form should be consulted.

The proposed agenda (Appendix 10.2) was accepted, with the addition of consideration of an FAO consultation document on communicable diseases, and with the provision that some time would be devoted to a preliminary consideration of draft recommendations on the 24th of April. Principal efforts of the Working Group during the meeting were to be devoted to expansion of the ICES Code of Practice and preparation of a draft Co-operative Research Report on transfers and introductions of marine species.

The chairman expressed his continuing disappointment at the persistent absence of Working Group participants from a number of ICES countries, despite correspondence from the Secretariat to the Delegates. It was again resolved that all member countries be strongly urged to send representatives to future Working Group meetings.

2.0 RELEVANT PUBLICATIONS

Recent publications of relevance to the Working Group were considered. These include:

Exotic Species in Mariculture (ed. R. Mann - title page circulated);

Solomon -- Coho salmon in North-West Europe, considered fully later in the meeting;

Powell -- Fish Health Protection Regulations;

Rosenthal -- Bibliography of introduced species (EMS publication); and

FAO Circular 715 -- A preliminary record of international transfers of fish species.

It was agreed that dissemination of recent information on introductions and transfers amongst Working Group members was extremely important and copies of the title page and cover of relevant papers should be circulated by the member in the country of origin to other members of the Working Group and the invited experts.

3.0 NATIONAL SUMMARIES

Summaries of recent data on introductions of non-indigenous species were presented by Working Group members.

3.1 Canada

The bay scallop (Argopecten irradians) was introduced to quarantined hatchery facilities at Ellerslie, Prince Edward Island, in early 1979. The adults were destroyed after spawning and the F_1 generation, of which only 13 remain, are being held in quarantine. A further importation of brood stock is anticipated in 1980.

F_1 progeny of European oysters (Ostrea edulis) were produced in quarantined hatchery facilities at Dalhousie University, Halifax, Nova Scotia, from brood stock from Maine (1977-78) and Wales (1978). Brood stock are now being held in unquarantined facilities at the university.

Pink salmon (Oncorhynchus gorbuscha) introduced as eyed eggs from British Columbia in 1977 and 1978 continue to be held in cage facilities in New Brunswick and Newfoundland. These stocks, being held for studies in ocean ranching and intensive cage culture, have both suffered significant accidental escapes as a result of damage to the net enclosures used.

No new introductions of any species are planned for the immediate future, but large-scale feasibility studies for the introduction of Pacific salmon to Atlantic waters are under consideration. Species considered include sockeye (O. nerka), pink (O. gorbuscha), chum (O. keta), coho (O. kisutch, and chinook (O. tshawytscha).

Mechanisms for the handling of introduction proposals have been developed in all regions of Canada. Introductions with little likelihood of impact on the other regions are considered by the Regional Introductions Committees and recommendations are prepared for fisheries managers.

Those proposals having potential for a broader impact are referred to the Canadian Atlantic Fisheries Scientific Advisory Committee (CAFSAC) for review. In the past year, the committees have conducted several reviews and developed recommendations in relation to Pacific salmon introductions and rainbow trout transfers. They have also monitored the progress of earlier introductions and made recommendations on proposals and approaches.

One Canadian Pacific region has developed a computerized data bank of all historical records of finfish transfers and disease occurrences as a tool for future research and as a basis for consideration of introductions.

Regulations already exist for control of introductions and transfers into the Region. In the Maritime Region, new regulations concerning the "Introduction and Transfer of Aquatic Species in the Maritime Provinces" are in preparation. These will include control of internal transfers.

3.2 Denmark

Denmark had no specific laws concerning introductions until 1966, when an attempt was made to prevent the introduction of IPN by banning imports of freshwater fish. Crassostrea gigas and C. virginica have been imported, but only on an experimental scale. Imported oysters are placed in a form of quarantine, but this is really for public health considerations.

Elvers have been imported from a number of European countries; salmon smolts have been imported from Sweden, and Scopthalmus has been introduced for rearing.

3.3 France

France is planning to resume imports of C. gigas from Japan and British Columbia to build up stocks, following poor recruitment of C. gigas in France for the last few years. Adult C. gigas were imported from Italy in 1979, but are now banned due to the possibility of C. angulata being sent with them. Small amounts of Ostrea edulis, Crassostrea gigas, and Venerupis semidecussata, imported from a California hatchery, suffered severe mortalities in some areas of France. Parasites were detected and so further imports were banned. Crassostrea rhizophorae have been imported to quarantine conditions from Guyana, and V. decussata from Guernsey. O. edulis from Greece contained parasites, so further imports were prohibited. No serious problems have been found with drills (Ocenebra japonica), Mytilicola orientalis or Pseudostylochus. Some difficulties have been encountered with Crepidula.

A few offspring of the South African crawfish Jasus lalandei were been caught in 1979 off the northern coast of France following release of 13,000 adults in 1970.

Sargassum muticum has expanded its range and has affected other seaweeds, such as the commercial alga Chrondrus crispus. Undaria pinnatifida, imported from the Far East with C. gigas seed, has continued to grow on the Mediterranean coast. Laminaria japonica has also been found in the south of France.

Coho salmon egg imports for commercial culture have continued.

3.4 Germany (Federal Republic)

Fishermen have voluntarily abstained from importing eel fingerlings if it is thought there is a risk of carrying disease.

Crassostrea gigas have been imported from sources where seed is certified disease- and pest-free. Coho salmon have been imported from the United States Great Lakes to land-locked sites, and two escapes have been noted so far. Imports have also been reported of O. masu and O. rhodurus (FAO Circular 715) to closed ponds.

Dicentrarchus, Siganus and Sparus have been introduced for research purposes. Accidental introductions include Potomopyrgus (gastropod), Mercierella (polychaete), and Rhythropanopeus (mud crab). Introductions through man-made environmental changes include Balanus improvisus, Neomysis integer (crustacean) and Gammarus tigrinus.

3.5 Ireland

Ireland has a total ban on all live fish or shellfish imports except under license. The only imports licensed are oyster spat from UK hatcheries and salmon eggs from Scotland, with strict certification.

Ormers, Haliotis tuberculata, were imported from Guernsey by the Shellfish Research Laboratory (University of Galway) about 1977. This brood stock was kept in strict quarantine until mid-1979 when it was transferred to open circulation within the laboratory. Many of the earlier F1 generation were killed by the cold weather while still in the laboratory. Permission has been granted by the Department of Fisheries and Forestry for F1 ormers to be placed in the sea. They will be kept in cages and placed on isolated rocks to facilitate their further study.

All the Crassostrea gigas in Ireland are of Conwy (UK-MAFF) origin, and were introduced without any further quarantine. The Shellfish Research Laboratory is considering the importation of further strains of C. gigas and also of reintroducing both C. angulata and C. virginica, both of which were at one time imported in large quantities. The Laboratory is also considering the importation of further brood stocks of Mercenaria mercenaria, which has occasionally been imported from the UK. A totally new introduction, Tapes semidecussatus, has also been suggested.

The recent discovery that very heavy settlements of scallops, Pecten maximus, occur in the North Water, Mulroy Bay, County Donegal, where they have also been successfully overwintered, is likely to lead to scallop spat being available for export from Ireland.

A heavy run of Atlantic salmon has entered Irish rivers. There is no intention of permitting the introduction of any Pacific salmon.

3.6 Netherlands

The relevant law (1963) is stated in such a way that it is forbidden to increase the number of species of fish and shellfish, so if for example C. gigas is allowed in from the UK, theoretically it is then possible to introduce it from anywhere else.

No new recent introductions have been carried out. With regard to previous imports, virtually no C. angulata are left in Dutch waters. The numbers of C. gigas are limited, though there are worries that natural settlement might commence in dammed waters, where the summer temperatures have been raised.

Mercenaria mercenaria introduced in 1965 were introduced directly to open waters. Little commercial interest has been shown and only a few specimens are left since no spawning has taken place.

Japanese seaweed (Sargassum muticum) is being found in large quantities as drift plants, but no attached specimens have been found.

3.7 Norway

In the province of Finmark, pink salmon (O. gorbuscha) from Soviet Union releases on the Kola Peninsula have come into coastal waters and up the eastern rivers. Pink salmon now reproduce in Norwegian rivers, but there is still some uncertainty if runs are really established. Pressure is increasing from fish farmers to introduce Pacific coho salmon (O. kisutch) for aquaculture.

Small quantities of C. gigas have been introduced to the Bergen area. Homarus gammarus is imported live from Scotland for fattening and then exported to Europe, especially the Netherlands.

A law is being developed to prevent the introduction of diseases in marine organisms; this may also include consideration of ecological implications.

3.8 United Kingdom

Recent laws include the Molluscan Shellfish (Control of Deposit) Order for Scotland 1978, which parallels similar legislation for the rest of the UK, in preventing the introduction and (in certain cases) transfer of molluscs. The Import of Live Fish (Scotland) Act 1978 restricts the import, keeping, or release of live fish or shellfish.

Homarus americanus was introduced to Northern Ireland for tank rearing in 1979.

The status of Mytilicola intestinalis as a definite mollusc pest is being questioned and research undertaken on the true effect on oysters and mussels.

Sargassum muticum has continued to spread within the UK. The seaweed has now been reported from Jersey (Channel Islands). The situation has been summarized in a recent ICES paper (CM1979/E:18).

A number of Penaeus and Crassostrea species have been imported to quarantine from various countries for experimental hatchery rearing. Possible future imports include Penaeus stylirostris from Mexico; Penaeus monodon from Thailand; and C. gigas from North America (last mentioned to maintain viable hatchery brood stocks).

A disease-free F_1 stock of coho salmon has been established after the whole life quarantine of parent fish in Scotland. The F_1 stock are contained by law in secure premises from which they cannot be moved or released without official permission. Dover sole (Solea solea) eggs, turbot (Scophthalmus) eggs and elvers have been imported from France.

3.9 United States

Two laws of the United States provide some measure of national control over transport and introduction of fish and shellfish and other wildlife. At present, there is proposed legislation before the United States Congress providing for control of interstate and foreign commerce in fish and wildlife. This legislation would strengthen existing laws, and make it unlawful to import or export

any fish or wildlife taken or possessed in violation of any law or regulation of the United States, any State, or any foreign country. A presidential executive order instructs federal executive agencies to restrict the introduction and export of exotic species and encourages the states, local governments, and private citizens to prevent the introduction of exotic species into natural ecosystems of the United States. The wording of the order is such that it is not binding on the several states. An attempt is being made to organize various coastal states into ad hoc committees to address the inconsistencies in some laws and regulations concerned with national and international transfers and introductions.

During the reporting period (1979-80), there has been activity in the following areas: Malaysian prawn (Macrobrachium) introductions, arc-shell culture development, and introduction of exotic oyster species for experimental purposes.

Culture of the Malaysian prawn, Macrobrachium rosenbergii has undergone remarkable expansion in many states of the United States. The original stock was introduced from Asia to Hawaii, and offspring have formed the basis for transfers to other states. Recently, other species of Macrobrachium from elsewhere in the world have been introduced (in hatchery or laboratory situations) to study growth, feeding, survival, temperature tolerance, hybridizing potential, and other factors important to aquaculture. Additionally, a number of strains of M. rosenbergii from various parts of the Pacific have been tested in Hawaii and California.

The arc-shell (Arcanoae) has been introduced from Yugoslavia to an inland hatchery at Orono, Maine, for research on hatchery methods to eventually enhance the arc-shell fishery of Yugoslavia. Offspring have

been transferred to facilities at a coastal laboratory (Walpole, Maine) operated by the University of Maine. Effluent is contained in a dry well. The original imports have been returned to Yugoslavia.

A new project on the genetics of the oysters Crassostrea rhizophorae and C. cortezensis and their hybrids has begun in Florida. Both species are being maintained in strict quarantine situations, after their transfer from Central and South America.

4.0 INTRODUCTIONS OF SPECIAL INTEREST TO THE WORKING GROUP

The Working Group then considered introductions of particular current interest, principally Pacific salmon, Pacific oysters, and seaweeds.

4.1 Pacific salmon

Considerable time was spent on discussions of the present situation of salmonid introductions and transfers, especially those of the coho salmon, Oncorhynchus kisutch. Dr. Munro (UK) started the session with a presentation on the general pros and cons for such introductions. Figures for European salmon imports indicated that there was considerable scope for increased national production by either pure aquaculture or by establishing new salmonid populations in areas which no longer contained native populations (e.g., acidic rivers of southern Norway). Against this was the possibility of an adverse effect through interspecies interactions such as competition, predation, or the introduction of disease.

Dr. Harache (France) then summarized the situation in France. A brief history of Pacific salmon introductions was first given, it being emphasized that such introductions were not in fact new. Considerable quantities of chinook and coho salmon had been introduced to Europe from the United States Great Lakes in the early 1900's, with adult fish being recaptured from the Seine and some Normandy rivers in the 1920's.

The present interest in introducing salmon to France (Pacific and Atlantic species) arose from minimal catches - 30 to 40 tons annually being obtained from the main production areas of the Loire, Brittany, and the Pyrenees. In 1971, 60,000 coho eggs from the USA and the same number of Atlantic salmon eggs from Scotland were imported for grow-out in hatcheries. Experiments indicated that coho seemed the better proposition with regard to resistance to disease, and the numbers grown to commercial size have steadily increased since that time, despite some problems with stress due to the combination of high temperature and high salinities found in Brittany waters in the summer. Production of coho in 1979 was 51 tons; this was expected to rise to 80-90 tons in 1980 (as compared with 4000 tons of Atlantic salmon produced in Norway and 500 tons produced in Scotland). Since the species has been introduced purely for aquaculture, the ecological consequences are considered by the French to be minimal. However, it was agreed that escapes were virtually unavoidable, and steps should be taken to minimize possible harmful effects. One possibility was the use of monosex or castrate cultures or possibly hybrids.

Dr. Harache also made reference to a proposal being prepared to introduce young coho or coho eggs to a Brittany stream in 1980 or 1981 to study their interactions with Atlantic salmon. Some members of the Working Group expressed the opinion that the proposal, when formalized, should be submitted to ICES, and that the streams should be chosen carefully because the lower reaches could make survival of ascending or descending fish unlikely.

Dr. Solomon (UK) then gave a presentation on the results of his study on the possible consequences of Pacific salmon introductions to European waters. Large numbers of coho had in fact escaped from fish farms in Normandy; this had almost certainly resulted in some fish migrating to the sea and then returning to produce young -- quite a surprising achievement considering the adverse conditions in the estuaries of some of the rivers concerned. However, the survey of the literature which had been carried out indicated that coho and Atlantic salmon might coexist, due to "interactive segregation" (specialization under population pressure to decrease competition), and salmonid production might in fact increase overall. However, considerably more research was required before any introductions could be considered for the UK. This research might be more profitably carried out on species involving less ecological risk, such as pink salmon where only a short phase is passed in fresh-water. Project proposals would probably be put to the Working Group after internal consultations. The final point was made that successful introductions seemed in fact to occur by accident, whereas most deliberate attempts had failed (an example given was the successful introduction of pink salmon in Lake Superior, as a result of an accidental release during the cleaning of holding tanks during a transfer to Hudson Bay).

Dr. Egidius (Norway) concluded the presentations on salmon introductions with a description of the pink salmon introductions into Norwegian waters as a result of the Soviet transplants to the Kola Peninsula. Recent research had indicated that spawning was now taking place, but that interaction with Atlantic salmon appeared minimal. In one river which has been studied, it was found that the Atlantic salmon

spawned on their normal grounds which were upstream of the coarse gravel chosen by the pink salmon. The fry of the latter had returned to the sea before the Atlantic eggs had hatched, so competition was avoided (hatchery observations also indicated that pink salmon commenced schooling behavior, indicating a readiness to return to the sea, very early in life).

Considerable discussion took place following the four presentations, but no clear agreement could be reached on the way ahead for Pacific salmon introductions. It was decided that a special subgroup should be formed under Dr. Munro to produce recommendations concerning pertinent research which should be carried out, and to try to provide some definitive answers to the many questions concerning the introduction of Pacific salmon to the Atlantic.

4.2 Pacific oyster introductions

The status of Pacific oyster introductions was reviewed, with particular attention to French imports.

4.2.1 France

The import of C. gigas from Japan and British Columbia was initially very successful, since spawning and natural settlement then took place leading to a doubling of production of Crassostrea sp. in France by 1976. Problems have developed recently, however, due to lack of settlement (caused perhaps by too high stocking densities), and shell deformities have been observed in certain areas. These abnormalities are extremely important in France, since oysters are marketed fresh in the shell.

It is now the plan to look at other species of oysters, which may have to be introduced in large quantities to counterbalance losses due to any new diseases. French participants stated that the ICES Code of Practice will be followed, in that preliminary observations on the suitability of new candidates (behavior, quality, past status, etc.) will be carried out under strict quarantine conditions. Brood stock of suitable species will then be produced in hatcheries (ISTPM plans to have its own hatchery in the near future to enable detailed experiments to be carried out on disease resistance, etc.). The species being looked at are Ostrea chilensis and Crassostrea rhizophoreae.

With regard to the digestive gland disease in O. edulis, this has disappeared from N. Brittany, parts of the Rade de Brest and Rivers Crach and St. Philibert. It is, however, still active in the Morbihan/Auray area and it appeared in the River Penerf for the first time recently. In July, 1979. a new parasite appeared in beds at Ile Tudy (near Nantes) possibly causing some mortalities.

4.2.2 United States

Theoretically, hatcheries should not export exocit species to areas where there is a possibility of ecological harm. However, one west coast hatchery has been sending out seed which may be infested with Mytilicola orientalis, a parasite which can affect a number of species.

Within the USA, C. gigas has been transferred to Massachusetts with consignments of C. virginica and possibly also to Maine and New York. Some problems are being experienced with university research projects, where escapes into natural waters are possible.

4.2.3 Other countries

Crassostrea gigas has been imported to the Conwy (UK) hatchery to improve viability of brood stocks. Germany (FRG) has imported C. gigas seed from Scotland; and Ireland has found C. gigas in batches of O. edulis seed from the UK.

4.3 Seaweed introduction

The Working Group then considered the status of accidental or deliberate introductions of seaweeds.

4.3.1 France

Undaria pinnatifida was found on the Mediterranean coast in 1976, presumably imported along with Japanese C. gigas spat. It has spread to some extent, but has not as yet been observed on the Atlantic coast. Reproduction occurs in July, and the weed then disappears till November, after the emission of spores. The effect on fishermen has therefore been slight until now, but over the 1979/80 winter there has been exceptional proliferation of the weed, and it is now fouling the ropes used for suspended oyster and mussel culture.

Macrocystis pyrifera. The planned experiment has not proceeded any further since permission has still not been obtained from the French authorities. Any new developments will be reported to the Working Group. There have been no new proposals put forward for three years, but articles appearing in the press at odd times caused some confusion. There was, for example, a meeting with fishermen recently at the preferred site for the experiment (Rade de Morgat

in Douarnenez Bay) to try to allay their fears regarding the ISTPM proposals (newspaper articles were circulated among members of the Working Group). It is now planned to experiment with algae in the natural state, at a site which would eliminate most of the risks of spread of the weed; castration is not thought to be a really effective precaution, so other steps would be taken. Interactions with other weeds would be studied. Some discussion took place on a review paper published in 1959 by Warren C. Thomson, "Attachment of the giant kelp, Macrocystis pyrifera in fine sediments and its biological and geological significance" (Int. Oceanographic Congress, Sept. 1959, American Assoc. for the Advancement of Science, edit. Mary Sears, Woods Hole), which indicated that Macrocystis could form holdfasts in sand and spread to form large beds (this may have been M. integrifolia, not M. pyrifera, however).

Eukema. This alga was successfully introduced from Indonesia to Djibouti in 1976, where it is cultured on ropes, since any natural settlement on nearby rocks is quickly eliminated by coral fish. The weed has now been transferred to the French Caribbean (Ile St. Martin), where natural populations already exist.

Sargassum muticum. This weed has spread both eastward and westward from the Cherbourg peninsula where it was first found in 1975. It is now present in areas between St. Malo and Grancomp, with plants exceeding 4 meters. Sargassum is competing with the native seaweeds and has already had an adverse effect on Chondrus crispus production, which has dropped from 100 to 20 tons in the affected area. The weed has, however, been reported to harbor increased quantities of crustacea (especially crabs and shrimp).

4.3.2 United Kingdom

The most important development has been the continued spread of Sargassum muticum along the south coast of England. It has also appeared at Jersey in the Channel Islands.

4.3.3 United States

There is speculation that microalgae (such as those causing paralytic shellfish poisoning have been and are being transferred with invertebrates, but there is no hard evidence as yet.

5.0 EXPANSION OF CODE OF PRACTICE

The Code of Practice concerning introductions of non-indigenous species was revised by the Working Group and approved by the Council in 1979 (Appendix 11.4). An initial reaction from the parent committees was that expansion and clarification of the Code was needed. The Working Group addressed the problem as a major effort at its 1980 meeting.

The Working Group formed three subgroups to consider different aspects of the code, one to cover definitions of terms in the code, the second to consider any additional explanatory material required to cover fish (especially salmonid) introductions, and the third additional material for shellfish (especially molluscs). All three groups reported that substantial addenda were required to clarify sections of the code. It was decided that the subgroups would each produce a draft document (taking into consideration the points raised in the general discussion at the present meeting) which would be circulated to Working Group members, so that a complete package of the code plus addenda would be available at the next meeting of the Working Group. The draft document for each subgroup would be produced, after the present meeting, by correspondence, and would form part of the 1981 Working Group Report.

6.0 COOPERATIVE RESEARCH REPORT ON INTRODUCED SPECIES

Preparatory to drafting a cooperative research report on the present status of introduced species (an update of ICES Cooperative Research Report No. 32, 1972), the Working Group considered the replies to the introductions questionnaire received in response to ICES resolution CM1979/4:10. Such responses as had been received varied considerably in depth and quality and the chairman felt that further approaches might be required to obtain adequate information from some member countries. However, the Working Group split into a number of subgroups to consider the data obtained on the various aspects of introductions and transfers covered by the individual sections of the questionnaire.

The subgroups studied the various sections but the work required was considerable and most reports could not be completed during the meeting. The subgroups will therefore be responsible for sending drafts of individual sections to the chairman by June 1, 1980.

Consideration was also given to developing a shortened questionnaire covering the most important information, to encourage member countries to respond and supply data. However, despite gaps in the available data, it was decided to proceed with a final document for October 1, 1980.

7.0 SALMONID AD HOC STUDY GROUP

This subgroup, which was formed following earlier discussions on Pacific salmon introductions, and which met several times during the Working Group meeting, reported back to the full Working Group. A number of proposals were made, the most important of which was that the ad hoc group continue its activities. The Working Group agreed that this was vital and the chairman

directed that in light of Council Resolution 1979/4:6 such an informal group be formed under Dr. Munro. The title of the group would be "Special ad hoc Study Group on Introductions and Transfers of Pacific Salmon into Atlantic Waters", and its terms of reference would be to:

(1) review the current status of Pacific salmon introductions to the ICES area;

(2) review the available information on possible effects of existing and possible future introductions;

(3) encourage implementation of and coordinate feasibility and impact studies by member countries;

(4) consider and advise upon applications from member countries for introductions of Pacific salmon, via the Working Group and the Council;

(5) report on the above to the Working Group [The first preliminary report to be submitted to the WG chairman by September 1, for circulation to Working Group members].

8.0 INTERNATIONAL COMMUNICATIONS

The Working Group felt that the dissemination of knowledge regarding introductions within the ICES area was generally very poor. It was therefore recommended that member countries develop procedures so that any imports of exotic species would require notice from the exporting country and formal permission from the importing country. Working Group members should ensure that any relevant information on introductions be brought to the attention of the other Working Group members.

FAO is apparently considering similar introduction problems on a world-wide basis. A representative from FAO will be invited to the next meeting of the Working Group for liaison purposes.

9.0 NATIONAL LAWS

Copies of all laws concerning introductions and transfers should be sent by each member country to the Working Group chairman and the ICES Secretariat by July 1, 1980, with a short summary of the main features of such laws. These summaries will be reproduced as an appendix to the Cooperative Research Report on Introductions, which is now in preparation by the Working Group.

10.0 RECOMMENDATIONS

The Working Group on Introduction of Non-Indigenous Marine Organisms offers the following recommendations:

10.1 In view of the fact that some introductions of Pacific salmon (genus Oncorhynchus) have taken place with apparent disregard for the possible biological consequences, member countries are urged in the strongest terms to follow the ICES Code of Practice and to develop and adopt appropriate legislation where this has not already been done.

10.2 Culture of Pacific salmon in ICES waters must be assumed to lead to escapes in proportion to size of cultured populations; serious consideration should be given to the possible effects of such escapes on native species and marine ecosystems, including those of other countries.

10.3 Where introductions of Pacific salmon are made for mariculture purposes, the possibility of using castrates, or sterile or monosex populations, should be explored to reduce potential risks.

10.4 It is urgently necessary that detailed studies be made of the present situation with regard to competition, predation, and other ecological interactions in countries where reproducing populations of Pacific salmon (genus Oncorhynchus) exist.

10.5 Taking into account the ecological, pathological and genetic risks which may be incurred by transferring indigenous or acclimatized species from one country to another, the exporting countries should develop adequate investigations and control facilities to avoid these risks. If these facilities do not exist, the recipient country should prevent live imports from being placed in natural waters. All exporting countries are urged to have or to develop a system of zoosanitary control to certify absence of organisms of public health and animal health significance.

10.6 Recognizing that a number of introductions and transfers of marine organisms are often unauthorized, and can be potentially damaging to native species and fisheries on them, member countries should inform the appropriate communities (scientific, commercial, and regulatory) of the potential hazards involved in such actions and of the need and importance of notifying appropriate authorities in their own countries regarding such introductions and transfers. Such authorities should take immediate action to inform their counterparts in adjacent or potentially affected countries of such introductions and transfers. Member countries should develop procedures that would require notice of shipment by the exporting country of living organisms destined for introduction and an entry permit from the importing country.

10.7 Because of difficulties in interpretation of terms, the name of the Working Group on Introduction of Non-Indigenous Marine Organisms should be modified to the "Working Group on Introductions and Transfers of Marine Organisms".

10.8 To eliminate questions regarding the original and revised versions of the Code of Practice, the designation of the code should be "The ICES Code of Practice, adopted October 1979".

10.9 Because of the current chaotic situation and likelihood of greater problems with regard to introduced species -- especially those of Pacific salmon -- into North Atlantic waters, ICES member nations are strongly urged to appoint members and send representatives to the meetings of the Working Group on Introduction of Non-Indigenous Marine Organisms. There has been a lack of response by a number of member countries to the expressed hope of the Council (letter from the General Secretary dated 5 March 1980) for greater participation in the Working Group. The following countries were not represented at the 1980 meeting: Belgium, Finland, GDR, Iceland, Poland, Portugal, Soviet Union, Spain. As a minimum, a written summary of national activities should be presented by all member countries.

10.10 In view of the urgency of problems concerned with transfers and introductions of non-indigenous species, particularly those concerning Pacific salmon, macroalgae, and oysters, the Working Group on Introduction of Non-Indigenous Marine Organisms should meet in Sète, France, May 5-8, 1981.

11.0 APPENDICES

11.1 TERMS OF REFERENCE: WORKING GROUP ON THE INTRODUCTION OF NON-INDIGENOUS MARINE ORGANISMS

At the 1978 Statutory Meeting, the Council agreed that the Working Group on the Introduction of Non-Indigenous Marine Organisms should be reconvened with Dr. C. J. Sindermann as Convenor.

The relevant resolution (C.Res.1978/2:28) reads:

"It was decided that: the Working Group on the Introduction of Non-Indigenous Marine Organisms should be reconvened with Dr. C. J. Sindermann as the Convenor. The recent plans on intended introductions should be assessed. The Group should also comment on the proposals made by the Working Group on Pathology of Marine Organisms to amend the present Code of Practice to reduce the risks of adverse effects arising from the introduction of non-indigenous marine species, adopted by the Council on 10 October 1973. The Group should meet at Conwy, 1-3 April 1979, immediately prior to the Working Group on Pathology so that one joint session of the Groups is possible".

From an earlier Council Resolution (1971/2:7) the function of the Working Group was described as follows:

(a) collate and disseminate information received regarding existing and proposed introduction of non-indigenous marine organisms, and

(b) take responsibility for advising the Council on all questions relating to the introduction of new species and for suggesting and modifying agreed procedures covering them, with the aim of establishing an accepted International Code of Practice.

The Working Group should include in their consideration the movement of species between member countries as well as new introductions from outside the ICES area.

Additional terms of reference for the Working Group were approved at the 1979 Statutory meeting. The resolutions read as follows:

C.Res.1979/4:6 -- "The Council should encourage member countries to conduct feasibility and environmental impact studies for all species of Oncorhynchus prior to any further introductions into North Atlantic waters and adjacent seas".

C.Res.1979/4:10 -- "Member countries should be requested to complete the questionnaire on "Statement of the present situation in relation to the introduction of non-indigenous marine organisms", as described and reproduced in Cooperative Research Report, No. 32. Completed questionnaires should be sent to Dr. C. Sindermann, Chairman of the Working Group, by 1 February 1980".

C.Res.1979/4:11 -- "Delegates should be encouraged to send to the ICES Secretariat by October 1980 copies of legislation and regulations in their countries regarding introductions, including considerations of the following: inspection and quarantine procedures, certification, training of inspectors, and intra-national transfers. This material will be compiled into a summary report by the Working Group on the Introduction of Non-Indigenous Marine Organisms".

11.2 AGENDA: 1980 MEETING

AGENDA

International Council for the Exploration of the Sea

Working Group on Introduction of Non-Indigenous Species

Institut Scientifique et Technique

des Peches Maritimes

Nantes, France

April 22-25, 1980

April 22, 1980

9:00 am	Convene
	Introductions Review of relevant publications since last WG meeting
10:00 am	National summaries
12:00-1:30 pm	Lunch
1:30 pm	Consideration of the general problems of salmon introductions
	Summaries of background documents
	Dr. Munro Dr. Solomon Dr. Egidius Dr. Piggins Dr. Harache
	Establishment of a study group to consider Pacific salmon introductions
	Preparation of an annotated bibliography on Pacific salmon introductions, including ecological requirements, completion, predation, etc.
	Preparation of review papers for 1980 Statutory meeting
5:00 pm	Adjourn

April 23, 1980

9:00 am	Reconvene
	Consider status of oys-er introductions and plans for future introductions
	Consider status of seaweed introductions
	Consider status of other introductions
12:00-1:30 pm	Lunch
1:30 pm	Consideration of expansion of revised Code of Practice
	Review draft and background documents
	Dr. Munro -- Unilever study
	Drafting session
5:00 pm	Adjourn

April 24, 1980

9:00 am	Reconvene
	Consideration of responses to questionnaire and draft Cooperative Research Report
	Drafting session on report
12:00-1:30 pm	Lunch
1:30 pm	Consideration of mechanisms to insure international communication concerning proposed or planned introductions
	FAO aquaculture EIFAC Information bulletin -- ICES - newsletter
	Status of national laws and regulations concerning introductions -- collection and summary
5:00 pm	Adjourn

April 25, 1980

9:00 am	Reconvene drafting subgroups
	Drafting session
12:00-1:30 pm	Lunch
1:30 pm	Reconvene Working Group
	Review proposed activities and new initiatives for 1980-1981
	Consideration of desirability of a Special Meeting on Introduced Species in 1981 or 1982
	Review recommendations
	Review draft reports
5:00 pm	Adjourn

11.3 LIST OF PARTICIPANTS IN 1980 MEETING

Working Group on Introductions of

Non-Indigenous Species

Nantes, France, April 22-25, 1980

Participants

Name	Address
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11.4 REVISED CODE OF PRACTICE

REVISED CODE OF PRACTICE TO REDUCE THE RISKS OF ADVERSE EFFECTS ARISING FROM INTRODUCTION OF MARINE SPECIES*

I. Recommended procedure for all species prior to reaching a decision regarding new introductions (this does not apply to introductions or transfers which are part of current commercial practice).

(a) Member countries contemplating any new introduction should be requested to present to the Council at an early stage information on the species, stage in the life cycle, area of origin, proposed place of introduction and objectives, with such information on its habitat, epifauna, associated organisms, etc., as is available. The Council should then consider the possible outcome of the introduction, and offer advice on the acceptability of the choice.

(b) Appropriate authorities of the importing country should examine each "candidate for admission" in its natural environment, to assess the justification for the introduction, its relationship with other members of the ecosystem and the role played by parasites and diseases.

(c) The probable effect of introduction into the new area should be assessed carefully, including examination of the effects of any previous introductions of this or similar species in other areas.

(d) Results of (b) and (c) should be communicated to the Council for evaluation and comment.

II. If the decision is taken to proceed with the introduction, the following action is recommended:

(a) A brood stock should be established in an approved quarantine situation. The first generation progeny of the introduced species can be transplanted to the natural environment if no diseases or parasites become evident, but not the original import. The quarantine period will be used to provide opportunity for observation for disease and parasites. In the case of fish, brood stock should be developed from stocks imported as eggs or juveniles, to allow sufficient time for observation in quarantine.

*Note: A marine species is defined as any aquatic species that does not spend its entire life cycle in fresh water.

(b) All effluents from hatcheries or establishments used for quarantine purposes should be sterilized in an approved manner.

(c) A continuing study should be made of the introduced species in its new environment, and progress reports submitted to the International Council for the Exploration of the Sea.

III. Regulatory agencies of all member countries are encouraged to use the strongest possible measures to prevent unauthorized or unapproved introductions.

IV. Recommended procedure for introductions or transfers which are part of current commercial practice.

(a) Periodic inspection (including microscopic examination) by the receiving country of material for prior mass transplantation to confirm freedom from introducible pests and diseases. If inspection reveals any undesirable development, importation must be immediately discontinued. Findings and remedial actions should be reported to the International Council for the Exploration of the Sea.

(b) Inspection and control of each consignment on arrival.

(c) Quarantining or disinfection where appropriate.

(d) Establishment of brood stocks certified free of specified pathogens.

It is appreciated that countries will have different attitudes to the selection of the place of inspection and control of the consignment, either in the country of origin or in the country of receipt.

PROPOSED STEPS TO REDUCE DANGERS OF DISEASE IN THE INTRODUCTION OF NON-INDIGENOUS SPECIES