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International Council for
the Exploration of the Sea

C.M. 1985/F:60
Mariculture Committee

REPORT OF THE WORKING GROUP ON INTRODUCTIONS AND TRANSFERS
OF MARINE ORGANISMS

Göteborg, Sweden, May 28 - June 1, 1985

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SUMMARY

In Göteborg (Sweden), May 28-June 1, 1985, the WORKING GROUP ON INTRODUCTIONS AND TRANSFERS OF MARINE ORGANISMS,

1. Considered the introduction of the brown seaweed Undaria to the Atlantic coast of France, and found that "too little is known to make a sound, objective, and substantive statement of the ecological and/or other risks if Undaria were to establish, propagate, and spread on the Eastern Atlantic European coast, and urged that "any commercial (industrial) expansion of the program be held in abeyance, and efforts at containment of the existing introductions be carried out, until a full, detailed, and extensive study be submitted to ICES..." and suggested that, in addition to a French report, an expert be asked to prepare a detailed analysis.

In the text see: pages 25-26, and Recommendation 2, on page 35

The full report: is Appendix VIII, and the findings are on pp.9-11 therein

2. Considered the introduction of the coho salmon Oncorhynchus kisutch into the Cornwallis River, Canada, as a result of stockings in the United States, and expressed its concern over this development, and urged an extensive examination be undertaken as soon as possible, and expressed the willingness to participate in such a study.

In the text see: pages 22-24, and especially pp. 23-24

In the Appendix: see Appendix IV

3. Considered the continued introduction of the chum salmon, Oncorhynchus keta, into the State of Maine, United States, by a private company, and re-expressed its concern over these unabated releases, and re-emphasized its desire to be kept fully informed of the program.

In the text see: pages 23-25, and especially pp. 24-25

4. Based upon (2) and (3) above, and upon other matters brought to the attention of the WG, proposed that at its next meeting a one-half day workshop on "Salmonid Introductions to the East Coast of North America" be convened.

In the text see: page 25

5. Convened in a two-day joint session with the European Inland Fisheries Advisory Commission's (EIFAC) "Working Party on Introductions", and, in so doing,

* Discussed, compared, and harmonized the CODES OF PRACTICE

* Planned for cooperation in preparation of the MANUAL OF PROCEDURES

* Reviewed and planned for testing the DECISION MODELS

* Identified strong bases for future JOINT ACTIVITIES

In the text see: pages 27-30

In the Appendix: see Appendix V

- (6) Considered changes and modifications to the ICES CODE OF PRACTICE, and modifications on the importation of eyed salmonid eggs

For conclusions see: text pages 30-32

Concerning egg importations: see text pages 31-32

- (7) Considered 1984-1985 NATIONAL SUMMARIES and new LAWS AND REGULATIONS

For the laws and regulations see: text pages 4-8, including TABLE I

For the National Summaries see: text pages 9-18

For current salmonid status see: text pages 19-23

- (8) Formulated recommendations to the parent committee, including:

- * Formation of an Advisory Committee on Introduced Species

See: text page 34, and Recommendation 1, on page 35
also see, C.M. 1985/F:64

- * Seeking more information on salmonid fish introductions in Eastern Europe

See: text page 25, and Recommendation 3, on page 35

- * Encourage the establishment of necessary legal instruments relative to introductions and transfers in those member countries currently without such relevant laws, acts, or orders

See: Recommendation 4, on page 36

- * Convene a symposium, "The Effects of Introductions and Transfers on Living Marine and Aquatic Resources and Ecosystems"

See: text page 33, and Recommendation 5, on page 36

WORKING GROUP ON INTRODUCTIONS AND TRANSFERS OF MARINE ORGANISMS

Report of a meeting, held May 28 - June 1 1985 at Göteborg, Sweden

The 1985 meeting of the ICES Working Group on Introductions and Transfers of Marine Organisms was held at the National Board of Fisheries, Göteborg, Sweden, from May 28 to June 1 1985. Fifteen participants representing 12 member countries were present:

- | | |
|------------------|-----------------------------|
| C. J. Sindermann | USA (Chairman) |
| J. T. Carlton | USA (Rapporteur) |
| R. A. Eisner | Canada |
| G. Turner | Canada |
| V. H. Jacobsen | Denmark |
| P. Tuunainen | Finland |
| H. Grizel | France |
| H. Rosenthal | Federal Republic of Germany |
| D. McCarthy | Ireland |
| B. de Groot | Netherlands |
| E. Egidius | Norway |
| H. Quiroga | Spain |
| B. I. Dybern | Sweden |
| A. L. S. Munro | UK |
| D. Solomon | UK |

In addition, a report on national laws from Belgium (Dr. P. Hovart) had been received and was presented by the Chairman. Drs. R. Welcomme (FAO/Rome) and D. Charbonnier (FAO:EIFAC/Rome) were guests of the WG during portions of the meeting. The members of the WG were welcomed on behalf of the fisheries

authorities of Sweden by Dr. Bernt I. Dybern. The Chairman thanked Dr. Dybern for his remarks, and then reviewed the purpose and goals of the Working Group and of this year's meeting. The Agenda for the meeting was considered and, with adjustments, approved (Appendix I).

The recent death of Dr. H. A. Cole was noted. Dr. Cole was the original chairman of this Working Group (1970-1974), and the original Code of Practice relative to introductions and transfers was formulated under his aegis.

STATUS OF WORKING GROUP RECOMMENDATIONS FOR 1984

The Chairman reviewed the status of recommendations formulated at the last meeting of the Working Group in Halifax, Canada in May 1984 (see 1984 Report, C.M. 1984/F:35: pp.50-52) and submitted for consideration at the 72nd Statutory Meeting of ICES in Copenhagen in October 1984:

Recommendation 1

That the Guidelines for Implementing the Code of Practice be published.

- * The Guidelines were published as Cooperative Research Report 130, 1984, 20 pp.

Recommendation 2

That the Guidelines be disseminated and translated.

- * C. Res. 1984/4:10 passed:
"It was decided that ICES will ensure the widest possible dissemination of its "Revised Code of Practice to Reduce the Risks of Adverse Effects Arising from Introduction of Marine Species", and that ICES concomitantly encourage member countries to translate the Code into their official languages."

Recommendation 3

That member countries be reminded on informing ICES at an early stage of contemplated introductions.

- * C. Res. 1984/4:11 passed:
"It was decided that ICES member countries contemplating introductions and transfers of marine organisms should be reminded that the ICES Revised Code of Practice calls for providing to the Council 'at an early stage' such information as would provide adequate time for full appraisal of the implications of each proposed introduction or transfer."

Status of Working Group Recommendations for 1984 (continued)

Recommendation 4

That a minisymposium be convened concerning introductions and transfers, and current matters and problems related thereto.

- * No resolution passed. Consideration delayed; the WG will resubmit this suggestion as a possible theme session for 1986 or minisymposium for 1987

Recommendation 5

That the WG meet again to consider a manual of procedures, changes in the Code of Practice, plans for a possible minisymposium, case histories, methods for the increased dissemination, understanding, and implementation of the Code, national laws and regulations, transport of nonindigenous species by drilling vessels, the kelp Undaria in Atlantic waters, the status of finfish, shellfish, and algal introductions in ICES member countries, and a joint meeting with EIFAC

- * C. Res. 1984/2:33 passed.

International Activities Concerning Introductions and Transfers of Marine Organisms

International concern, apart from the current activities under ICES aegis, on the matter of introductions and transfers of exotic species, was noted for the following organizations:

- * Food and Agriculture Organization of the United Nations: EIFAC, European Inland Fisheries Advisory Commission
- * Council of Europe
- * International Council of Scientific Unions (ICSU): Scientific Committee on Problems of the Environment (SCOPE)
- * Comision de Pesca Continental para America Latina (COPESCAL)
- * United States Environmental Protection Agency
- * American Fisheries Society

The activities of these organizations, and certain recent symposia, are

briefly in Appendix II.

NATIONAL SUMMARIES OF INTRODUCTIONS AND TRANSFERS, 1984-1985

1.0 Relevant laws and regulations in ICES member countries

Table 1 (herein) summarizes the current (1985) status of laws regulating introductions. New materials were submitted by Belgium, Denmark, Finland, and Ireland (see also 2.0, below). Data for certain countries are still lacking. The last ICES summary of laws and regulations concerning introductions and transfers was in 1981; all documents from member countries submitted since that time are on file with the Working Group, and a revised compilation, summary, and synthesis can eventually be prepared from these materials.

2.0 Other Procedures concerning introduced species

DENMARK

In 1984 an increasing number of elvers (Anguilla anguilla) have been imported from some European countries (that is, France, Portugal, Spain, U.K.). Exact numbers are not available. A certificate (Appendix III-a, herein) is required before permission (Appendix III-b, herein) is granted by the Danish Veterinary Service. When the shipment enters Denmark the permission is checked by the Customs Service. The same procedure applies to the imports of smolts.

Important conditions of Appendix III-b are:

*elvers must be accompanied by a zoosanitary certificate indicating that no diseases have been identified prior to the export and showing the area where the elvers had been caught

*the elvers shall be transferred directly to the production systems

*the effluent from these systems shall be filtered through the ground without any possibility of reaching lakes, streams or ditches before the filtration

*the elvers (eels) shall only be removed from the systems after a permission from the Danish Veterinary Service has been obtained. Eels

Table I.

1985 STATUS OF NATIONAL LAWS AND REGULATIONS OF ICES MEMBER COUNTRIES
 CONCERNING INTRODUCTIONS AND TRANSFERS OF MARINE ORGANISMS

Country	Date of most recent laws	NOTES (for most countries, other, earlier laws also exist)
Belgium	1984	Laws concern animal and public health control; there are no laws on the control of introductions
Canada	1984	"Fish Inspection Regulations" amendments of October 1982 and January 1984; new laws and regulations are being prepared 1985-1986
Denmark	1984	"Order on control of oysters", No. 104 (1984): primarily human health aspects, but 104.5.4 requires that released oysters be parasite and disease free
Finland	1983	Fisheries Law 286/82, paragraph 121: permission required for crayfish and fish introductions
France	1984	Order #3297 (19 November 1981, replacing #2354); also a shellfish import regulation list amended 9 March 1984
FRG	1978 1980s?	No national laws specifically regulate marine introductions; some local state laws do have recent regulations (no copy submitted)
GDR	---	---
Iceland	1970	"Law on salmon and trout fisheries"
Ireland	1973	Live Fish (Restriction on Import) Order 1972 (S.I. No. 4 of 1972); Fish Diseases (Control of Imports) Order 1973 (S.I. No. 18 of 1973)
Netherlands	1963 (1977 footnotes)	---
Norway	1978	New marine laws expected by 1986

Table I (continued)

Country	Date of most recent laws	NOTES
Poland	---	---
Portugal	---	Laws concern animal and public health control, not introductions
Spain	1984	New national regulations (no copies submitted)
Sweden	1983	Agriculture Board Ordinances, Veterinary Regulations (LSFS 1983:30/Vb10, paragraph 6); Swedish National Ordiances (SFS 1982:126, paragraph 34)
UK	1981	Wildlife and Conservation Act 1981: Sections 14 and 16, and Schedule 9, Parts I-II
	1983	Diseases of Fish Act 1983 (no copy submitted)
USA	1981	---
USSR	pre-1980	---

2.0 Other Procedures concerning introduced species (continued)

DENMARK (continued)

- * meant for consumption may be removed without such permission
- * Excessive mortality shall be reported to the Danish Veterinary Service
- * If infectious diseases occur all elvers (eels) shall be killed and destroyed without any compensation from the public

FRANCE

A new "Modele de certificat d'origine et zoosanitaire relatif aux coquillages vivants destines a l'importation en France pour l'epuration ou l'entreposage (1) dans des stations agrees" has been developed (Appendix III-c, herein).

FRG

The marine station of the Biologische Anstalt Helgoland provides on request live material to mainland universities and to universities outside FRG; as far as is known, these specimens are used strictly for laboratory purposes and are not released into the environment. With each shipment, a leaflet is provided, drawing the attention to the fact that it is the responsibility of the receiver of the shipment to follow the ICES Code of Practice if applicable.

SWEDEN

The Board of Agriculture (in cooperation with the Board of Fisheries and the State Veterinary Institute) sharpened regulations in December 1984 for eel (Anguilla anguilla) quarantine (Appendix III-d, herein).

2.0 Other Procedures concerning introduced species (continued)

UNITED STATES OF AMERICA

A 1985 ruling by the United States Circuit Court has raised certain questions about the ability of states to prevent the introduction of diseases and parasites associated with shellfish and fish movement. The State of Maine had banned the importation of "live bait" for use in recreational fisheries. The U.S. Circuit Court ruled against this regulation, citing it as a barrier against interstate commerce and therefore unconstitutional. The effects of this ruling are not known, but will vary depending upon whether individual states impose a complete ban on importations, or allow importations under special permits with inspection controls (source: Commercial Fisheries News, April 1985, vol. 12, no. 8, page 10).

UNITED KINGDOM

(a) Stringent inspections are planned for the shipment of several thousand tons of shell of cultured Mytilus edulis from the Netherlands to be used as oyster cultch. The shells are subject to temperatures of 140° Celsius and 3 atmospheres for two minutes considered sufficient to kill pests, parasites, and disease agents.

(b) Diseases of Fish Act 1983: health regulations to allow imports of live salmonids are still being drafted, and in consequence no importations have yet occurred.

(c) Because of disease risks, regulations to prevent the introduction of ungutted salmonid fish have been prepared and submitted for European Economic Community (EEC) and General Agreements on Trade and Tariffs (GATT) comment.

3.0 Deliberately introduced animal or plant species

3.1.1./3.1.2. Fishery enhancement and mariculture

Cross-reference: Canada, Denmark, FRG, Ireland, Norway, Poland, Sweden, UK, USA --
see: CURRENT STATUS OF EXOTIC SALMONIDS, elsewhere in this report

NETHERLANDS

A tabular summary of introduced, released, or considered fish species for introductions may be found in C.M. 1985/F:³ (de Groot: Preliminary review of introductions of nonindigenous fish species in the Netherlands). See also: deGroot, 1985.

NORWAY

Turbot (Scophthalmus) juveniles are imported from Scotland on a small scale; it is hoped that the entire life cycle can be successfully carried through soon, making further importations unnecessary.

3.1.4. Recreational purposes

IRELAND

The illegal importation of certain species of exotics for aquariums and garden ponds is causing serious concern on ecological grounds, primarily relative to the golden orf Cyprinus idus, the catfish Silors glanis and Ictalurus melas, and to a lesser extent the koi carp (Cyprinus).

3.1.5. Captures of introductions originally made in neighbouring countries

Cross-reference: Canada, Denmark -- see CURRENT STATUS OF EXOTIC SALMONIDS, elsewhere in this report

3.1.6. Research purposes

CANADA

- * Newfoundland: the Marine Sciences Research Laboratory annually imports quantities of rainbow trout (Salmo gairdneri) from Ontario for research purposes as does the Environmental Protection Service. In 1981 a quantity of rainbow trout were imported by the Pulp and Paper Research Institute of Canada for research at Stephenville
- * Newfoundland: the MSRL imported a number of Green Sailback Mollies (Poecellia latipina) from Florida in 1979.
- * Maritimes: Arctic char (Salvelinus alpinus) were brought into New Brunswick (Salmon Research Centre, St. Andrews), Manitoba (Rockwood hatchery) and to Newfoundland (St. John's, quarantined) from Fraser River, Labrador, for genetic research purposes in aquaculture. There is no permit to release this anadarmous stock to cages or to the wild at this time.

FRG

- * In 1984, mullets were imported from Israel (Mugil cephalus) as 2 cm long fry and from Yugoslavia (Liza ramada). Fish are used to build up broodstocks for scientific work on reproduction and larval rearing. Fish are kept under quarantine conditions (recycling systems) at the Biologische Anstalt Helgoland, Zentrale Hamburg. So far, no disease agents have been detected and fish are growing fast.

3.2.1. Deliberately introduced invertebrates: fishery enhancement

CANADA

- * In May 1984, ministerial approval was obtained to plant American oysters (Crassostrea virginica) at Newfoundland and in May 1985 the transplant was completed. One hundred bushels were set at four predetermined locations in Two Guts Pond (Port au Port Bay). The original project (initiated by the Fisheries Research Board) was expanded and transplantations were made to three sites with monitoring of two of these being carried out by Resources Development Branch, Canada Department of Fisheries and Forestry, and by the Department of Biology, Memorial University of Newfoundland. In general, Newfoundland was determined to be marginal for the culture of the American oyster.
- * American lobster (Homarus americanus): 3,000 adult American lobster (2,000 in 1982 and 1,000 in 1983) were moved from Comfort Cove, Notre Dame Bay, Newfoundland, to St. Michaels Bay, Labrador, in an attempt to initiate a contiguous fishery there. Sex ratio was approximately 50:50. Success of transplants remains to be evaluated.

3.2.2. Deliberately introduced invertebrates: mariculture (growth and fattening)

CANADA

- * Live spat of the sea scallop (Placopecten magellanicus) were shipped in 1980 to Quebec.

DENMARK

- * Crassostrea gigas: imported: from England (1,390,000 specimens), Scotland (53,000) and Northern Ireland (900,000) [all came from certified disease-free hatcheries]
- * Venerupis semidecussata: imported: from Scotland (1,000, with certificate), and placed near Sæby in North Jutland.
- * Patinopecten yessoensis: Underlining that the Order on Control of Oysters only deals with oysters (family Ostreidae), and most likely being aware of the ICES Code of Practice, a commercial firm imported 5,000 Patinopecten by air from wild stocks in Japan and immediately (within five hours from arrival) placed the shipment in the sea at the island of Læsø in the Kattegat. A few days later all except 400 were dead, and it has not been possible to get exact information as to the fate of the dead animals.

FRANCE

- * Placopecten magellanicus: Approximately 5,000 sea scallop spat (seed) were shipped to St. Pierre and Miquelon in December 1978 at the request of ISTPM-St.Pierre (fide Canada National Report 1985).
- * 1984 importations, country of origin, species, quantities held either in storage or sold directly, are as follows: (Huitres plates, Ostrea edulis; Huitres creuses, Crassostrea gigas; Moules, Mytilus edulis).

ESPECE	HUITRES PLATES	HUITRES CREUSES	MOULES	AUTRES COQUILLAGES
Origine	Irlande G.-Bretagne	Sénégal (naissain) Divers	Hollande Irlande G.-Bretagne Espagne Allemagne Danemark	Irlande G.-Bretagne Canada Tunisie Italie
Passage en station (en tonnes)	201,7	13,31	12 000	1490
Vente directe (en tonnes)	334.8	46	30 000	2286,8

N.b.: Ces données concernent les coquillages passés en station d'entreposage (effluents traités à la sortie) qui sont ensuite conditionnés pour la mise en marché et les coquillages mis directement en marché.

3.2.2. Deliberately introduced invertebrates: mariculture (continued)

FRG

- * Since about 14 years ago, Pacific oysters (Crassostrea gigas) have been regularly imported. Shipments originated from various sources, but came mainly from Scottish hatcheries. Between 1976 and 1981, this species had been artificially reproduced in an experimental hatchery (Baltic coast). Hatchery-grown seed had frequently been transferred to North Sea grow-out areas. Small quantities were produced by several local fishermen on a trial basis. No diseases have been transferred with these trial transplantations, which ceased in 1982.

NORWAY

Oyster spat (Crassostrea gigas and some Ostrea edulis) were imported from Scotland in 1984.

- * Pecten maximus spat will be imported in 1985 from the Island of Skye.
- * Lobsters (Homarus) are imported from Scotland for outgrowth (2-3 months).

SWEDEN

- * Importations of limited numbers of spat and adults of Ostrea edulis from Norway is made by people starting up oyster culture.

Sweden noted that it is very concerned about the recent introductions into Danish waters of certain molluscan species, such as Tapes, (Venerupis), Crassostrea, and Patinopecten.

UNITED KINGDOM

- * Crassostrea gigas: large amounts of seed are commercially produced and distributed to many parts of the UK.
- * Venerupis semidecussata: small amounts of seed are now being sold by commercial hatcheries for ongrowing in several parts of the UK.
- * Haliotis tuberculata: small amounts of seed are now being sold by commercial hatcheries for ongrowing in several parts of the UK (as with V. semidecussata).

3.2.3. Deliberately introduced invertebrates: live storage prior to sale

UNITED KINGDOM

No deposits in coastal waters of the American lobster (Homarus americanus) were allowed. There was one outbreak of gaffkemia in a commercial unit holding Homarus vulgaris (European lobster).

3.2.5. Research purposes

FRANCE

The experiments with Ostrea chilensis are finished. The results are reported by Grizel et al. (1984). Identical experiments are now underway with an F₁ generation of Ostrea angasi from New Zealand.

FRG

Sea urchins from the Gulf of Akaba, Red Sea area, were imported for bioassay purposes; the specimens were quarantined until maturity and artificially induced spawning was employed to obtain early life cycle stages for water pollution studies. No specimens were released into the natural environment.

IRELAND

The abalones (ormers) Haliotis discushannai and H. kamtschatkana, and the European lobster Homarus vulgaris, are held under quarantine conditions.

U.K.

160 adults of Crassostrea virginica were imported from the USA in 1984 to quarantine at the Conwy Laboratory. These adults and their F₁ offspring will be held in quarantine until it is established that they do not pose a disease risk to native species. From past experience of the import of this species over many years of thousands of tons, earlier in this century from the USA, it is not expected that this oyster will breed successfully in UK waters. However, this aspect will be checked by trial plantings before any general release is authorized.

3.3. Deliberately introduced plants

FRANCE

Cross-reference: See the Special Report, "The Introduction and Cultivation of the Brown Alga Undaria on the Atlantic Coast of France," elsewhere in this report.

4.0. Species introduced accidentally with deliberate introductions

FEDERAL REPUBLIC OF GERMANY

Two cases of accidental introductions occurring co-incident to deliberate introductions are recorded:

Mytilicola intestinalis has recently been found in mussel beds of the northern Friesland Wadden Sea (Meixner. pers.comm. where their occurrence was unknown so far. This parasite has probably been transferred with seed mussels relayed in the Wadden Sea area. These transfers must have originated from infected stocks. The German mussel production has dramatically expanded in recent years, employing extended relaying techniques. Production in the past leveled around 17 to 19.000 tons per year but grew to over 50,000 tons during the last year. It is hoped that the severe winter 1984/1985 had largely killed the infected mussel stocks so that no further spread of Mytilicola will occur.

A new exotic parasite in eels of the Ems river and its estuary

First records of a new nematode occurring in the swimbladder of the European eel were reported in 1983 from the Ems river. Fishermen and local people called this parasite "white eel" occurring inside juveniles and adults of the Atlantic eel. Körting (Hannover) tentatively identified this species as Anquillicola sp., known to occur in eels of Southeast Asia. The number of incidences seems to increase. In early 1985 G Peters (Univ. Hamburg) investigated eels of stocking size (15 to 35 cm total length) and found that about 20% of the sample was infected with this worm. Since the nematode reaches substantial size (up to 2 cm) the swimbladder extends considerably in infected fish. Up to five worms were found in several fish and multiple infection is quite common. It should be noted that an eel growing aquaculture plant operates in Emden in brackish water using the waste heat from a power station. It is presently unknown whether fish of this farm are already affected. The possible source of introduction of this SE Asian exotic is also unknown. It is interesting to note, however, that rumors exist within the fish trade industry that a life shipment of eels from Taiwan took place in 1983. Although fish have probably been transferred only for direct consumption and sold on various markets in northern Germany, one cannot exclude the possibility that some, especially the smaller specimens, have been released or kept for on-growing. Other possible pathways, however, have also to be considered. A recent examination of eels sampled from the Elbe-river revealed that these fish are unaffected.

5.0 Completely accidental introductions

Cross-reference: CANADA -- see Current Status of Exotic Salmonids, elsewhere in this report

IRELAND

The spread of the roach Rutilus rutilus over the past 20 years has reached alarming proportions. At the present time there are very few major catchments without roach. This species was accidentally introduced into the Cork region in 1889 when being used as live bait.

NETHERLANDS

The American bivalve mollusk Ensis directus (Conrad) was caught alive for the first time on 04-05-1984 near the island of Texel (53°03'N - 04°41'E) at a depth of 8 m. This species has been known since 1970 in the German Bight. The first dead shells were washed ashore in the Netherlands in 1982 (beach of Schiermonnikoog) and in 1983 (beaches of Terschelling, Ameland, and Schiermonnikoog). It is striking that the spread of this razor clam from the German bight area is against the residual current. Ensis now also occurs in the Wadden Sea proper (Essink, 1984, 1985; Swennen, 1984).

NORWAY

The Asian brown algae Sargassum muticum was found twice, as drifting specimens, during the summer of 1984, on the southeast coast of Norway (near Lillesand, east of Kristiansand).

UNITED STATES OF AMERICA

- * The current status of the common introduced marine organisms along the USA Atlantic coast is shown in Table II (herein). Relatively new introductions that are still spreading are the tunicates (ascidians, seasquirts) Styela clava and Botrylloides, and the green algae Codium (for Codium: Carlton and Scanlon, 1985).
- * The National Fishery Research Laboratory in Gainesville, Florida, under the direction of Dr. J. Clugston, continues to monitor in a limited manner the exotic freshwater and estuarine fish in the South Atlantic Coast region. Field monitoring of Tilapia spp. in Florida continues.
- * Dr. W. Courtenay reports that a single specimen of an exotic Pacific serranid fish (Chromileptes altivelis, 195mm SL) was captured in St. Petersburg, Tampa Bay, Florida, in November 1984, alive. It is believed to be an aquarium release; there have been prior reports of the same species in the area.

UNITED KINGDOM

- * No change in the distribution of Bonamia infections. The Vibrio disease of the Hitra region in Norway has been found in farmed salmon in Shetland.
- * Sargassum muticum continues to establish and spread in southern Britain.

TABLE II.

Current status of some common introduced (non-native) marine species on the U.S. ATLANTIC COAST

Species	Common Name	Date Entered Community (Locality) N=North; S=South	Native to (Mechanism)	NOTES
<u>Littorina</u> <u>littorea</u>	Common Periwinkle	1860s-1870s N of Cape Cod, Massachusetts; 1875- 1880s S of Cape Cod	Western Europe (intro- duced for food?)	N to Labrador; populations now S to at least Delaware
<u>Haliplanella</u> <u>lincata</u>	Lined Sea Anemone	1892: New Haven, Connecticut	Asia (ship fouling)	Spread N to Salem, Massachusetts, by 1901; now along much of coast
<u>Ficopomatus</u> <u>enigmaticus</u> (= <u>Mercierella</u>)	Tube Worm	1976: Barnegat Bay, New Jersey	Australasia (but <u>via</u> ship fouling from Western Europe?)	Associated with thermal effluent of power station
<u>Teredo furcifera</u> and <u>Teredo bartschi</u>	Shipworms	1974: Barnegat Bay, New Jersey	Subtropics (via wooden pleasure boats)	Associated with thermal effluent of power station
<u>Teredo bartschi</u>	Shipworm	1975: Waterford, Connecticut (Long Island Sound)	Subtropics (via wooden pleasure boats)	Associated with thermal effluent of power station; very localized
<u>Carcinus maenas</u>	Green crab	S of Cape Cod: presumably an 18th or 19th century introduction into Long Island Sound; N of Cape Cod: 1872, Provincetown	Western Europe (in ship fouling?)	Spread N to Eastern Canada; possibly still expanding range along Nova Scotian coast
<u>Praunus flexuosus</u>	Mysid "shrimp"	1960: Barnstable Harbor, Cape Cod, Massachusetts	Western Europe (ballast water of ships)	Spread N to Nova Scotia; but not S of Cape Cod?
<u>Botryllus</u> <u>schlosseri</u>	Sea squirt (colonial tunicate)	19th century(?): "It is... very probably an introduced species brought here on the bottoms of ships"-Van Name, 1945:222	Western Europe (ship fouling?)	Now along much of coast

TABLE II (continued)

Species	Common Name	Date Entered Community (Locality)	Native to (Mechanism)	NOTES
<u>Botrylloides</u> <u>diegensis</u>	Sea squirt (colonial tunicate)	Early 1970s: Eel Pond, Woods Hole, Massachusetts	California (released by experimental biologist)	Spreading along Cape Cod coastline; expected to expand in range
<u>Styela</u> <u>clava</u>	Sea squirt (solitary tunicate)	1976: Rhode Island	Asia (but probably via Western Europe in ship fouling)	Now (1985) found N to Boston, Massachusetts (probably via Cape Cod Canal); southernmost record: September 1984, Long Island Sound (Mystic River Estuary, Mystic, Connecticut)
<u>Codium</u> <u>fragile</u> <u>tomentosoides</u>	Codium (Spaghetti Weed) -- a green alga	1957: Long Island, New York	Asia (but probably via Western Europe in ship fouling)	Colonized to N of Cape Cod in 1970s; slowly spreading S (now to North Carolina) and N (separate populations in Maine and on island off New Hampshire coast)

Prepared by J.T. Carlton, May 1985

(from Manuscript in preparation)

8.0/9.0 Live Exports

CANADA

Exports of lobsters (Homarus), oysters, clams, mussels (Mytilus), and eels (Anguilla) take place on a regular basis; these go to the USA and Europe.

DENMARK

- * Mytilus edulis: 27, 378 tons of live, fresh, salted and frozen mussels were exported; the data are pooled, and it is not possible to get exact information on how many of these were alive.
- * In order to enhance the stock of the endangered species of houting (Coregonus oxyrinchus), a collaboration is taking place between the FRG and Denmark. Fertilized eggs are sent to FRG and hatched smolts are placed in cages in the Keller-See near Kiel, without direct connection to freshwater fish ponds. Smolts of 4-5 cm size are then brought back and released into the Vidaa system, which appears to be the only present freshwater spawning area for this anadromous species. Both German and Danish authorities have given permission for this experiment.

NORWAY

Ostrea edulis spat are exported to Sweden.

UNITED KINGDOM

- * Crustacea: trade in European lobsters (Homarus vulgaris) continued with many European countries. A new trade in live velvet crabs (Leocarcinus puber) to Spain has developed. Both are for direct consumption (8.2).
- * Oysters: Trade in wild native oysters (Ostrea edulis) to France continues (8.1). Exports of seed of the Japanese oyster (Crassostrea gigas) to Norway (9.1).
- * Exports of seed of the scallop Pecten maximus were sent to Norway (9.1).
- * Exports of live juvenile turbot (Scophthalmus maximus) were made to several European countries for ongrowing trials (9.2).

CURRENT STATUS OF PROPOSED OR ACTUAL INTRODUCTIONS

SALMONID FISHES

RAINBOW TROUT: Salmo gairdneri

CANADA

- * Initially introduced in 1887 from New York State, USA. Additional imports in 1890, 1891, 1893 and annually from 1896-1900; these were imported as eggs and incubated by the Newfoundland Game Fish Protection Society. The fry were distributed to various ponds on the Avalon Peninsula and later used as broodstock for further stocking.
- * Imported on "a number of occasions" from the late 1970s and early 1980s for the trout farm at Hopeall, Trinity Bay, Newfoundland; stock not subsequently planted outside the trout farm.
- * A number of hatchery trout were found in Newfoundland west coast rivers in 1983; these may be accidental introductions.

DENMARK

- * As part of an on-going experiment on ocean ranching 1000 tagged fish (as smolts) were released at the Isefjord (10 May 1984); on 12 May 1984 1000 tagged smolts were released at the Aarhus Bay. So far only local Danish recaptures have been reported. All rainbows were hatchery reared Danish smolts.
- * In 1984 Poland released 326,000 fish in the Baltic Sea. Most recaptures in Danish waters stem from ICES Subdivision 25, but some recaptures have been reported from inner Danish waters. In 1985 a closer investigation on the Danish landings on the Island of Bornholm is expected to take place.

FEDERAL REPUBLIC OF GERMANY

- * Under the auspices of a research project on rainbow trout culture carried out by scientists of the Institute for Marine Research of the University of Kiel (Dr. Peter Bahrs), an experimental release was made into Kiel Fjord, Baltic, in 1984:
 - about 150 marked fish (30-45 cm total length, 400-1,300 g net weight) were released in May 1984 near the Power station Kiel-East, to which a cage culture unit is attached. From this release a total of 31.3% of the tagged fish were caught and reported by fishermen up to the end of 1984. The longest distance travelled by recaptured fish was about 33.3 km (18 miles).
 - about 100 marked fish (of similar size) were released in October 1984 at Kiel Canal near Rendsburg

The fish used in this experiment originated from the cultured stock raised in the laboratory unit of the University of Kiel.

Current status of exotic salmonids in ICES member countries (continued)

RAINBOW TROUT, Salmo gairdneri (continued)

POLAND

- * In 1984 Poland released 326,000 rainbow trout in the Baltic Sea. (see DENMARK report, above)

UNITED KINGDOM

- * "Several million" ova were imported, principally from Denmark, Tasmania, and USA. A small proportion were subsequently reared in sea water.

UNITED STATES OF AMERICA

- * 25,000 - 30,000 smolts from Lake Ontario (State of New York) were released into Great Bay, New Hampshire in April 1985 by the State of New Hampshire fisheries agencies.

ATLANTIC SALMON: Salmo salar

CANADA

- * Discussion is going on now (1985) in a number of forums in the Maritimes related to introduction of Atlantic salmon from Europe for aquaculture.

DENMARK

- * On 21 May 1984, 6,800 one year old smolts imported from Sweden (with certificates) were released at the Island of Bornholm in the Baltic Sea.

IRELAND

- * A consignment of 50,000 fingerlings were imported from Norway in 1982-1983. The introduction adhered to the relevant fishery laws. The stock was quarantined at Fanad Sea Fisheries to Donegal, where no direct exit to the sea exists. The importation is not to be taken to be a precedent or indication that any future applications for an import license will be considered favorably.

Current status of exotic salmonids in ICES member countries (continued)

ATLANTIC SALMON, Salmo salar (continued)

NORWAY

- * Live smolts are imported from Sweden and Scotland.

SWEDEN

- * Import of salmonid eggs can, for the moment, only be made from the Nordic countries and from the Isle of Man. There is a fear that viral diseases could be introduced with imports from other countries (Sweden is now considered to be virus-free).

UNITED KINGDOM

- * Approximately two million ova were imported to Scotland from Norway in 1984.
- * Salmon have been shipped from British Columbia to the UK for study and release under controlled conditions (fide Canada National Report; year of shipments not noted)

PINK SALMON, Oncorhynchus gorbuscha

CANADA

- * Imported from British Columbia as eggs in 1959, 1962, 1964, 1965 and 1966, and incubated at North Hr. River, St. Mary's Bay, Newfoundland. This experiment was unsuccessful and the run did not become established. Pinks strayed to other river systems as far as northern Labrador.
- * In 1979 an experimental group of pink salmon were accidentally lost at Conne River. In 1978 another group of pink salmon were accidentally lost at Deer Island. Both localities are in Newfoundland.
- * An adult pink salmon was captured by gill-net in the Miramichi River, New Brunswick, in September 1983 (Randall, 1984). The specimen was a ripe male, weighing 1.7 kg, and 58.5 cm in total length. Possible origins include releases in Newfoundland, Russian transplants in the Baltic and White Seas, populations now established in the Great Lakes, and (favored by Randall, 1984), releases in Maine in May, 1982.

Current status of exotic salmonids in ICES member countries (continued)

PINK SALMON, Oncorhynchus gorbuscha (continued)

UNITED KINGDOM

- * No decision has yet been reached on a plan to experimentally ranch the pink salmon.

UNITED STATES OF AMERICA

- * Pink salmon have not been imported and released in the State of Maine since 1983. Eggs from the State of Alaska are no longer available. Returns from the 1982 and 1983 releases have now ceased, as pink salmon spend no more than 14 months at sea.

COHO SALMON, Oncorhynchus kisutch

CANADA

- * A population of coho salmon is now established in the Cornwallis River, Nova Scotia, where all year classes have been represented since 1978 in parr samples (see Barbour, 1985: Appendix IV herein). Sightings of coho continue to be made from the Bay of Fundy as well as the Digdeguash River, New Brunswick. The source of the Coho in Nova Scotia and in New Brunswick appear to be the New England plantings (probably New Hampshire). Department of Fisheries and Oceans staff in Scotia-Fundy region are making a study of this coho population. (See also: Martin and Dadswell, 1983)

UNITED STATES OF AMERICA

- * The States of Massachusetts and New Hampshire continue their annual releases of pen-raised smolts of coho salmon. These are derived from eggs stripped from returning females released in prior years. 100,000 smolts of coho [now F₃ to F₄ generations since original introductions from Pacific coast of USA] were released in Massachusetts in April 1985. 118,000 smolts [original stock introduced some years ago from Oregon and Washington] were released in Great Bay, New Hampshire, in April 1985. [Releases for 1971-1982 are given in Martin and Dadswell, 1983, p. 2, Table 1]

Current status of exotic salmonids in ICES member countries (continued)

CHUM SALMON, Oncorhynchus keta

UNITED STATES OF AMERICA

- * Sea Run, Inc., of Kennebunkport, Maine, reports that they import eyed eggs in December from Hokkaido, Japan and from a population in the Hood Canal, Puget Sound, Washington, and raise these to the fry stage by the following spring for river release into the open ocean. A seven pound immature female chum salmon, presumed to be from the 1983 releases, was recently captured. Sea Run, Inc., reports that all imports of eyed eggs are certified disease free and come from disease-free stocks; they are double-disinfected in addition, both at the source and after import to Maine. Sea Run, Inc., uses gel electrophoresis to distinguish the Japanese from Washington chum salmon stocks, so that returns can, in turn, be identified. In May 1985, 1,000,000 fry from Hokkaido, and 500,000 fry from the Hood Canal, were released.

Salmonid Fishes: DISCUSSION

Establishment of Coho Salmon in Canada

The continued stocking of coho salmon by the states of Massachusetts and New Hampshire, and the establishment of a breeding population of coho in Nova Scotia as a direct result of these stockings, was the subject of considerable concern expressed by WG members from Canada, France, Sweden, the UK, and other countries. Discussion about these releases has been extensive in Canada, and will be addressed in NASCO as well. The release of coho salmon in USA waters commenced prior to the Code of Practice, and the extent to which these releases should be viewed (under ICES definitions) as being part of "current commercial practice" was brought up. Several WG members urged that continued stocking be ceased, or that stocking be restricted to monosex (all female) lines.

The WG concluded that:

In light of the introduction of coho salmon into the Cornwallis River, Nova Scotia, Canada, since 1978, as a result of stocking in the United States, the WG expresses its concern over this development, relative to the possible negative effects, and urges

that an appropriate extensive examination of this problem be undertaken as soon as possible. The WG expressed the willingness to participate in this examination and study. The WG also expresses its awareness of the introduction of other salmonid species on the Atlantic coast of North America, for and about which less information appears to be available.

Continued Release of Chum Salmon in the State of Maine

The release in 1985 of chum salmon from Hokkaido, Japan, and from the State of Washington, as fry, in Gulf of Maine waters, was viewed with considerable concern by WG members. It was noted that the private company involved has (a) satisfied all local and state requirements relative to these introductions for the past five years, (b) the principals involved in the company are professional microbiologists, aware of disease risks, and have gone to considerable length to assure that disease-free stocks are released, and (c) the company intends to establish a brood stock if sufficient recaptures are available. The Code of Practice was not known to the company at the time they initiated their studies and releases. Nonetheless, WG members found that these releases of chum salmon were, on disease, ecological, and other grounds, in direct contradiction to the Code of Practice. It was noted that federal US authorities have ceased the importation and transfer of Atlantic salmon eggs from US Pacific coast hatcheries because of the presence of IHN virus (Infectious Haematopoietic Necrosis) in west coast stocks; WG members expressed concern that this being the case, why chum salmon eggs from the State of Washington were being transported to the State of Maine. Other WG members queried how the private company is monitoring sea captures and returns of released fish.

The Working Group:

Re-expressed its concern at the continuing and unabated levels of the introduction of chum salmon in the form of eggs from Japan and the State of Washington into the State of Maine by

a private company, and re-emphasized its desire to be kept fully informed of the directions of the program. The WG noted that U.S. federal authorities have ceased to transfer ova of Atlantic salmon reared in Pacific coast hatcheries to the Atlantic coast because of the risk of disease (IHN) introductions. In contrast, however, the WG noted that a private company continues to introduce the ova of wild chum salmon to the coast of Maine from the Japanese and U.S. Pacific coasts.

The Working Group also felt that because of (1) the recent capture of an adult pink salmon in New Brunswick, (2) the establishment of a population of coho salmon in Nova Scotia, (3) the continued release of coho salmon in the United States, (4) the continued release of chum salmon in the United States, and (5) extensive concern and interest in the question of Pacific salmonid introductions and releases now and in the future on the North American Atlantic coast, expressed by all WG members, that the next WG meeting should include a one-half day workshop on Salmonid Introductions to the East Coast of North America.

Salmonid Introductions in Eastern Europe

The lack of information on recent activity with salmonid introductions in Eastern Europe was noted with concern. WG members noted that such information would be of great interest. It was suggested that ICES, through its member country delegates, attempt to obtain more information on these matters before the next WG meeting, and that this be formed as a recommendation.

CURRENT STATUS OF PROPOSED OR ACTUAL INTRODUCTIONS [continued]

The Introduction and Cultivation of the Brown Alga Undaria on the Atlantic coast of France

The Working Group convened in special session on 29 May 1985 to address the French introductions of Undaria in Atlantic Ocean waters. The findings of

this session, and supporting documentation, are presented herein as Appendix VIII. The WG response (see Appendix VIII, page 10 therein, item (4)), included the following decision:

"(The Working Group) urges that any commercial (industrial) expansion of the program be held in abeyance, and efforts at containment of the existing introductions be carried out, until a full, detailed, and extensive study be submitted to ICES on the risks imposed if Undaria were to become established on the Atlantic coast..."

The WG response also included (see Appendix VIII, page 11 therein, item (6)) the suggestion that an expert be asked to prepare a detailed, independent analysis, not on the expense of the Council. These conclusions and suggestions are formulated as recommendations in this Report.

ENTERIC REDMOUTH DISEASE

A. Munro (UK) noted that ERM disease (first recorded in the UK in brown trout on an Essex fish farm in 1978) has now appeared in rainbow trout (Salmo gairdneri) in sea cages in Denmark in 1984.

INTRODUCTIONS OF NONINDIGENOUS SPECIES BY DRILLING VESSELS

J. Carlton (USA) presented a bibliography of works on this subject, and on fouling organisms on drilling platforms in general. WG members noted certain difficulties (time, research funds, and access) in assessing the current importance of this transport mechanism of exotic species, but encouraged studies by research institutions in ICES member countries on this phenomenon, which has been shown in the United States and in New Zealand to be a viable mechanism of long-distance transport of exotic species.

This bibliography is included with other cited references as Appendix VII, herein.

JOINT MEETING of the
European Inland Fisheries Advisory Commission's (EIFAC) Working Party on Introductions
and of the
ICES Working Group on Introductions and Transfers of Marine Organisms

As per C. Res. 1984/2:33, the WG met in joint session with FAO/EIFAC on
30-31 May 1985, in Göteborg, at the Yrkesinspektionen, to:

- (1) consider commonalities and differences in the Codes of Practice of the two committees, and to harmonize the Codes to the extent practical,
- (2) consider a manual of procedures (protocols) concerning the introduction and transfer of marine and inland organisms,
- (3) consider the use of "decision models" to decide about the advisability or feasibility of introductions, and,
- (4) consider joint activities.

Twenty-six participants representing FAO and 13 countries were present:

D. Charbonnier	FAO/Rome	B. de Groot	Netherlands/ICES
R. Welcomme	FAO/Rome	B. Steinmetz	Netherlands/EIFAC
M. Jean-Claude	Belgium/EIFAC	E. Egidius	Norway/ICES
R. Eisner	Canada/ICES	S. Mehli	Norway/EIFAC
G. Turner	Canada/ICES	H. Quiroga	Spain/ICES
J. Dahl	Denmark/EIFAC	B. Dybern	Sweden/ICES
V. Jacobsen	Denmark/ICES	M. Fürst	Sweden/EIFAC
P. Tuunainen	Finland/EIFAC-ICES	B. Holmberg	Sweden/EIFAC
H. Grizel	France/ICES	A. Munro	UK/ICES
A. Lelek	FRG/EIFAC	D. Solomon	UK/ICES
H. Rosenthal	FRG/ICES	B. Stott	UK/EIFAC
K. Tiews	FRG/EIFAC	J. Carlton	USA/ICES
D. McCarthy	Ireland/EIFAC-ICES	C. Sindermann	USA/ICES

The meeting was opened by the Chairmen K. Tiews and C. Sindermann, with welcoming remarks to all participants, on behalf of the fisheries authorities and of the Ministry of Agriculture, by Dr. B. Dybern. The agenda was adopted with small modifications. The FAO/EIFAC report of the joint meeting is appended herein as Appendix V. The joint meeting of the two working parties proved to

very successful, with all of goals outlined being attended to and decided upon, and with considerable new insight and understanding being achieved on the activities, goals, and concepts of both working groups.

Reviewed here are the decisions of this joint meeting (see also Appendix V):

CODES OF PRACTICE

A document detailing all of the differences between the ICES and EIFAC Codes was prepared by the ICES Rapporteur and discussed in detail at the Joint Meeting. The necessary distinctions between the two codes, one dealing with inland and the other with marine introductions, were noted. Based upon a comparison of the Codes, several changes were made in the EIFAC Code [Appendix V, herein: p. 3 therein, 16(a, b)], and a modification of the definitions of "Exporting Country" and "Country of Origin" were made in the ICES Code (see below). The ICES Code being at a more advanced stage, ICES WG members noted that it was more feasible to modify the ICES Code through suggestions in the Guidelines and/or Protocols, rather than the text of the ICES Code itself.

PROTOCOLS: MANUAL OF PROCEDURES

The development, coordination, implementation, writing, and editing of a Manual of Procedures to reduce the risks of adverse effects arising from the introduction and transfer of exotic species is regarded by both working parties as a major undertaking. The ICES WG has, through past workshops, developed an outline and structure for such a Manual, and has identified potential authors for some but not all of the sections [see 1984 HALIFAX ICES WG REPORT, C.M.1984/F:35, pp. 47ff]. It was agreed that the Protocols (Manual of Procedures) should be harmonized as much as possible, with modifications as pertinent for marine and freshwater introductions.

It was agreed that the Protocols should be a joint effort between the ICES and EIFAC working parties, with experts in both groups, and invited experts, contributing chapters. Peer review of the contributed chapters was also suggested. Large sections of the Protocol outline developed by the ICES WG apply to both ICES and EIFAC concerns, and extensive mutual interest was expressed by many WG/WP members.

Names of potential authors were suggested during the meeting; a tentative deadline of January 1986 was set for draft sections; and the EIFAC Secretariat may examine the possibility of locating funds to assist in protocol drafting. G. Turner (Canada) was invited to act as Editor [see Appendix V, herein: p. 3, IV, 19].

PROTOCOLS: MANUAL OF PROCEDURES (continued)

The broad outline of the Manual is as follows:

- I. Introduction
- II. ICES/EIFAC Codes of Practice
(and Definitions)
- III. Protocols
 - A. Universal considerations (principles)
 - 1. Inspection and certification
 - 2. Quarantine
 - 3. Pathology (Diseases and Parasites)
 - 4. Genetics
 - 5. Ecology and Behavior
 - B. Species-group considerations (principles)
 - 1. Salmonid fishes
 - 2. Eels
 - 3. Other finfish
 - 4. Molluscs
 - 5. Crustaceans
 - 6. Marine plants
- IV. Protocols for species of current commercial practice
- V. Protocols for species imported solely for scientific studies in research institutions

A former section (VI), on methodology for presenting to the WG/WP proposals for introductions is deleted, and would be handled internally within ICES and EIFAC. "Decision models" (see below) would tentatively be considered under section II.

REVIEW AND DECISION MODELS TO ASSESS INTRODUCTIONS

As part of its methodology for evaluating the risks of introductions, EIFAC adopted a "Review and Decision Model" procedure (EIFAC, 1984), a revised version of a protocol originally proposed by Kohler and Stanley (1984). The application, use, and utility of this approach was discussed at length in the Joint Meeting.

ICES WG members felt that, for ICES purposes, the decision model boxes and flow patterns were not flexible enough, and that the "answers" called for at each decision level would frequently differ in different countries, and at different times. It was felt, however, that the decision model was a useful tool to lead discussions. Both EIFAC and ICES members agreed that a "test" of the review and decision model would be useful, using actual introductions that had taken place (oysters and rainbow trout) and proposed

REVIEW AND DECISION MODELS TO ASSESS INTRODUCTIONS (continued)

or newly initiated introductions (such as Undaria in France). B. Stott (UK) and H. Grizel (France) agreed to examine the decision model relative to rainbow trout in the UK and the Japanese oyster Crassostrea gigas in France, respectively. If an invited expert is selected to independently study the Undaria situation in France, they will be asked to incorporate the decision model in their examination of the case as well (through the ICES WG).

FUTURE JOINT ACTIVITIES OF EIFAC AND ICES

The WG/WP agreed that the exchange of ideas, thoughts, and principles, the availability of new information, and the opportunity for joint discussion, had made this joint meeting very worthwhile, and a desire and hope for future joint meetings was expressed. Areas of possible joint activity identified were [see Appendix V herein, p. 4, for details]:

- (1) Joint work and production of a Manual of Procedures (the Protocols)
- (2) Work with each other on testing the Review and Decision Model
- (3) Evaluation of the effects of introductions of salmonids, sturgeons, and eels
- (4) Mutually prepare case histories of introductions to be brought to public attention, including the production of popular articles translated into each country's language
- (5) The development and refinement of decision-making models relative to introductions

It was suggested that a possible future joint meeting should be considered for 1987.

ICES REVISED CODE OF PRACTICE AND GUIDELINES FOR IMPLEMENTING THE CODE (CRR 130):
MODIFICATIONS AND CHANGES

(A) General changes to the Revised Code of Practice

During and before the Joint Meeting (above), ICES WG members decided to not alter the Code, for stability purposes, but rather to make additions and modifications in the Guidelines (Cooperative Research Report 130) and, now, to

the Protocols (Manual of Procedures) now being drafted. The change in definitions of "Country of Origin" and "Exporting Country", to agree with the EIFAC definitions, does not effect the Revised Code of Practice's recommended procedures. It was agreed, however, that the Revised Code of Practice should contain a footnote, which advises the user to see Cooperative Research Report 130 ("Guidelines for Implementing the ICES Code of Practice Concerning Introductions and Transfers of Marine Species"), and, eventually, should contain a cross-reference (by footnote) to the Protocols as well.

(B) Re-examination of the provisions of the Code of Practice relative to the importation of salmonid eggs

At the ICES 1984 Statutory Meeting in Copenhagen, several members of the Mariculture Committee indicated that the Working Group should re-examine the provisions of the Code of Practice concerned with the importation of salmonid eggs. As the Code and Guidelines now stand, only F₁ individuals that are pathogen-free, and not the original egg or adult importations, can be introduced directly into the environment. Referring to the decision to not alter the Code of Practice itself in a substantial manner, thus retaining its original integrity, the WG decided that the Guidelines and Protocols should and could indicate that alternative protocols for introduction of salmonids are available, and that the Guidelines and Protocols will thus indicate the flexibility relative to individual situations. For example, a draft chapter for the Manual of Procedures (Protocols), on measures to minimize the risks of introduction of disease agents with introductions and transfers of salmonid ova and fish, prepared by A.L.S.Munro (UK), provides for the introduction of ova from specified pathogen-free farmed broodstocks, such stocks to have been certified pathogen free for two years and be supplied by a protected water source free of wild fish. Such ova could, then, be introduced directly to the importing country without quarantine if accompanied by the appropriate certificates and documentation. This measure is one

four alternative procedural steps for importing and transferring salmonid ova and fish; these materials are now in draft form, and will become part of the Manual of Procedures (1986). Several members of the WG emphasized, however, that while such procedures may satisfy disease- and parasite-requirements for egg introductions, they do not address the ecological and genetic questions of such introductions, such matters needing also to be weighed before any introductions are sanctioned.

(c) Dissemination and Translation of Code of Practice

C. Res. 1984/4:10 encourages ICES member countries to translate the Code of Practice into their official languages. The WG is currently aware that the Code has recently been translated into Dutch (de Groot, 1985), Norwegian (Egidius), and Spanish (Augsburger and Gallardo, 1983).

Dissemination of the Code, which has also been encouraged, is through widespread publication, it is hoped, in national fisheries journals and newsletters. To date, those that have come to the attention of the WG include publications in print or planned in the Netherlands, Norway, and the United States, and by the European Mariculture Society (Rosenthal, 1982). The Code has also been included in recent publications by Sindermann (1984) and by Rosenthal (1985).

The WG renewed its appeal that the Code of Practice be as widely published and publicized as possible in the appropriate national journals of ICES member countries.

MINISYMPOSIUM FOR 1986 or 1987 on "The Effects of Introductions and Transfers on Living Marine and Aquatic Resources and Ecosystems"

Throughout the WG sessions, the importance among all ICES member countries for an understanding, concern, and control, of exotic species, was underscored, relative to deliberately introductions, accidental introductions, introductions for hatchery rearing purposes, planned introductions, and live exports. It is felt that because such concerns are of sufficient magnitude, that because of the amount of information that has now accumulated and the considerable efforts and attention given these matters by the WG over the past six years, and because the development of detailed, accurate, and thorough Case Histories could form the foundation for a rigorous understanding of the processes that lead to successful versus unsuccessful introductions, a symposium would be extremely beneficial at this time, either as a theme session for 1986 or as a minisymposium for 1987. This symposium would concentrate on "The Effects of Introductions and Transfers on Living Marine and Aquatic Resources and Ecosystems", wherein specially invited papers on significant case histories of exotic species would be invited, these focusing upon the pathological, ecological-behavioral, and genetic effects of introductions. These case histories, and others that could be developed, would then provide a framework against which proposed future introductions could be compared and considered. These case histories could, also, individually, test and examine the Review and Decision Models currently under discussion by both ICES and EIFAC working groups on introduced species.

The possibility of a symposium, as outlined above, is presented as a recommendation herein.

Introductions and Transfers of Marine Organisms: A Proposal for
Council Action

With expanding activity throughout the North Atlantic Ocean and the world relative to the movement of non-indigenous species, and with logarithmically growing interest in the introduction and transfer of marine and aquatic organisms for aquaculture (mariculture) purposes, and because an effective continuing body is needed within ICES to address these matters, the WG considered at length a proposal to submit to the Council relative to the formation of a more permanent body within ICES to assume responsibility for the activities of the present Working Group. This proposal is detailed in a separate ICES document, C.M. 1985/F:64, "Introductions and Transfers of Marine Organisms: A Proposal for Council Action" [12 pp., C. J. Sindermann, B. I. Dybern, and H. Rosenthal]. Major advantages to ICES of the new body would be:

- (1) Establishment of a permanent group to provide advice to ICES on a continuing basis,
- (2) Broad representation from ICES member countries, built on a nucleus of designated members,
- (3) Ability to respond promptly and more directly to requests for opinions or actions,
- (4) Ability to coordinate on a regular basis with counterpart EIFAC introductions group, and
- (5) Continued maintenance of a record of all national laws, regulations, and codes concerning introductions.

In addition, this body would maintain continued ICES surveillance of former, on-going, and planned introductions and transfers of marine organisms in ICES member countries. Terms of Reference for this body are detailed in C.M. 1985/F:64, as are the proposed procedures for handling within ICES proposals for introducing or transferring marine organisms, under the aegis of

such a committee.

This suggestion is also presented here in the WG Report as a recommendation.

RECOMMENDATIONS

During the course of the meeting, recommendations to the parent committee were formulated by the Working Group. These recommendations are:

- (1) That in view of the growing interest in introductions and transfers of marine organisms for aquaculture (mariculture), and because requests to ICES for opinions concerning introductions are certain to increase, and because of a need to respond promptly and more directly to requests for opinions and actions, and to coordinate on a regular basis with other international introductions working groups, and because of a need to maintain continued ICES surveillance of introductions and transfers of marine organisms, and to maintain a record of all national laws, regulations, and codes concerning introductions, it is suggested that the Council consider establishing a more permanent body within ICES that would permit ICES to provide more timely advice to member countries relative to the introductions and transfers of marine organisms, and the benefits and risks involved in such movements, such a group to have terms of reference as proposed in C.M. 1985/F:64.
- (2) That, based upon all of the considerations and conclusions formulated at a special discussion session, it is urged that any commercial (industrial) expansion of the program to plant the brown seaweed Undaria in open marine waters be held in abeyance, and efforts at containment of the existing introductions be carried out, until a full, detailed, and extensive study be submitted to ICES on the risks imposed if Undaria were to escape from cultivation and become established on the Atlantic coast of Europe, and that, in the meantime, also, an expert be asked to prepare, not on the expense of the Council, a detailed analysis, addressing the questions and matters raised at the special discussion session, such an analysis to be available before the next Working Group meeting.
- (3) That ICES, through its member country delegates, attempt to obtain more information on the introduction and transfer of salmonid fish in Eastern Europe, in light of the growing interest throughout the North Atlantic Ocean on the introduction and transfer of both Pacific and Atlantic salmonid species.

RECOMMENDATIONS

(continued)

- (4) That, because some ICES member countries have not established relevant laws, acts, or orders for preventing or controlling introductions in the marine environment (as can be seen in the current national reports of unacceptable introductions into the sea still taking place), and because it is thus very difficult for those member countries without adequate national legislation on the introduction and transfer of marine organisms to follow the Code of Practice at this time, and in view of the explosive growth of aquaculture, ICES should encourage member countries to establish the necessary instruments as soon as possible.

- (5) That, because of the great importance among all ICES member countries for an understanding and control of exotic species, because of the great amount of information that has now accumulated and the considerable efforts and attention given these matters of the Working Group on Introductions and Transfers of Marine Organisms over the past six years, and because the development of detailed, accurate, and thorough Case Histories of introductions could form the foundation for a rigorous understanding of the processes that lead to successful versus unsuccessful introductions, a symposium be convened, entitled, "The Effects of Introductions and Transfers on Living Marine and Aquatic Resources and Ecosystems," either as a theme session for 1986, or as a minisymposium for 1987, wherein invited scientific papers on significant case histories on the effects of introductions and transfers would be presented.

- (6) That, because of the need to:
 - (i) continue to monitor the introduction of the brown seaweed Undaria on the Atlantic coast of France, and to consider the reports and studies now in preparation regarding Undaria by which a decision of the Working Group may be reached,

 - (ii) develop, coordinate, write, and edit, in conjunction with EIFAC, a "Manual of Procedures to Reduce the Risks of Adverse Effects Arising from the Introduction and Transfer of Non-Indigenous Marine and Aquatic Organisms", for a 1986 target completion date,

 - (iii) continue cooperation and collaboration with EIFAC on the development and refinement of decision-making models, and the preparation of case histories,

(6) [continued]

(iv) convene a one-half day workshop on "Salmonid Introductions to the East Coast of North America," focusing on current concern over recent introductions of coho, chum, and pink salmon,

(v) consider plans for a symposium (as a theme session for 1986 or a minisymposium for 1987) on "The Effects of Introductions and Transfers on Living Marine and Aquatic Resources and Ecosystems,"

and

(vi) continue its oversight of the status of shellfish, finfish, and algae introductions in and between ICES member countries,

The Working Group on Introductions and Transfers of Marine Organisms, in order to encourage participation in the critical issues now under study by the Group, meet in one of the Eastern member countries, or, as an alternative if the former is not feasible, in Aberdeen (Scotland), in early May 1986.