

SHELLFISH COMMITTEE

by

J. Audouin

1980



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MOLLUSCA

Belgium

(Reporting on Crustacea only)

Canada

(G. P. Ennis)

Crassostrea virginica

Oyster research and enhancement programs in New Brunswick included shelling of the littoral zone in Caraquet Bay with clam shells to increase oyster spatfall on the publicly managed oyster picking grounds. Oyster population studies were conducted in the St. Nicholas, Molus, Bass and Main Richibucto Rivers, and the status of the Richibucto River oyster management scheme was reviewed. Port sampling of oyster landings was carried out on the east coast of New Brunswick.

Several oyster enhancement and development projects conducted in Summerside Harbour, Prince Edward Island, during recent years were assessed to determine their impact on public oyster beds.

Placopecten magellanicus

Georges Bank

Landings decreased by 43% in 1980 to 43,331 MT round weight, owing to continued depletion of above-average year-classes and diversion of Canadian effort on the Scotian Shelf. Canadian landings are only from the northern part of Georges Bank; and because of the absence of a fisheries agreement with the U.S. in this disputed area, there continues to be no further efforts to optimize yield per recruit to help compensate for decreasing numerical abundances. However, fleet size has not been allowed to increase and trip quotas of 13.61 MT of meat remain in effect.

Surveys indicate that recent recruitment has only been average, and hence landings can be expected to fluctuate near the historic average level of about 80,000 MT round weight, combined Canadian and U.S. landings. Ongoing studies to define scallop concentration from log data are continuing, and scallop distribution is being investigated by means of cameras mounted on the underwater sled "BRUTIV".

Bay of Fundy

Landings off Digby, Nova Scotia, in 1980 (6,830 MT round weight) were significantly greater than in 1979 owing to the sudden availability of recruited scallops in inshore waters in the fall fishing season. The inshore scallop fleet did not significantly exploit Georges Bank in 1980, as scallops could be more economically fished on the Scotian Shelf. The scallop fishery around Grand Manan Island also reestablished itself in 1980 with the discovery of numerous scallop concentrations in inshore waters.

Northumberland Strait

Landings continued to decline in this fishery, with landings (1,543 MT round weight) 19% lower than in 1979. Considerable regional differences in recruit abundance at age were observed, with younger, recruited scallops particularly scarce in the western Strait. However, a very large number of one-year-old scallops was observed in this region, indicating that in a few years recruitment may improve.

Scotian Shelf

Southwestern Scotian Shelf scallop landings were above average in both 1979 and 1980 (2,216 and 41,973 MT round weight, respectively). The area of exploitation was largely different in each of these years. Since the Shelf can be exploited by both the offshore and Bay of Fundy scallop fleets, scallop concentrations can be depleted within months of their discovery. However, a sufficient number of concentrations have been consecutively found to allow high landings over both years.

Newfoundland

The extremely lucrative price paid scallops this year has made scalloping attractive to many fishermen and has resulted in a resurgence of the fishery throughout Newfoundland. The inshore fishery was particularly evident in Port au Port Bay, Bay St. George and Placentia Bay.

Maritime vessels prosecuted the offshore fishery on St. Pierre Bank in 1980 (204 MT).

Chlamys islandica

There was an active fishery for the mollusc in the northeastern Gulf of St. Lawrence. Of the 1,105 MT (round weight) scallops landed in Newfoundland approximately 750 MT came from this fishery. Up to 13 vessels were involved, but only 10 were active through the season. Boats are in the 45-52 ft. range, the majority being 45 ft.

There was a smaller fishery for the Iceland scallop off Labrador (59 MT round weight) and the Bay of Islands (30 MT).

A systematic line survey was conducted in the northeastern Gulf of St. Lawrence and preliminary assessments are being attempted.

A first estimate of minimum trawlable biomass has been derived for Iceland scallops in St. Pierre Bank (NAFO Subdivision 3Ps).

Arctica islandica

The quahaug fishery in SA 4 has been relatively insignificant with nominal catches of 37 MT and 94 MT in 1979 and 1980, respectively. These landings were predominantly from Northumberland Strait in SA 4T. They reflect increased effort in the fishery to supply an export market. The fishery is conducted with hydraulic dredges.

Very little is known of the biology, distribution and abundance of Arctica in Canadian waters. In 1980 a cooperative program was undertaken with USA to conduct resource surveys on the Scotian Shelf (SA 4). Four Banks in the SW region were surveyed and information on environmental and biological conditions were also collected. The program is proposed to continue to cover the entire Shelf. Inshore resource surveys in SA 4T and 4X were also carried out during 1980 with emphasis on biology, distribution and abundance.

Denmark

(Reporting on Crustacea only)

France

(J. Audouin)

Ostridae (Travaux de l'I.S.T.P.M.)

Ostrea edulis : La régression de la maladie due à Marteilia refrigens est confirmée. Le parasite est toujours présent dans le Golfe du Morbihan, les rivières d'Auray et de Pénérif et dans la Rade de Brest. Dans ce dernier secteur, les huîtres naturelles semblent s'être immunisées. Leur croissance, leur qualité et les mortalités sont normales.

L'épizootie due au nouveau protiste X, nommé Bonamia ostreae s'est développée dans tous les centres d'élevage bretons. Des mortalités importantes (50 à 80%) ont été constatées sur les huîtres âgées de 3 ans à 4 ans. Ce parasite a également été décelé sur des huîtres élevées à Arcachon et dans le bassin de Marennes-Oléron.

Mytilicola sp. et Minchinia armericana ont été signalés.

La production de naissain est évaluée à 450 tonnes. Le stock de 18 mois (huîtres de demi-élevage) à 2 000 tonnes. La production d'huîtres à la consommation s'est située autour de 5 000 tonnes.

Crassostrea gigas

Mytilicola orientalis s'est étendu à de nombreux centres d'élevage situés sur la façade atlantique. Les pourcentages d'huîtres parasitées et les taux d'infestation sont très variables. Ils n'excèdent cependant pas 30% pour un taux maximal de 5 Mytilicola par huître.

Des études sont réalisées sur le "chambrage" avec production de gel. La carence de certains acides aminés pourrait être à l'origine du phénomène. D'une façon plus générale, la qualité de la coquille (forme et structure), se dégrade dans de nombreuses zones. L'influence du milieu semble prépondérante dans le processus.

La production globale à la consommation (70 000 à 80 000 tonnes) est en baisse par rapport aux années précédentes (100 000 tonnes). Cette tendance résulte des mauvais résultats de captage de 1978, en particulier dans le bassin d'Arcachon.

En 1980 des fixations importantes ont été observées dans le bassin de Marenne-Oléron. Le captage à Arcachon ne devrait pas satisfaire la demande de ce bassin. La production en demi-élevage, dans ce dernier est en augmentation par rapport à 1979: il atteindrait 350 tonnes.

Mytilidae (moules)

Mytilus edulis : Les travaux sur les phénomènes d'envasement et sur la recherche de méthodes de "dévasage" sont poursuivis. La craie a été testée avec quelques succès sur une vasière située en amont du bassin d'Arcachon.

La production mytilicole française évolue autour de 50 000 Tonnes, le premier bassin producteur étant celui du Viviers-sur-Mer avec une quantité de 10 000 Tonnes de moules de bouchots. Les méthodes d'évaluation des stocks, propres au bassin de Thau (culture en suspension sous radeau) ont permis d'évaluer la biomasse à 7 000 Tonnes.

Pectinidae

Pecten maximus : L'étude des stocks de coquilles Saint Jacques (ISTPM - CNEXO) s'est poursuivie sur les principaux gisements français (Manche Orientale, Baie de Seine, Baie de Saint Brieuc, Belle-Ile, etc...). L'évaluation des prérecrues, réalisée au moyen de dragues spéciales, et l'estimation de la reproduction en cours grâce aux travaux de captage permettent de prévoir l'évolution des captures et de définir des quotas annuels de pêche en fonction des prévisions de re-

crutement pour les deux années suivantes. La production française se situe entre 15 et 18 000 Tonnes. Les opérations de captage mises en oeuvre en Baie de Saint Briec (Centre d'expansion économique), en Rade de Brest (Comité Local des Pêches Maritimes) et à Belle-Ile (ISTPM) se sont soldées par des résultats médiocres (5 à 40 coquilles par collecteur). Elles ne peuvent dans ces conditions avoir aucune incidence sur le stock.

Chlamys varia : La production française s'est élevée à 350 - 400 Tonnes. Une étude de la pêche en Rade de Brest (ISTPM - CNEOX) a montré que, si les apports n'ont pas beaucoup évolué au cours des dernières années, il y a eu en revanche un déplacement de l'effort de pêche, la productivité des différents secteurs évoluant différemment. Les opérations de captage donnent des résultats moyens mais restent limitées ; elles ne peuvent pas avoir d'incidence sur le stock, au niveau où elles sont pratiquées.

Vénéridae

Venus verrucosa : L'étude du stock de praires du Golfe Normano Breton est terminée (CNEOX et Comité Local des Pêches Maritimes de Granville); des aménagements en vue d'en améliorer l'exploitation ont été proposés. Leur mise en oeuvre est retardée par suite des divergences d'intérêt entre les flotilles intéressées par cette activité.

- Travaux portant sur la biologie et l'endocrinologie des Mollusques marins. (Laboratoire de Zoologie et Laboratoire Maritime de LUC S/MER)

1. Equipe GASTEROPODES (Responsable : Professeur W. STREIFF).

- a) Etude de la différenciation des gonades et des tractus génitaux chez Littorina littorea : recherches ultrastructurales et expérimentales en cultures d'organes. Mise en évidence d'un facteur endocrinien masculinisant et de facteurs endocriniens cérébraux de fonctionnement des gonades.
- b) Etude des facteurs internes responsables de l'association en chaînes chez Crepidula fornicata (Thèse de Doctorat d'Etat - P. LE GALL, soutenue en 1980).
Recherches ultrastructurales sur la gonade de Crépidule.
- c) Etude des facteurs externes et internes responsables de la présence d'un pénis chez les femelles d'Ocenebra erinacea (Analyse expérimentale du contrôle exercé par les facteurs neuroendocriniens et les facteurs du milieu.
- d) Etude de l'action des Trématodes parasites sur la sexualité de Littorina littorea.

2. Equipe LAMELLIBRANCHES (Responsable : Professeur P. LUBET).

2.1. Sexualité et Endocrinologie sexuelle.

- a) Etudes des séquences et des modalités du cycle de reproduction de la Coquille St-Jacques (Pecten maximus) en rade de St-Brieuc.
- b) Recherches sur les facteurs internes contrôlant la différenciation sexuelle chez les Pectinidae (Chlamys opercularis, Chlamys varia, Pecten maximus) ; Mise en évidence d'un phénomène d'autodifférenciation ovocytaire, d'un facteur masculinisant endocrinien et de facteurs neuroendocriniens de fonctionnement des gonades.
- c) Recherches sur les facteurs neuroendocriniens contrôlant le fonctionnement des gonades chez la Moule (Mytilus edulis) et l'huître creuse Crassostrea gigas. Mise en évidence en cultures d'organes de facteurs neuroendocriniens non sexualisés et non spécifiques contrôlant la multiplication des ovogonies ou spermatogonies, la méiose dans la lignée mâle, la prévitellogénèse et la vitellogénèse dans la lignée femelle. Mise au point de tests d'activité biologique destinés à tester les extraits de ganglions afin d'isoler les facteurs neuroendocriniens (essais portant sur l'activité de l'enzyme Aspartate trans-carbamylase et sur la DNase).
Recherches d'analogues des neurohormones des mollusques.
- d) Recherches sur l'action de la température sur les cycles de reproduction de la moule, de l'huître creuse et de l'huître plate. Mise en évidence d'une action freinatrice sur le cycle sexuel exercée par l'accroissement des températures chez la moule alors que le phénomène inverse est observé chez les huîtres.

2.2. Nutrition et métabolisme

- a) Mise au point d'un régime alimentaire destiné à permettre le prégrossissement du naissain de Crassostrea gigas (Brevet à déposer au CNRS). Démonstration de l'efficacité d'un aliment artificiel, entièrement original et permettant une excellente croissance même aux températures de l'eau en hiver.
- b) Etude de l'accumulation et de l'utilisation des réserves au niveau du tissu de réserve de la moule et de l'huître (Activité glycogène-phosphorylasique et étude à l'aide de précurseurs radioactifs).

3. Equipe CEPHALOPODES (Responsable : Mme Eve BOUCAUD)

Dr. ès-Sciences, Maître-Assistant, Chargée de cours.

- a) Etude ultrastructurale du tractus digestif et de ses annexes (Foie-Pancréas) de Sepia officinalis. Détection histochimique des enzymes, détection des zones d'absorption à l'aide de substances marquées.
- b) Recherches sur les lipides de la glande digestive au cours d'un cycle annuel sur Sepia officinalis : Variations quantitatives et qualitatives, étude spéciale des stérols et détermination des stérols en spectrographie de masse (Thèse de Doctorat 3ème cycle, M. B. BLANCHIER, 1980).
- c) Etude expérimentale en cultures d'organes du contrôle exercé par la glande optique sur le métabolisme de la glande digestive.

Federal Republic of Germany

(R. Meixner & K. Tiews)

Mytilus edulis

Monitoring of mussel beds along the German North Sea coast and in the Flensburg Fjord has been continued by the Institut für Küsten- und Binnenfischerei.

Cardium (= Cerastoderma) edule

Cockle beds along the German Wadden coast of Niedersachsen and Schleswig-Holstein were again surveyed by the Institut für Küsten- und Binnenfischerei.

Programme 1981:

Mytilus edulis

Monitoring work on size and age composition of mussel beds along the German Wadden coast and in the Flensburg Fjord will be continued by the Institut für Küsten- und Binnenfischerei.

Cardium edule

The survey work on cockle stocks in the German Wadden area will be continued by the Institut für Küsten- und Binnenfischerei.

Iceland

(U. Skúladóttir & H. Eiriksson)

Chlamys islandica

Two research vessel surveys were carried out in 1980. One of the surveys included a search for new beds in Skagafjörður, North Iceland where a few small exploitable beds were located. The second survey was concentrated on the most heavily exploited beds in the Breidafjörður fishery, West Iceland.

As in previous years, the various fjord fisheries were managed mainly by catch quotas. Catch/effort data were obtained from catch reports - giving information for each boat about culled catch, fishing hours, fishing area, size of boat, crew and dredge. Moreover sampling was continued in all the main fishing areas.

Total landings in 1980 amounted to approx. 9.000 metric tons as against 7.800 m tons in 1979. The major proportion of the catch

came from the Breidafjörður fishery or approx. 7.150 metric tons in 1980 as against 6.055 m. tons in 1979. Catch rates in this fishery have been steadily increasing since 1976, being 920 kg per one hour of fishing in 1980 as against 890 kg in 1979.

In 1981 exploratory surveys are planned off the east coast of Iceland. Furthermore surveying of stocks by underwater camera will be initiated.

Todarodes sagittatus

The squid Todarodes sagittatus reappeared in Icelandic waters in late summer 1979 (total catch 437 tons) after an almost total absence from this area for 14 years. Hence research on squid was then commenced, investigation on the species having been virtually non existing in this area up to that date.

Biological samples were collected and experimental work with pelagic squid-trawls were made in autumn 1979.

Measures had been taken to carry on with catch experiments (trawls and pumping) but the squid failed almost totally to migrate into Icelandic waters in 1980. Hence research has been limited to biological studies of specimens occasionally caught in small quantities around Iceland by research vessels.

Ireland

(J.P. Hillis)

Ostrea edulis

Spatfall density was investigated by the placing of collectors on beds in Tralee Bay, Co. Kerry and Clew Bay, Co. Mayo.

Mytilus edulis

Investigations were carried out upon an exceptional spatfall in Castlemaine Harbour, Co. Kerry, the first of such magnitude since ca 1960, the extent and density of spat in all areas where it occurred being assessed.

Pecten maximus

Settlement was monitored at Lough Hyne, Dunmanus and Bantry Bays and in the North Water of Mulroy Bay. A population assessment of Pecten in Mulroy Bay was carried out by diving, morphometric data being simultaneously collected. Distribution and age-structure of Pecten in the commercial dredge catch in Cork Harbour and Roaringwater Bay were also examined.

Netherlands
(A.C. Drinkwaard)

Molluscs

1. Ostrea edulis L.

At the end of the year the total rather young population of native Zeeland flat oysters in the non tidal enclosed sea-arm Grevelingen amounted to 10 - 20 million in number. This means an increase since last year, but it also shows the climate dependency of pond breeding. The oyster spatfall inventory program will be continued, waiting for a good summer like in 1976. Private leases for spat collection can be extended till 250 hm². For real commercial on-growing there are too much objections here, like the restricted flow, only activated by wind, and consequently limited food transport.

About 4500 m³ mussel shells from processing plants, threefold of 1979, were brought to the lake Grevelingen as cultch for collecting spat, spreaded on 60 hm². The spatfall monitoring showed only some scarce good results. Predation by starfish must have diminished the growing stock. Nevertheless in spring 500 - 750 000 Grevelingen oysters were planted in the Oosterschelde basin on the culture area Yerseke Bank.

Furthermore the genetic stock of this oyster type is only contained in older oysters along the artificial rocky slopes of the dikes around the Oosterschelde. In part these flat oysters live in competition with natural settled Pacific oysters. Importation of Crassostrea gigas is not more allowed since the unexpected spatfall in 1976. Even the hand picking has been decontrolled, to reduce this non-indigenous oyster in the Zeeland area.

The supply of flat oysters for on-growing and fattening from abroad concerned 9 million in spring and about the same number direct for market in autumn. They only got the flavor of the Oosterschelde.

For starting a feasibility study on large scale nursery exploitation, blue prints of biological and technological prerequisites are evaluated. The results of the dredging on the hatchery - nursery material (Barfleur - Texel), sown in April 1979 on a culture plot of the Yerseke Bank, were an eye-opener for the growers

2. Mytilus edulis L.

The set-back situation in the mussel culture activities of 1979 resulted in one of the lowest landings since the fifties. From Waddenzee and Oosterschelde respectively only 33 000 and 32 000 t were landed in the season 1980 - 1981. Importation of 8 000 t consumption mussels from abroad was a special event. Like for oysters this showed the international importance of the Oosterschelde as transit-trade harbour to the West-European mariculture market. The Dutch landed value however was the same as in the season 1979 - 1980 since the prices were high.

Nothing beyond some noticed spring mortality on wide spreaded locations and favoured by a good seed fishery, followed by a calm winter without ice, the own mussel landings in the season 1981 - 1982 are expected to be "normal" again. From the lake Grevelingen 6 500 t nearly marketable mussels could be harvested in February. The given figures include this extra supply.

The seed production of mussels in the lake Grevelingen was nearly nil. Gonad condition, spawning and larval development will be checked in 1981.

3. Cerastoderma edule L.

This year the peak landing of 35 000 t cockles live weight in 1978 has been exceeded and amounted to 45 000 t, good for 7 000 t shucked meat. The fishing technique is now well in balance with the bottom conditions of the cockle flats. Several new hydraulic harvesters are ordered.

Transplanting experiments by commercial ships are carried out again with rather good growth results. About 50 hm² was available for planting about 500 t small cockles. During the fishery of these cockles at the end of May the population density on the original beds in the Waddenzee decreased from about 5 000 till 2500 per m³.

Cockle fishery is now the third, but not the least pillar of the Dutch molluscan shellfish branch in fishery. Consequently the research attention is adjusted to this situation. A supplementary semi-culture of cockles can help to stabilize the yearly landings. This year the juvenile recruitment remained behind and may give a moderate year in 1982.

An overall survey and assessment of the cockle stock in the Waddenzee, gulleys and flats, has been carried out by the Netherlands Institute for Nature Management, Department for Estuarine ecology. Also surveys of benthic invertebrate species and numbers before and after cockle harvesting were carried out. Reports are to expect in 1981.

4. Environmental conditions.

The growth and quality of cockles, mussels and oysters in relation to environmental conditions in the Oosterschelde is more and more pin-pointed in close co-operation with the Delta Service - Rijkswaterstaat in the Ministry of Transport and Public works: Environmental and Hydrographical Research Division.

Within the project "BALANS" the situation of food supply, production, distribution and consumption is studied in relation to the total rough food web and organic carbon flux. On that basis a prognosis of the new production capacity after 1985 has to be made, when the storm-surge-barrier is protecting the estuary from floods and the tide will be reduced.

The same holds for the joined efforts in recording the hydrographic pattern in the Oosterschelde basin, especially on the Yerseke Bank and the 200 hm² natural mussel rewatering plots in the tidal and just sub-tidal area. Herewith the counteracting of silt sedimentation and re-suspension by tidal currents, wind turbulence and also the human dredging operations came into prominence. The Molluscan Shellfish Department of the Netherlands Institute for Fishery Investigations therefore was reinforced by a physical geographer.

A considerable fund of basic data on hydrography and ecology of the Oosterschelde now also comes at hand by the joined hydrological and biological research of the Delta Institute for Hydrobiological Research of the Royal Netherlands Academy of Arts and Sciences, also situated at Yerseke.

5. Diseases and pests.

The import of about 6 million oysters from Brittany, France in spring makes it understandable that the new disease, brought on by Microcell 'X' (Bonamia ostreae), gave serious problems and losses in the Oosterschelde too. The abnormal mortalities during summer lead to a general check of the oysters on the Yerseke

Bank plots, planted this year with oysters of several origins, from Ireland, England and Greece inclusive.

Based on histological research in August the disease was found to be present in the oysters of French origin only. The check in November showed the first observations of the disease in oysters from England too. In December the presence of the disease in oysters from Greece origin followed. The presence of the disease in oysters from Dutch origin is questionable. Own samples were negative. One sample, delivered by one of the planters showed infection.

These facts proved that the micro-organism is also infectious in the circumstances of the Dutch oyster culture. Bonamia ostrea must be considered therefore as a serious threat for the commercial interests to-day and the re-stocking development-plan for the Oosterschelde in future.

Measures are provided for preventing extension of this disease and to combat its settlement by cleaning up all plots, used for foreign oysters. A prohibition for planting oysters on these plots has been issued. This must lead to a nearly oyster-free culture area during 1981, in hope to create a gap in the cyclus of the parasite, affecting its survival possibilities.

The typical broodstock in the non tidal salt water lake Grevelingen is placed under heavy protection, to have still a sound sally-basis in future, thinking along the lines of pond breeding, hatchery supply and own large scale nursery exploitation.

In 1981 oysters from the lake Grevelingen will be used as informers of the remained infection potency. They will be brought to the Yerseke Bank in flat gauze bags, connected to a lot of beacons, spread over the area in view.

The restocking program for the Oosterschelde is ceased till better news becomes available.

6. Shellfish toxicity and sanitary control.

During summer period phytoplankton and sediment studies have been continued in the coastal area of the Waddenzee and Oosterschelde. These observations will be continued.

The sanitary monitoring and control of water and marketable molluscan shellfish has been continued by the Chemical Department of the Netherlands Institute for Fishery Investigations.

In consequence of the import of mussels from Denmark, Germany and Ireland and the import of oysters from the U.K., some corrections had to be made.

Norway

(K.R. Gundersen)

Cephalopods

Todarodes sagittatus

During January-April 1980 squid from the previous autumn invasion were still present in the eastern Norwegian Sea and Norwegian coastal waters. Female T. sagittatus measured 35-50 cm dorsal mantle length (DML), males, 33-38 cm. In April-May some squid were also taken in pelagic and bottom trawls between the Faroes and the Porcupine Bank. There was considerable variation in DML, 15-53 cm. According to countings of growth rings in the statoliths, small T. sagittatus, 15-22 cm in DML, were hatched during September-December 1979. Females larger than 35 cm were probably nearly one year older. Males with DML above 30 cm were maturing, most of them with spermatophores developed. Of the females, some with DML above 35 cm were maturing, a single specimen with oocytes in stage 3.

During the second half of 1980 T. sagittatus invaded the eastern Norwegian Sea and adjacent areas in enormous numbers. The invasion started in July-August, culminating in October-November, comprising the northern North Sea, the Norwegian Sea to Jan Mayen and Bear Island, and the Norwegian coast from south of Bergen to north to Kirkenes. In February 1981 squid were still present in most of these areas.

In coastal areas the squid fed mostly on 0 group fish. The squid fishery yielded about 3000 tonnes, but much more could have been taken.

Gonatus fabricii

Material was collected during surveys with pelagic trawls, mostly for post-larval and 0 group fish in June-September in the Norwegian Sea, including the Jan Mayen and West-Spitsbergen areas. Two specimens were caught near Jan Mayen in February. Mainly juveniles and small Gonatus, DML 15-70 mm, were taken. Maximum numbers were recorded off northern Norway in July, up to 1000 specimens per half hour's haul with a Harstad trawl, 18x18 m opening. Larger Gonatus, DML 150-250 mm, were caught near Jan Mayen in February, and in deep water west of Bear Island in September.

Poland

(J. Porebski)

Cephalopoda

The Department of Ichthyology of SFI in Gdynia in 1980 conducted squid research in the north-west Atlantic. Length frequency distribution, maturity, parasites and statoliths for age determination were collected. Two papers concerning the age of squid and stock assessment of Illex illecebrosus in Division 4W were submitted to the NAFO Secretariat.

In SFI - Swinoujście branch, research on Illex argentinus and Martialia hyadesi from the south-west Atlantic were carried out. Size and sex composition, maturity, food, parasites and vertical-horizontal distribution were studied.

Portugal

(A. Cascalho & J.C de Ataíde)

Mollusca

Instituto Nacional de Investigaçã das Pescas

Study of the biology of the populations of Patella vulgata, P. aspera and P. depressa on the rocky intertidal substrate of the Portuguese coast: fecundity, recruitment and growth (M. Guerra and M.J. Gaudêncio).

Installation of three depuration plants for grooved carpet shells in Algarve (R. Cachola).

Continued work on a molluscs experimental park in Tavira (Algarve) (R. Cachola).

Transplantation of Sado estuary oyster to the Tejo estuary in order to observe their behaviour in an ancient natural bank with monitoring about organoleptic characters, bacteriology, gills disease, etc. (A. Dias, M.D. Dias).

Collection and critical compilation of all statistical information on Cephalopods fishery in Portugal. Characterisation of commercially important species, their regional distribution, capture methods, etc. (L. Coelho).

Periodic and systematic biological sampling of Octopus, Sepia and Loligo from commercial landings and from the research vessels "Noruega" and Mestre Costeiro". (L. Coelho).

Collection and preservation of statoliths of Loligo vulgaris, Loligo forbesi and Illex coindetti for later studies (L. Coelho).

Faculdade de Ciências da Universidade de Lisboa

Studies on Cephalopods from the west coast of Portugal (pelagic juveniles) (C. Reis).

Inventory of Molluscs of the central zone of the Portuguese coast (Peniche, Lagoa de Óbidos, Cascais (C. Reis).

Bathymetrical distribution of Cephalopod stock from the Portuguese coast (C. Reis).

Growth and reproductive studies on Mytilus galloprovincialis populations from the Portuguese coast (A.M. Costa and M.M. Machado).

Instituto de Ciências Biomédicas "Abel Salazar", Universidade do Porto

The fine structure of the spermatozoon of Patella lusitanica (Gastropoda, Prosobranchia) with special reference to acrosome formation (Carlos J.C. Azevedo).

Universidade do Açores, Departamento de Oceanografia e Pescas

Statistics on Logilo fishery in the Açores 1972-1980 (H.R. Martins).
Spawning areas in the Central Group of the Açores (H.R. Martins).
Biometrical parameters in Logilo forbesi (H.R. Martins).

Spain

(H. Quiroga)

Mollusca

Oysters, Ostrea edulis: growth and survival of hatchery-reared oysters is being studied. The oysters are being cultured on rafts using baskets for keeping the individuals.

Scallops, Pecten maximus: Scallop spat obtained in an experimental hatchery, transferred to the sea, where it is enclosed in baskets which are hung from rafts. Growth and survival is being studied for sizes from 5-10 mm to commercial sizes of 80 mm.

Mussels, Mytilus edulis: The evolution of the epibiont community in the mussels cultured on rafts has been studied.

Cockles, Cerastoderma edule and clams Venerupis sp.: the natural beds where cockles and clams are very abundant and heavily exploited are being studied with population dynamic criterions. The purpose of the studies is to know the population parameters in order to propose exploitation regulatory measures.

Cephalopoda: Octopus, Sepia and Loligo populations of the African coast (North-west and mid-west) are being sampled in order to study size, weight and sex.

Sweden

Reporting on Crustacea only.

United Kingdom

1. England and Wales

(E. Edwards)

Molluscs

Pecten maximus

Fisheries information was obtained from all ports. The main fishery development in 1980 was the location of scallop beds in Cardigan Bay in Wales. Good catches of high quality scallops attracted vessels from all over England and Wales and the landing value for the area exceeded £1 million. This enabled the total landing value for England and Wales to be maintained at around £2 million.

Stock surveying using underwater television continued. Dredge surveys were undertaken off South-west England to delimit areas of slow-growing scallops, in the newly-developed fishing grounds in Cardigan Bay and off the NE coast of England, where new beds were located.

Recruitment was monitored in the English Channel by means of artificial spat collectors. Settlement appeared poor/moderate in 1980. Spat obtained in 1979 from the collectors, which were laid in an estuary in SW England, suffered an almost 100% mortality due to predation by crabs. Tagging these animals with a "superglue" appeared effective, as the tag was retained even on the shell fragments of predated animals.

A study on the seasonal variation in meat yield/gonad condition was completed for scallops in the western English Channel. Results indicated a different spawning cycle from scallops in the eastern Channel.

Research continued on possible "daily" shell banding in Pecten.

Cardium edule

Cockle surveys were undertaken in South Wales to assess stocks and advise on the possible recovery of the fishery. Dense populations of survivors of the 1979 spatfall were found in parts of the fishery, though other areas appeared to be becoming unstable. Spatfall in 1980 appeared moderate/poor overall, probably due to a lack of available settlement areas.

Buccinum undatum

Trials were undertaken of possible alternative whelk baits to the traditional herring. Blue whiting, deepwater smelt, mackerel and scad all appeared effective baits.

Ostrea edulis

The oyster industry has maintained a high level of output during the year but sales to mainland Europe were curtailed during the latter months of 1980. This reflected the reaction by Dutch and French growers to new disease problems which have been causing large mortalities on their grounds.

Stock levels of larger sizes of oysters remain good in all fisheries in England and Wales but young oysters are in short supply following several years with poor recruitments.

In several areas attempts to grow hatchery seed to a size suitable for relaying purposes are proving to be economically successful and techniques continue to be developed and refined.

Mercenaria mercenaria

The stock of American hard shelled clam which has become established in Southampton water is being increasingly exploited and studies have been made of the stock levels,

age/size relationships and fecundity of this resource.

Shellfish pests

The distribution of introduced pests such as Sargassum and Urosalpinx has been monitored.

Further work has been carried out on control measures for Ocenebra erinacea.

The legislation for controlling importations of molluscan shellfish destined for relaying in tidal waters of England & Wales has continued to be successful in preventing any introduction of disease.

No further spread of existing shellfish pests was reported in 1980.

2. Scotland

(J. Mason)

MOLLUSCA

Pecten maximus and Chlamys opercularis

Monitoring of the fisheries and assessment of the state of, and effects of fishing on, the principal stocks were maintained. Studies of the settlement and early life history continued. Exploratory fishing was undertaken.

Culture of spat of both species taken on artificial collectors was undertaken. In addition areas were chosen for experimental re-seeding with scallops. Preliminary observations of the sea bed were made using divers and underwater television.

Studies were made of mortalities and local movements of scallops.

Loligo forbesi and Todarodes sagittatus

Landings of both species were monitored, and a study of the biology and distribution of T. sagittatus in Scottish waters was begun.

Oysters (Ostrea edulis and Crassostrea gigas)

Survival, growth and condition of hatchery-reared C. gigas were studied under a variety of conditions.

Pests and diseases of molluscs

Molluscs for import and export have been examined for pests and diseases prior to licensing or certification.

U.S.A.

(Stephen H. Clark¹ and Michael Castagna²)

General

This report summarizes research activities on commercially important mollusk and crustacean species during 1980 by U.S. federal and state agencies and academic institutions.

The Northeast Fisheries Center (NEFC) of the National Marine Fisheries Service (NMFS) participated in six inshore-offshore bottom trawl surveys totalling 141 vessel-days at sea which provided data for shellfish species. Additional surveys were conducted for sea scallops (Placopecten magellanicus), surf clams (Spisula solidissima), ocean quahogs (Arctica islandica), red crabs (Geryon quinquedens), and northern shrimp (Pandalus borealis), totalling 76 vessel days at sea. NEFC personnel also participated in cooperative surveys with Canada to investigate sea scallops and with the USSR to investigate short-finned squid (Illex illecebrosus) and long-finned squid (Loligo pealei). Several state agencies (Maine, Massachusetts, and Rhode Island) conducted inshore bottom trawl surveys in cooperation with the NEFC which provided data on various shellfish species. Additional data were obtained during sea sampling trips aboard commercial vessels in directed shellfish fisheries.

A total of 234 commercial samples were also taken at dockside and 3,213 age determinations were made for surf clams, scallops, and ocean quahogs.

Manned Undersea Research and Technology Program (MURT) personnel initiated a shallow-water undersea research project in cooperation with Rutgers University and the Harbor Branch Foundation (Fort Pierce, FL) to monitor living resources (including key shellfish species) in oil and

gas drilling lease areas on Georges Bank. Detailed inventories of existing shellfish resources in coastal waters were also conducted by several state agencies including those of Rhode Island, New York, New Jersey, North and South Carolina, and Georgia. Several state agencies also actively engaged in the collection of statistical data for shellfish species and/or development and expansion of statistical reporting programs in cooperation with NMFS.

NEFC personnel prepared stock assessment reports for principal shellfish resources of the USA Atlantic coast and also completed numerous other reports and manuscripts dealing with the biology and distribution of commercially important species. Several state agencies also continued stock assessment work and related research. The Shellfish Technical Assistance Program of the Massachusetts Division of Marine Fisheries (DMF) continued to provide aid to municipal officers and industry. The North Carolina Department of Natural Resources and Community Development (DNRCD) completed an environmental assessment of the effects of agricultural freshwater release in estuarine areas.

American Oyster (Crassostrea virginica)

Researchers at Rutgers University continued surveys to determine prevalence and intensity of Minchinia nelsoni (MSX) disease in Delaware Bay and related research on environmental and biological factors contributing to MSX incidence. Studies continued at Rutgers and at the University of Delaware to develop methods of reducing or preventing predation by oyster drills (Urosalpinx cinerea). Agencies within the states of Rhode Island, New Jersey, Delaware, Maryland, and Virginia continued monitoring work and/or surveys to determine the extent of available resources. NEFC researchers evaluated growth and spatset rates in different genetic strains in conjunction with ongoing aquaculture projects. The North Carolina

DNRCD studied mortality, growth, and spatset in areas planted with seed oysters; the South Carolina Wildlife and Marine Resources Department (WMRD) conducted evaluations of mechanical harvesting gear. Researchers at the University of Maryland studied growth and survival of different genetic strains; researchers at the College of William and Mary worked on development of a strain of oysters resistant to the oyster parasite Perkinsus marinus. Investigations of oyster disease organisms and transmission in natural populations were conducted at Cornell and at the University of Houston and were continued by the Delaware Department of Natural Resources (DNR).

Sea Scallop (Placopecten magellanicus)

NEFC personnel completed research vessel surveys (including participation in Canadian surveys) of major scallop grounds and continued stock assessment work and related analyses. An evaluation of size selectivity of the NEFC research survey scallop dredge was completed, and a new dredge was also designed and constructed for use in evaluating gear selectivity and dredge induced mortality during commercial operations. Maine Department of Marine Resources (DMR) personnel continued work on biology and management.

Bay Scallop (Argopecten irradians)

NEFC researchers evaluated growth rates of hatchery-reared scallops transplanted into estuarine areas. Several townships in Massachusetts conducted baseline surveys for development of a management program. The Rhode Island Department of Environmental Management (DEM) continued evaluation of environmental parameters affecting the life cycle of this species; the North Carolina DNRCD continued collection of data for assessment and management purposes.

Calico Scallops (Argopecten gibbus)

The North Carolina DNRC conducted exploratory fishing operations to determine the location and extent of harvestable concentrations off the North Carolina coast.

Hard Clams (Mercenaria mercenaria)

The New York Department of Environmental Conservation (DEC) continued a variety of studies including development of a population index for assessment purposes, exploratory surveys, and monitoring (sanitary surveys) and transplanting (for cleaning prior to harvesting). The State University of New York continued work on biology, ecology, distribution, and fishery population dynamics and completed an annotated bibliography on this species. Studies of the biological effects and sociological implications of alternative harvesting strategies were initiated at the University of North Carolina; researchers at the University of Georgia conducted baseline population dynamics studies to provide information for resource development and management. The University of South Carolina studied the effects of various environmental factors on natural populations; research on genetics and breeding was also conducted by the Virginia Institute of Marine Science (VIMS) and the College of William and Mary.

Ocean Quahog (Arctica islandica)

NEFC personnel conducted stock assessment work and continued age and growth and maturation studies and development and refinement of deepwater hydraulic sampling gear. Researchers at the Woods Hole Oceanographic Institution (WHOI), Yale University, Rutgers University, and the University of Princeton conducted biological studies and age and growth analyses.

Surf Clam (Spisula solidissima)

NEFC personnel conducted stock assessment work, continued aging studies and development and modification of survey gear, and evaluated growth rates of hatchery-reared surf clams transplanted into estuarine areas. Researchers at the University of Maryland-Eastern Shore conducted aging studies.

Short-finned Squid (Illex illecebrosus)

Long-finned Squid (Loligo pealei)

NEFC personnel conducted stock assessment work for both species and joint research with USSR scientists on spawning and distribution of Illex. NEFC personnel also successfully tested equipment for processing (skinning) eviscerated squid.

U.S.S.R.

(B.G. Ivanov)

Molluscs. The mass arrival of squids in the area of Murman was observed for the first time in 1980.

CRUSTACEA

Belgium
(F. Redant)

Crangon crangon

A study on the occurrence of the black spot disease in brown shrimp off the Belgian coast was completed. Different aspects were investigated, e.g. a quantitative analysis of the occurrence of the disease among the shrimp population, the factors influencing its occurrence, the presence of different types of bacteria on the spots and the propagation of the disease under controlled bacterial conditions.

The quantitative study on predation mortality of post-larval brown shrimp by flatfishes (plaice, flounder and dab) was continued. Preliminary results of these investigations indicate that predation-mortality caused by flatfishes is small in comparison to predation mortality caused by some major shrimp predators (e.g. whiting, cod, bib). The results of this study will complete the quantitative consumption-production-model of post-larval brown shrimp.

The monthly analyses of the shrimp stock and of the by-catch of experimental shrimp trawling were continued in 1980. A study on long term interactions between the shrimp population and its competitors and predators was started.

Bi-monthly samplings of the shrimp larvae on an extended sampling-grid were also continued.

Nephrops norvegicus

The sampling of commercial Norway lobster catches were continued in order to obtain data on its catch and population composition. A quantitative study on the influence of demersal predators (cod and whiting) on the Norway lobster in the Central North Sea was completed.

Canada

(G. P. Ennis)

Homarus americanus

Throughout the Maritimes region during 1980, sampling of commercial lobster catches was continued to provide data on size frequency, egg condition, molt-stage, catch-per-unit-effort and by-catch. A Maritimes-wide, voluntary license buy-back scheme is continuing.

In the Gulf of St. Lawrence, 1978-80 sampling and tag return data have been analyzed and a variety of proposals for management put forward. The initiative for an increase in minimum legal size in the northern half of the Gulf is continuing.

In the southwestern Nova Scotia and the Bay of Fundy, analysis of over 30 years of historical data on the Grand Manan and Port Maitland lobster fisheries is progressing, and a number of reports and management options have been generated. The study of lobsters in the Bay of Fundy and off Port Maitland was continued with charter cruises and further tagging. Lobster growth data from the previous years tagging were recorded.

Field studies undertaken by SCUBA divers in southwestern Nova Scotia provided preliminary information on population size-structure and densities of early-stage juvenile lobsters in shallow inshore areas. Field work and sample processing were continued in surveys of fecundity, size at maturity, morphometrics and parasites of lobsters. Analysis of stomach contents from lobsters and Cancer crabs around the coastline of southwestern Nova Scotia is progressing; preliminary results demonstrate a substantial overlap in diet and indicate that lobsters and crabs may compete for limited prey resources.

Offshore lobster commercial logbooks from 1979 were analyzed and 1980 logbooks are being processed. In April/May lobsters were tagged on the intermediate grounds between the traditional inshore and offshore fishing areas; this study was to test the hypothesis that offshore lobsters move shoreward in the spring. Experimental trawl and trapping surveys were carried out on Browns Bank to evaluate trawling as an assessment method for offshore lobsters. An additional trapping survey was undertaken in September/October along two inshore-offshore transects (Seal Island-Browns Bank; Seal Island-Truxton Swell) as part of a study on the seasonal movements and distribution of lobsters and Cancer crabs off southwestern Nova Scotia. Lobster tissue samples taken from around the Maritimes in 1979 are being analyzed by X-ray spectroscopy in an attempt to identify possible stock differences.

Three lobster larval surveys were carried out along a transect from Grand Manan, Bay of Fundy, to the Jordan Basin. Forty-two out of a total of 77 larvae collected, in 317 tows, were taken in the shallows near Grand Manan. All of the Grand Manan larvae were stages I and II, indicating that they originated from local brood stock.

Long-term monitoring of the lobster fishery and studies of various aspects of lobster population biology and dynamics were continued in five localities around the coast of Newfoundland. This included commercial catch sampling, obtaining logs from individual fishermen, collecting tags from previous year's tagging operations, carrying out additional tagging and shell condition sampling. Studies of larval distribution and ecology in a near-shore area were continued. A tag-recapture study of an unfished lobster population around a small island continued.

Pandalus borealis

Monitoring of the Maritimes shrimp fishery and processing of fishermen's logbooks was continued. The fleet continues to exploit the Gulf of St. Lawrence; however, increased effort was directed to the S.E. of Cape Breton Island. CPUE sampling statistics for 1980 are being processed. Analysis of length-weight relationships as a method of age determination has been refined.

Sampling of the Newfoundland based fishery in the northern Gulf of St. Lawrence was continued. Three research surveys were conducted in this area, two in the northern commercial zone, the other covering the whole Gulf. These were designed to determine biomass, distribution, and diel variability in catches.

An intensified observer program in the Labrador shrimp fisheries provided details of catch and catch-per-unit-effort on a monthly basis. A research survey was carried out in the areas during July-August.

Chionoecetes opilio

For the Cape Breton Island inshore snow crab fishery, port and at-sea sampling of commercial catches was continued to provide data on size frequency and moult-stage. Stock assessments carried out for Cape Breton Island, based on sampling data, fishermen's logbooks and tag returns, indicated an overall decline in commercial stock size. While recruitment failures were apparent throughout eastern Cape Breton, above average biomass additions occurred on the west coast. Snow crabs (2,500) were tagged off northwestern Cape Breton to investigate long-term growth and movement. Evaluation trials of a towed underwater camera sled (BRUTIV) and a beam trawl as independent assessment techniques were successful. A study was initiated on the morphological and electrophoretic characteristics of snow crabs from Cape Breton, Newfoundland, and western Gulf of St. Lawrence to determine the possibility of stock interactions.

In the Newfoundland fishery sampling of commercial catches at sea and at processing plants continued. Catch and CPUE data for the various management areas were analyzed and biomass estimates based on 1979 data derived. Extensive tagging studies to determine movement and fishing mortality were conducted. Attempts to develop a tag which will be retained through a molt continued.

Routine sampling for size, shell condition, sex and maturity of snow crabs, from an exploited population in the southwestern Gulf of St. Lawrence, was carried on for the duration of the fishing season both in ports (northern New Brunswick) and at sea, on commercial and research vessels. Logbooks filled by the fishermen were also routinely analyzed. During three research cruises, information on distribution, relative abundance and size structure of the stock was collected, as well as samples of hemolymph and claws for growth studies, and stomachs for feeding studies. A Yankee 36 bottom trawl, devoid of its large rollers, was compared to traps as a sampling tool for stomach contents and smaller size crabs. Approximately 3,000 crabs were tagged in the fall for recovery in 1981. Exploratory surveys were carried out in two different areas along the north shore of the estuary and Gulf of St. Lawrence. Their objectives were to define some biological characteristics of the populations and evaluate their commercial potential.

Cancer irroratus

Laboratory studies indicated that rock crabs, as well as mud crabs and lobsters, are potentially significant predators of oysters. A project on the identification and analysis of spatial and temporal distribution of crab larvae (various species), from samples collected in 1977-78, was completed.

A study on the fecundity and size at maturity of rock crab populations off southwestern Nova Scotia and Bay of Fundy was initiated.

Cancer borealis

Data on Jonah crab abundance and population structure, gathered by offshore trap surveys from southwestern Nova Scotia to Emerald Bank, are being analyzed. Parasites and gut contents of the crabs collected have been identified.

Geryon quinquedens

A trap survey along the edge of the Scotian Shelf between Browns and Emerald Banks provided red crab population size structure and biomass estimates. Red crabs were encountered in high density patches between 180-730 m. Crabs have been analyzed for parasites and gut contents.

MARINE PLANTS

Chondrus crispus

Historic data for the single most important dragrake district in the southern Gulf of St. Lawrence, landings, price paid kg^{-1} , CPUE, and effort data, were analyzed by regression analysis and correlation coefficients. The data suggest that fluctuations in annual landings are a function of abundance. Various environmental parameters as well as harvesting pressure are being monitored to determine the major variables controlling standing crop. Harvesting technology studies have shown that minor modifications to the traditional harvesting technique can have significant ($P < 0.05$) effects on both harvest yield and ecological impact. Similar studies are being carried out in the handraked harvest off southwestern Nova Scotia.

Laminaria longicuris

A feasibility study is underway to assess remote sensing as a stock assessment tool in southwestern Nova Scotia. The standing crop has been estimated in the past at 100,000 wet MT to 900,000 wet MT. Population studies both before and after harvesting have been carried out to determine the effects of both dragraking and selective removal on recruitment.

Multispecies studies

A study was initiated to quantify the value of macroalgae to commercial finfish and shellfish along Nova Scotia's Atlantic coast. The ultimate objective is to give resource management advice on the interrelationship of nearshore commercial species.

Denmark

(S. Munch-Petersen)

The investigations on the by-catch in the Danish Nephrops fishery were continued in 1980.

Greenland Waters (E. Smidt)

Pandalus borealis

Research on the West Greenland stocks was continued. Catch-effort data were obtained from commercial trawlers, and monthly samples were taken from off-shore trawlers in order to get information on diurnal variation in composition of the catches.

In the off-shore East Greenland area observations were made and samples were taken onboard commercial trawlers.

Federal Republic of Germany

(K. Tiews)

Crangon crangon

Long-term investigations by the Institut für Küsten- und Binnenfischerei to assess the shares of undersized protected fish species in the catch of the German brown shrimp fishery were continued. This research work also takes in account the fluctuations in the abundance of fish species found on the shrimp fishing grounds.

Assessment work on the dynamics of brown shrimp populations along the German North Sea coast went on, as well as a study on the predator-prey relationship in the Crangon fishery.

Co-operative young fish and brown shrimp surveys in the Wadden areas of Belgium, the Netherlands and the Federal Republic of Germany were continued.

Programme 1981- Crangon crangon

Analyses of brown shrimp catch samples by species and length will be continued by the Institut für Küsten- und Binnenfischerei, as well as the co-operative young fish and brown shrimp survey in the Wadden areas of Belgium, the Netherlands and the Federal Republic of Germany.

France

(J. Audouin)

Une étude de l'évolution de la pêcherie bretonne (araignées - tourteaux - homards) depuis 10 ans a été réalisée (C.O.R.P.E.CUM). Elle porte principalement sur l'évaluation des captures et de l'effort de pêche et comporte une analyse détaillée des flotilles et de leur évolution technologique.

Cancer pagurus

La biologie du tourteau sur la côte de Bretagne Sud est en cours d'étude (croissance, reproduction et migration). Des échantillonnages y sont régulièrement réalisés à bord de bateaux de pêche professionnels (ISTPM). Les apports sont voisins de 12000 Tonnes. Des expériences tendant à l'amélioration des techniques de marquage ont été entreprises (ISTPM).

Maia squinado

Lors des campagnes d'évaluation des stocks de coquilles Saint Jacques en Baie de Saint Brieuc, des observations sont systématiquement faites sur les araignées de mer juvéniles. Il reste à déterminer si une relation peut être établie dans cette région entre la densité de juvéniles observés sur cette importante nurserie et le stock d'adultes ultérieurement exploité (ISTPM).

Homarus gammarus

Des marquages de juvéniles hors-taille ont été faits sur la côte ouest du Cotentin (Comité Local des Pêches Maritimes de Granville) dans le but d'étudier leurs déplacements. Des expériences sur les habitats artificiels ont été entreprises. Les techniques de marquage des jeunes crustacés font l'objet d'expérimentations basées sur l'utilisation de marques miniaturisées (ISTPM - APASUB). Les études sur le comportement des juvéniles en milieu semi-ouvert se sont poursuivies (APASUB).

Les opérations de repeuplement des zones cotières ont porté sur l'immersion de post-larves produites en écloserie (165 000 provenant de l'Écloserie de l'Île d'Yeu et 100 000 de celle de Houat).

Des échantillonnages ont été réalisés lors de prospections faites à bord d'un bateau de pêche dans le secteur de l'Île d'Yeu en Mai 1980 (N = 1176 - ISTPM - ARFAC). Le contrôle des apports a été poursuivi dans différents secteurs (Le Conquet et l'Île d'Yeu - ISTPM).

Nephrops norvegicus

- Travaux de l'ISTPM

1 - Étude des pêcheries de langoustine -

a) Golfe de Gascogne (VIIIa) :

Une synthèse des études précédentes a été réalisée. Elle a montré :

- la nécessité de poursuivre, selon les recommandations du Groupe de Travail l'étude des paramètres biologiques de la langoustine,

- à partir des statistiques de débarquements de deux ports, que l'application des modèles de production telle qu'elle a été faite est délicate et demande une localisation plus précise de la provenance des débarquements et de l'effort. Une révision des évaluations est projetée.

b) Plateau Celtique (VII g et nord du VII h) :

Un programme d'échantillonnage a été mis en place. 24 sorties de douze jours ont été effectuées en 1980. Ces échantillonnages ont été effectués systématiquement sur la langoustine et les espèces accessoires. Un

premier bilan a permis de montrer (Irish Sea and Bristol Channel, W.G. 1980) que le nombre d'immatures de sole, plie, églefín, morue et merlan était inférieur à deux pour cent dans les captures.

2 - Sélectivité des chaluts dans la pêche de la langoustine -

Le facteur de sélectivité des chaluts français actuels dans la pêche de la langoustine est de 0.5 pour une pêche accessoire de 70 kg. Cinq expériences à bord d'un bateau scientifique ont été réalisées dans le Golfe de Gascogne. Elles ont permis de montrer que trois éléments influent sur les variations du facteur de sélectivité :

- le poids de la pêche accessoire,
- la largeur du fond du chalut,
- la vitesse de chalutage.

Une série d'expériences est actuellement en cours pour vérifier ces résultats à bord des bateaux commerciaux.

- Travaux du CNEXO - COB

Un programme ISTPM-CNEXO a été mis en place pour le Plateau Celtique (cf. paragraphe 1.b ci-dessus).

Les travaux d'échantillonnages de routine exposés en 1979 se sont poursuivis en 1980 suivant la même méthode.

Le modèle de rendement et de fécondité par recrue mis au point et adapté au cycle biologique de la langoustine a été amélioré en 1980.

Crevettes

Une exploration systématique du plateau guyanais a été entreprise à bord d'un navire japonais depuis l'automne 1980 dans le cadre d'un accord franco-japonais par la Japan Marine Fishery Resource Research Center. Cette étude suivie (ISTPM) doit se poursuivre jusqu'en Mars 1982 et aboutir à un inventaire des ressources en crustacés (crevettes pénéides) de ce secteur.

Algues

Des recherches sur les possibilités d'accroître les peuplements d'algues exploitables par substitution d'espèces ont été entreprises (ISTPM). Contrairement à ce qu'on supposait, la destruction des populations de Laminaria hyperborea n'est pas un moyen d'accroître les ressources en laminaires utilisables par les usines d'extraction.

Iceland

(U.Skuladottir-H.Eiriksson)

Pandalus borealis

Research was carried out along the same lines as before. Offshore fisheries have increased somewhat from 1979 to 1980. At times there have been juvenile shrimps in great proportions in some infjord areas. In order to get rid of these in the catches, several experiments with changes in gear have been carried out. In this special attention has been paid to increasing the slack in the netting of the sidepanels of the shrimptrawl (see the administrative report of the Fish Capture Committee 1980). Experiments along similar lines will be carried out in 1981. During 1981 tagging may be attempted again on a small scale if a suitable tag can be obtained. The purpose is to detect migrations if there are any. Apart from this research will be similar as before.

Nephrops norvegicus

Two research vessel surveys were carried out during the fishing season (May-July). The surveys included routine sampling of the catch in different fishing areas as well as measurements of sea temperatures and transparencies.

Catch rates of Nephrops in 1980 were the highest recorded since 1971 averaging 45.5 kg per trawling hour overall in the Nephrops fishery as against 33.6 kg in 1979 and 40.0 kg in 1978. This is related to good recruitment as well as favourable sea conditions for catching this species.

In 1981 work will continue along similar lines with added emphasis on studying factors affecting the catchability of Nephrops.

Ireland

(J.P.Hillie)

Homarus gammarus

During the summer, an investigation was conducted into the incidence of Gaffkaemia the causative agent of which disease, Aerococcus viridens var. homari enters the bloodstream through wounds caused by bad handling, including the "pegging" of claws for holding

purposes. severe mortality of stock in holding ponds frequently ensuing. 162 blood samples and 12 water samples from 6 ponds were examined in addition to blood smears from dead lobsters.

Nephrops norvegicus

Over 3,600 Nephrops in five samples were examined for length-frequency in the commercial catch during the year and in three cases, discards (ca. 1,500 specimens in all) and rejected cephalothoraces of Nephrops landed as "tails" (ca. 1,000) were examined to assess the pattern of discarding in the fishery. Length-frequency of whiting in the by-catch caught, landed, and discarded were also examined. Biometric studies to investigate maturity in both sexes of Nephrops were undertaken on a moderate scale.

Netherlands

(R. Boddeke).

Crangon crangon

Biological cycle

During this year extensive research was carried out on the quantitative distribution of male and female shrimps in Dutch offshore and inshore areas, in April-June and August-September. The results of histological investigations of the gonads of Crangon crangon to determine the relationship between the stage of development of the gonad and certain external characteristics used to distinguish between males and females which were carried out earlier, were used as a basis of this study. Significant differences proved to exist between the sex ratios in inshore and offshore areas that correspond well with data on migration, reproduction and growth.

Stock assessment

The usual extensive brown shrimp surveys were carried out in April and September-October along the coast of the Netherlands and in adjacent regions in cooperation with fisheries institutes in Belgium and the Federal Republic of Germany. Further calculations on the relation between CPUE data of the commercial fleet and density estimates derived from research vessel catches, showed a high measure of correlation for the entire coastal zone of the Netherlands although the relation differs in Waddensea, Zealand inshore waters and the offshore area. For this reason, CPUE data form a reliable basis for calculations on the relationship between stock (production of ripe eggs) and recruitment (catches of consumption shrimps for the different brown shrimp populations in the Dutch coastal area. This study in which also the great difference between winter and summer eggs of this species will be taken into account, will be finished in 1981.

Penaeid shrimps

Research on the biological differences between groups of Penaeids continued but was concentrated on the striped species, P. japonicus and P. kerathurus. Biological characteristics of these species show a great measure of similarity, distinguishing these species clearly both the groups of "white" and "brown" Penaeids.

Norway

(K. R. Gundersen)

Homarus gammarus

Lobster investigations were carried out in the field mainly on the same scale as in previous years with fishing experiments in the tagging areas in the Skerries north and south of Bergen.

Data of increasing in length during moult of untagged lobster in aquaria were obtained during the year, and growing of lobster from hatched larvae in aquaria to market size were continued.

Cancer pagurus

Fishing experiments on the same place in Bergen harbour with the same type of equipment were made from January to May and from September to the end of December.

Nephrops norvegicus

Fishing experiments with different types of pots were continued on the west coast.

Poland

(Reporting on Mollusca only).

Portugal

(A. Cascalho - J.C. de Ataíde)

Instituto Nacional de Investigaçao das Pescas - Lisboa

- Nephrops norvegicus was sampled for maturity and fecundity studies, from Cascais commercial landings (M.J. Figueiredo).
- Regular sampling has been made on Nephrops norvegicus in Cascais and Olhão, including sex determination and cephalothorax length measurements (A. Cascalho).

- Three exploratory fishing surveys have been made on the south Portuguese coast by two research vessels in order to obtain some information about Nephrops norvegicus biology (A. Cascalho).

Faculdade de Ciências da Universidade de Lisboa

- Decapod Crustaceans Systematics (A. M. Neves).
- Amphipoda from the Portuguese coast (Peniche and Lagoa de Óbidos), (J. C. Sousa Marques).

Instituto de Ciências Biomédicas "Abel Salazar", Universidade do Porto

- The fine structure of the spermatozoon of Polliceps cornucopia (Crustacea, Cirripedia) (C.J.C. Azevedo, C. Faria, I. Corral).

Spain

(H. Quiroga)

Norway lobster, Nephrops norvegicus : Populations along the Galician coast are being studied. During 1980 there were two research cruises and samplings on board of commercial ships and in ports.

Velvet swimming crab, Macropipus puber : The Ria of Arosa population of this commercially very important crab, which is heavily exploited, is being studied.

General : The Crustacea community living on the cultured mussels is being studied.

Sweden

(B. I. Dybern)

Nephrops norvegicus : No research activity during 1980.

Pandalus borealis : Continued collection of daily reports on shrimp and fish catches from a number of shrimp trawlers. Calculation of catch /effort.

Homarus vulgaris : Collection of daily reports from lobster fishermen. Measurements of lobsters from different regions to estimate average length, distribution of males and females, number of berried females, etc.

Trials with different escape openings. Studies of the behaviour of lobsters when entering and escaping.

Cancer pagurus

Compilations of results from research during previous years, especially migrations. Continuation of collecting fishermen's reports.

United Kingdom

(E. Edwards - J. Mason)

England and Wales

Nephrops

Observations were made aboard commercial vessels in the Irish Sea to record catch, landings and discards of Nephrops by quantity and size and sex composition. Fish bycatches were also recorded. A survey of the Irish Sea and the North Sea stocks was carried out by research vessel, together with mesh selection studies. Damage to and survival of discarded Nephrops was observed on commercial and research vessels. Trials of various designs of possible persistent tags have shown that while larger (> 35mm CL) Nephrops survive reasonably well, smaller ones show a high tagging mortality.

Lobsters (Homarus gammarus)

Larval studies have shown a concentration at the surface at dusk and dawn with catches from a 1/2h tow of a 2 m wide net of up to 79 larvae. At other times and depths abundance is very low making sampling extremely difficult. A comparison of the fecundity and size at maturity has been made between two contrasting geographical sampling sites. Following an increase in imports of Homarus americanus and outbreaks of gaffkaemia, sampling of imports has been done and control measures considered. Consultation with the fishing industry continues over the proposal to increase the minimum landing size.

Spider crab (Maia squinado)

Contact with this developing fishery has been maintained with the collection of catch-effort statistics and size composition sampling. Management measures are under consideration. Results from the 1978 tagging experiments show movements of over 50 km in the English Channel.

Shrimps (Pandalus montagui/Crangon crangon)

Comparisons were made between unimesh beam trawls of 10, 16, 20, and 24 mm mesh to determine selectivity.

Other Crustacean Fisheries

The fisheries for edible crab (Cancer pagurus), crawfish (Palinurus elephas) and deepwater shrimp (Pandalus borealis) were monitored.

Scotland

Homarus gammarus

Commercial landings of lobsters were sampled in all of the main fishing areas. Catch and fishing effort data were supplied by selected skippers. Tagging experiments were undertaken in the Outer Hebrides and East Fife fisheries using capture-recapture techniques. Five yearly mean recruitment trends in the Berwickshire fishery were analysed in relation to the biomass of the female spawning stock over the period 1955-79. Native stocks and imported lobsters have been examined for gaffkaemia.

Cancer pagurus

Commercial landings were sampled in the main fisheries.

Investigations were undertaken into the mechanisms by which Bruchdreifachbildungen and other limb abnormalities arise in this and other commercial species of decapod crustacean.

Geryon affinis

A small amount of additional exploratory fishing for this species of crab confirmed its presence on Rosemary Bank, the Ymir Ridge and both sides of the Wyville-Thomson Ridge.

Nephrops norvegicus

Sampling of commercial trawl catches continued in most fishing areas and sampling of a creel fishery was started. Studies of growth were undertaken in three areas by tagging and by keeping in cages animals which were close to the moult.

Preliminary trials were conducted with television and photographic cameras mounted on a sledge with a view to surveying some Nephrops grounds on the west coast.

The distribution and survival of Nephrops was studied in relation to dumping of industrial waste in a part of the Moray Firth.

Pandalid shrimps

Monitoring of the commercial fishery for Pandalus borealis in the North Sea continued. Exploratory fishing for Dichelopandalus bonnieri was conducted off the west coast of the Scottish mainland and south of St Kilda.

Crangon crangon

The Solway Firth fishery continued to be monitored.

U.S.A

(S.H.Clark)

Northern Shrimp (Pandalus borealis)

The Northern Shrimp Technical Committee³ completed an assessment of the Gulf of Maine northern shrimp stock; the Maine DMR completed studies on population age structure, growth and mortality rates, and continued research on environmental factors affecting recruitment and trends in abundance. NEFC personnel evaluated catchability of different sampling gears and studied diel variation in catch rates.

Brown, White, and Pink Shrimp (Penaeus spp.)

Personnel from the Southeast Fisheries Center (SEFC) and several Gulf coastal states conducted biology and stock identification studies and evaluated growth and mortality rates for Gulf of Mexico populations. The SEFC also analyzed mark-recapture data, continued gear evaluation studies to develop selective shrimp trawling gear (designed to reduce incidental

³The Northern Shrimp Technical Committee is a joint organization of state and federal scientists which is responsible for research and assessment work

capture and mortality of sea turtles) and initiated studies to evaluate the impact of brine disposal on shrimp stocks off Texas and Louisiana. A workshop on the "Scientific Basis for the Management of Penaeid Shrimp Stocks" is scheduled for November in Key West, Florida. The North Carolina DNRC conducted intensive sampling in estuarine areas to monitor trends in abundance and to provide baseline data for management; the South Carolina WMRD monitored distribution and relative abundance and conducted (recreational) gear selectivity studies, and the Georgia DNR conducted sampling to delineate estuarine nursery areas, to monitor trends in abundance, and to assess seasonal and geographic distribution (including postlarval shrimp). The Georgia DNR also conducted mark-recapture studies to investigate movements, seasonal distribution, and growth rates and initiated development of predictive harvesting models for management purposes. Development of an automatic shrimp deheading system was initiated at Clemson University. The University of North Carolina and Louisiana State University evaluated alternative management strategies for inshore penaeid shrimp fisheries.

Spiny Lobster (Panulirus argus)

The Georgia DNR conducted baseline studies to identify and assess spiny lobster resources off the Georgia coast.

American Lobster (Homarus americanus)

The Maine DMR continued surveys of the commercial fishery, stock assessment, and evaluation of biological parameters. Studies on nutritional requirements continued at WHOI. Connecticut Department of Environmental Protection (DEP) and Rhode Island personnel continued collection of catch-effort data; the New York DEC completed studies on movements, growth, and mortality rates in western Long Island Sound. NEFC personnel conducted

assessment work for offshore populations. The Lobster Plan Development Team⁴ continued collection of data and analyses for inclusion in a new Fishery Management Plan.

Blue Crab (Callinectes sapidus)

The North Carolina DNRCD and the South Carolina WMRD conducted sampling to monitor trends in abundance and to evaluate movements; the South Carolina WMRD also conducted gear evaluation studies. The Georgia DMR conducted sampling to delineate estuarine nursery areas, to monitor trends in abundance and to assess seasonal and geographic distribution patterns.

Jonah Crab (Cancer borealis)

The Maine DNR conducted a variety of biological and management-related research projects on this species, and the Rhode Island DEM conducted studies to evaluate growth, mortality, population size/sex composition and commercial catch rates.

Red Crab (Geryon quinquedens)

NEFC personnel continued studies of the biology and distribution of red crabs and examination of catch-effort trends in commercial data:

⁴The Lobster Plan Development Team consists of state and federal scientists working jointly under the coordination of the New England Regional Fishery Management Council.

U.S.S.R.
(B.G. Ivanov)

In May-June scientists of the Polar Research Institute of Marine Fisheries and Oceanography (PINRO) and Northern Fish Scouting Administration (Sevrybpromrazvedka) assessed deep water prawn (Pandalus borealis) stocks in the Barents Sea on vessels "Gemma" and "Novoiljinsk" by trawl survey and underwater photography. The biomass of deep water prawn was estimated in different areas of the Barents Sea and adjacent waters. Data on size, sex composition and on fecundity were collected. The peculiarities of larval drift were studied.