

P l a n k t o n C o m m i t t e e

By J.H. FRASER

1967

Belgium

(E. Leloup)

Ostende. Examen qualitatif et quantitatif du phytoplancton; détermination quantitative des substances nutritives dissoutes dans l'eau (ammoniaque, nitrites, nitrates, silicates. 1. Bassin de **Chasse**: une fois par quinzaine. 2. Bassin du Commerce: une fois par semaine.

Canada

(L.M. Dickie)

Canada has no plankton research programme in the ICES area but two general studies of interest to the Council have been further developed during 1967. Both are echo-system studies being conducted by the Fisheries Research Board of Canada, and include hydrography and plankton benthos and fish population biomass and productivity measurements. One is carried out in the Georgia Straits, east of Vancouver Island on the coast of British Columbia. The other is carried out in St. Margaret's Bay on the south coast of Nova Scotia near Halifax. Both projects are being conducted in close association with the International Biological Programme, and have as their object the study of variability of phytoplankton and zooplankton in relation to water masses, and an assessment of the use that is made of this basic production by higher trophic levels, especially fish.

Denmark

(Vagn Kr. Hansen)

1. Grønlands Fiskeriundersøgelser

West Greenland

Report for 1967

The observations at sea were kept at a minimum because of limited sailing possibilities.

Programme for 1968

The new research vessel "Adolf Jensen" has now been put into commission.

In April, May and July four E.W. sections will be operated each month. Observations: hydrography; distribution of eggs and larvae of cod, halibut, Greenland halibut, redfish and wolf-fish.

Regular observations will be made at the permanent station at the entrance of Godthåb Fjord.

2. Danmarks Fiskeri- og Havundersøgelser

Report for 1967

<sup>14</sup>C Kattegat: Bi-monthly measurements of the primary production (by the method) and sampling of zooplankton by 8 litre water bottles were continued from the Danish lightvessels Anholt Nord, Aalborg Bugt and Halsskov Rev. Through co-operation with the 'Zool. Institutionen', Göteborg University, the Swedish lightvessel Fladen Grund has been incorporated in these investigations from December 1966, and will continue till April 1968.

Programme for 1968

Kattegat: The bi-monthly plankton observations made from the Danish lightships will be continued.

North Sea: In the southern North Sea sampling of zooplankton by 8 litre and 25 litre water bottles will be made in May as a part of the planned investigation on diurnal variations in the catchability and rate of feeding of sandeel, sprat etc. in relation to the tide.

France

(M-L. Furnestin)

I. Travaux de l'Institut des Pêches Maritimes. Laboratoires de Paris et de La Rochelle.

Poursuite de l'étude de prélèvements saisonniers de zooplancton (années 1965-1966) entre la Bretagne et la côte nord de l'Espagne: 1) analyses volumétriques 2) inventaire des oeufs et larves de poissons (présentation à Hambourg de l'étude descriptive et écologique d'une trentaine d'espèces) 3) étude particulière des oeufs et larves de Sardine (présentée à Hambourg) 4) étude des communautés planctoniques dans le Golfe de Gascogne (communication à Hambourg sur le peuplement planctonique du plateau continental).

Programme pour 1968

- Poursuite des analyses volumétriques et de l'examen de l'ichthyoplancton sur les prélèvements de 1967 et 1968 (identification, étude de quantitative et relations avec les conditions hydrologiques). Etude immédiate des oeufs et larves de Sardine dans leurs rapports avec le milieu et la pêche.
- Extension à la zone du large de l'étude des peuplements zooplanctoniques du Golfe de Gascogne: Chaetognathes, Méduses, Salpes et Dolioles, Siphonophores.

II. Travaux des Laboratoires conchylicoles de l'I.S.T.P.M.

Les travaux ont concerné, comme les années précédentes:

- les larves des mollusques comestibles dans les centres de captage;
- les fluctuations des populations microplanctoniques des estuaires et des claires. Un mémoire a été rédigé sur le "Microplancton des rivières de Morlaix et de Penzé" (G. Paulmier);
- Le verdissement des huîtres. Les résultats ont été publiés dans Rev.Trav. Inst.Pêches marit., 31(4), p. 373-82 "Recherches préliminaires sur le verdissement des huîtres en claires: l'évolution de leurs divers pigments liée au complexe pigmentaire de Navicula ostrearia BORY" (J. Moreau).

Les recherches porteront sur les mêmes sujets en 1968.

III. Travaux du Laboratoire de Biologie animale (Plancton).

Faculté des Sciences. Marseille.

Etudes de méthodologie: Utilisation des données volumétriques dans l'évaluation de la biomasse planctonique (compte-rendu à Hambourg).

Recherches écologiques et biogéographiques 1) sur les Chaetognathes des campagnes danoises dans l'Atlantique nord 2) sur le plancton profond du Golfe de Gascogne (comptes-rendus à Hambourg).



Programme pour 1968

- Sur le thème proposé par le Conseil International: "Upwelling", étude du plancton d'une zone de remontée sur la bordure cantabrique.
- Rapport sur le plancton du plateau continental N.O. africain (connaissances actuelles et orientations à donner aux recherches), en vue du Symposium sur les Ressources vivantes du plateau continental atlantique africain de Détroit de Gibraltar au Cap Vert (Ténériffe, mars 1968).

Ireland

(F.A. Gibson)

No data relating to plankton were collected during 1967.

Netherlands

(P. Korringa)

In reports to the Demersal Fish (North) Committee and to the Pelagic Fish (North) Committee plankton work carried out by the Netherlands on the distribution and quantity of eggs and larvae of fish has been recorded.

Periodical observations in the coastal water of IJmuiden to detect plankton blooms which could lead to adverse conditions for fish and shellfish were continued in 1967.

Norway

University of Oslo (T. Braarud)

I. Phytoplankton surveys

- a) Trondheimsfjord. The all-year quantitative survey started in 1963 is being extended to include also 1965. (E. Sakshaug)
- b) The survey of phytoplankton populations at great depths on material collected at weather ships A and M was continued. Weekly samples from the upper layers were collected at M during the spring development. (P. Brettum).
- c) A study of the annual phytoplankton cycle in Nordfjord was started. (K. Starheim).
- d) A study of the vertical phytoplankton distribution in an area with very pronounced halocline was undertaken in Hardangerfjord and in Nordåsvatn. (U. Lillemoen).
- e) A monthly quantitative phytoplankton survey of the Skagerrak was started. (C. Almnes).

II. Special phytoplankton studies

- a) Taxonomic studies with the use of electron microscopy have been continued, on coccolithophorids (K.R. Gaarder) and diatoms (G.R. Hasle and B.R. Heimdal).
- b) A report has been prepared on the occurrence of "brown water" in the coastal waters of Southern Norway. (T. Braarud and B.R. Heimdal).
- c) The survey of nanno-phytoflagellates in Norwegian waters by means of cultures and dilution technique has been continued. (J. Throndsen).
- d) Experimental work has been carried out on Euglena cf. proxima, a H<sub>2</sub>S-tolerant marine species. (E. Paasche).

III. Zooplankton

- a) Studies on the ecology of planktonic larvae of bottom invertebrates in the Oslofjord were continued. (T. Schram).
- b) Preparation of a report on the Oslofjord zooplankton as related to pollution and water transport was completed. (Beyer, Dybwad & Versvik).
- c) Studies on the hydrography, zooplankton, and zoobenthos of a heavily polluted basin in the Oslofjord were continued. (T. Andersen and B. Braaten).

d) Studies on the local stock of Aglantha digitale in the Oslofjord were commenced. (O. Smedstad).

e) A paper on the zooplankton, zoobenthos, and bottom sediments in the Oslofjord was presented at the International Symposium, Heligoland, 1967.

Institute of Marine Research, Bergen (G. Berge)

### Phytoplankton

1. In a study of seasonal and annual variations in the offset and intensity of the phytoplankton development, recordings of turbidity were performed with the continuous recording transparencymeter on board R.V. "G.O. Sars" and "Johan Hjort". The following areas were surveyed:

Coastal waters from Stad - Torsvåg 30. March - 14. April

Norwegian Sea and coastal banks 22. May - 28. June

2. As part of a programme "Recruitment mechanism of Herring and Cod" chlorophyll measurements were undertaken in the coastal waters of Western Norway, together with optical measurements, transparency recordings, and sampling for taxonomic analyses of phytoplankton. Simultaneously samples were collected from a drift station and from a surveying research vessel in the area between Stad and Torsvåg from 8. March - 12. May.

3. A celloscope was used in the counting and volume determination of phytoplankton. In co-operation with a technical institute a further development of the celloscope was made in order to count organisms and particles up to 3 mm in size.

### Zooplankton

Sampling was continued at the permanent oceanographical stations along the Norwegian coast. Plankton was on an average less abundant than in 1966, but single samples taken in June and July were fairly large. At station "M" the variation of plankton volumes during the year followed the normal trend. Some salps were taken at "M" in October.

Samples of zooplankton, fish eggs and larvae collected during cruises for studying the spawning and larval abundance of herring and cod in Norwegian waters will be mentioned in connection with these species.

Commercial fishery for zooplankton on a minor scale is carried out with surface nets in some Norwegian fjords during May and June. The plankton is mainly used as food for rainbow trout and salmon in fish farms.

In August-September experimental fishing with a small surface trawl in fjords near Bergen yielded only small quantities of plankton.

### Krill (Euphausiids)

During cruises with R.V. "Peder Rønnestad" in the fjords north and south of Bergen once a month from January to June and in October, and in some fjords in North Norway in May, horizontal hauls were made with an Isaacs-Kidd 3' pelagic trawl at various levels from the surface to 300 m, both day and night. Species of Atlantic origin, new to the Norwegian fauna, e.g. Thysanopoda acutifrons, Stylocheiron maximum, Nematoscelis megalops, were found to have permanent populations in the deeper layers of the fjords.

In March-April, commercial fishery for krill with projectors and dip nets yielded 2,000 kg.

### Poland

(W. Mańkowski)

#### 1. Baltic Sea

In 1967 plankton sampling in the area from the Arkona Deep to the Gdańsk Deep was started in connection with the International Biological Programme.



The investigations were intensified by an increase in number of stations and by the extension of the programme. The phytoplankton has been studied as the primary production. Additional examinations were carried out simultaneously as given below:

Method	<sup>14</sup> C	Chlorophyll	pH	Alkalinity	Light intensity
Number of observations	106	102	57	58	39

The net plankton was collected:

Sampling method by	Hensen net	Standard net	Nansen net	Apstein net	Water samples
Number of samples	903	328	112	281	576

Plankton samples, taken by Hensen net, were segregated into micro-, macro- and ichthyoplankton.

The quantitative micro-plankton estimation was confined to volume determination.

Other estimations concerning the quantity of the wet and dry mass are still being carried out.

The collections of macro- and ichthyoplankton are being used to estimate the vertical distribution within a yearly cycle and the daily vertical migrations of particular species.

The samples collected by the standard Copenhagen net, and from water-bottle samples are used for qualitative and quantitative determinations of the phytoplankton with the inverted Untermohl microscope.

## 2. Firth of Szczecin

The systematic assessment of production and plankton development in this area was continued with respect to its dependence upon the variable conditions of the environment.

For this purpose 74 samples of plankton from 3 routine stations were taken fortnightly from March till November and analysed with respect to seasonal changes and biomass quantity.

## 3. North Sea

In July samples of plankton were taken in the western part of the North Sea and in the southern area of the Irish Sea.

In autumn (September-October) some observations were made in the western part only of the North Sea.

Plankton samples were collected using various nets according to the purposes of sampling.

The number of samples taken in vertical hauls by different nets were:

Hensen net	184
International Copenhagen net	121
Ring trawl (210 cm diam.)	44

The collected plankton material has so far been analysed only for occurrence of the fish eggs and larvae.

## 4. NW Atlantic

During the autumn (October-November) 259 semi-quantitative samples were collected.

## 5. Shelf of NW Africa

In July 55 samples were taken by the Hensen net. The investigations concerned:

- a) the estimation of the zooplankton biomass in accordance with the latitude, depth, and other physical and chemical factors of the environment.
- b) the distribution of the fish eggs and larvae.

In 1968 the regions mentioned above will be further investigated to give data on the occurrence and quantitative composition of the plankton and the distribution of the eggs and larvae of commercial fish.

### Portugal

(H. Vilela)

During 1967 the study of the copepods collected by the vessel "Faial" off the Portuguese coast was continued. To enable their identification to be completed the study of the fish larvae was deferred and work is expected to begin on this off the Portuguese south coast.

### Sweden

(A. Lindquist, A. Svansson, H. Ackefors)

All the samples from the Skagerrak-Kattegat area containing fish eggs and larvae during the months February, May and June, collected in different years, have been worked up. Plankton samples have been taken with a Nansen net in connection with hydrographical investigations in the Baltic proper. The samples have been taken in 12 different stations spread out over the whole area. The net hauls have been taken between 25-0 m, 50-25 m, 100-50 m, 150-100 m, 200-150 m, 300-200 m, 400-300m, 460-400 m.

Measurements of the primary production with  $^{14}\text{C}$  have been made twice a month from the lightvessels Finngrundet and Hävringe in the Baltic. The measurements from Hävringe were discontinued 1st December 1967 when the light vessel was replaced by an automatic lighthouse.

### United Kingdom

#### 1. England & Wales

No information.

#### 2. Scotland

##### Aberdeen (J.H. Fraser)

Preliminary surveys of the environmental conditions on Rockall Bank were made in May, June/July and September 1967 as part of a programme to assess the stocks of Micromesistius (Gadus) poutassou. Surveys of the conditions in the channel between Rockall and Scotland were also made at these times and in April when samples were taken at Porcupine Bank. Coastal plankton west of Scotland was investigated in January, June/July and November; in the region of Fair Isle, Orkney and the Moray Firth in April, May, June and September; in the central northern North Sea in March, May, June and September; in the Norwegian Deep in May and June and to a very limited extent in the North Sea south of 57°N in March. A limited survey was also made in Faroese waters in October.

Zooplankton sampling methods included the Gulf III, 1 metre nets and the new International W.P.3 net. The International Standard Fine net and sedimentation method was used for phytoplankton and the Icelandic High Speed Sampler in connection with pollution surveys.

Work at Aberdeen in 1967 was on the following lines:-

- a) Plankton and its relation to the general environment and the fisheries (zooplankton J.H. Fraser, phytoplankton D.D. Seaton).



- b) Routine collections of zooplankton standing crop data (biomass and dry weight) from the northern North Sea and west coast waters (J.A. Adams).
- c) Herring-plankton relationships in the northern North Sea (J.A. Adams).
- d) Plankton of the Rockall Bank area (D.D. Seaton).
- e) Population studies of euphausiids. A seven year project on the euphausiids of the North Sea and adjacent waters was completed during 1967 and is now being prepared for publication (J.A. Adams).
- f) Factors associated with the use of the Gulf III - in particular the evaluation of the volume of water filtered (J.A. Adams).
- g) Food of predatory species, especially Pleurobrachia (J.H. Fraser).
- h) Studies of plankton populations of inshore lochs (N.T. Nicoll).
- i) In support of C.Res.1966/4:14, autumn spawned herring larvae were intensively sampled in the area 57°N, 59°30'N - 0° and 4°W in September (A. Saville).
- j) Plankton associated with pollution in general (J.A. Adams) and by pulp mills (J.H. Fraser).

Investigations on the hormones of phytoplankton were not continued in 1967.

#### Programme for 1968

Work on the environmental conditions at Rockall will be further emphasised in 1968. Other investigations will continue on similar lines to 1967.

#### Edinburgh (R.S. Glover)

The ecological survey of the plankton of the North Atlantic Ocean and the North Sea, using Plankton Recorders towed by merchant ships and weather ships, was continued in 1967 as in previous years. Plankton recorders were towed for 117,200 miles by 13 merchant ships, 7 European weather ships and 11 U.S. Coastguard Cutters.

The research programme remains essentially the same as before, including (a) the preparation of an atlas of the plankton showing the distribution of over 200 species (b) annual and seasonal fluctuations of the abundance and distribution of the plankton in relation to physical parameters of the environment and changes in the fisheries, (c) studies of intra-specific populations of copepods, euphausiids, diatoms and dinoflagellates. During the year preliminary assessments of biomass were made by conversion of the counts of abundance.

Work is progressing on the design of an oceanographic recorder which will undulate vertically between 10 and 75 or 100 metres. Successful experimental tows have been made with a prototype carrying a data logger with sensors for temperature and depth as well as a continuous plankton sampler.

The survey of the plankton and the herring was continued off the north-east coast of Scotland.

U.S.S.R.

(S.G. Fedorov)

In 1967 data were collected on the qualitative and quantitative distribution of phytoplankton, macroplankton and zooplankton. Observations on macroplankton were carried out in the Barents Sea. In 1967 222 samples were collected; in the West Spitsbergen areas and on slopes of the Bear Island and Hope Island 116 samples were obtained (on two cruises); and in the southern Barents Sea 106 samples (on two cruises).

In June/July 495 samples of zooplankton were taken to observe the drift of fish larvae during a cruise including:-

1. Near the Bear Island - 39 samples
2. On the Kopytov Bank - 45 samples
3. In the south-western Barents Sea- 213 samples
4. Near the north-western shores of Norway - 198 samples

In feeding areas of the Atlanto-Scandian herring in the Barents Sea 1,602 zooplankton samples were collected (on seven cruises) in autumn and winter and 192 samples of phytoplankton were taken by the Nansen bathometer on two cruises.

The programme of investigations for 1967 will be repeated in 1968. Plankton is being collected in the Norwegian and Barents Seas.

In addition to zooplankton samples, phytoplankton samples will also be collected from the Norwegian Sea and samples of macroplankton from the Barents Sea.