




TELEPHONE MEMORANDUM

To DR. Holt.	Date	Time 18/4
Call from Mrs. Bonanno	Number	

Please call

Will call back

FOR Mrs Mann - Borghese
please in Geneva

	FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS	Circ. gen. Fish. Coun. Mediterr., 3 APR. 26 1971
	ORGANISATION DES NATIONS UNIES POUR L'ALIMENTATION ET L'AGRICULTURE	
	ORGANIZACION DE LAS NACIONES UNIDAS PARA LA AGRICULTURA Y LA ALIMENTACION	

GENERAL FISHERIES COUNCIL
FOR THE
MEDITERRANEAN

CIRCULAR

cooperative programme of research on aquaculture

report I

EDITORIAL NOTE

This is the first of a series of reports planned to be issued by the General Fisheries Council for the Mediterranean (GFCM) Cooperative Programme of Research on Aquaculture (COPRAQ), to promote contacts and the rapid exchange of information between institutions voluntarily participating in it (About 20 to date).

As some readers will already know, this cooperative effort was initiated during the latter part of 1970 to enable the implementation of observational and experimental studies recommended by the GFCM on the advice of its Working Party on Aquaculture and Fisheries in Brackish Waters.

A proposal to hold a meeting of the COPRAQ research workers in conjunction with a meeting of the working party towards the end of this year, is now under consideration. In the meanwhile, it is hoped that this series of reports along with the FAO Aquaculture Bulletin will serve the purpose of keeping the participating institutions and workers as well as others directly concerned, informed of the progress of the investigations and the results obtained.

These reports will be issued as and when sufficient data from the participating institutions have accumulated. Contributions (brief reports on the results achieved, future line of studies, any relevant publication etc.) should be addressed to the GFCM Secretariat^{1/} which will also request information from the participants at intervals of about four months.

^{1/} GFCM Secretariat
FAO

Via delle Terme di Caracalla
00100 Rome, Italy

COPRAQ AND PARTICIPANTS

The problems selected for investigations under COPRAQ are the following:

1. Controlled/induced breeding, including the development of techniques for large-scale production of "seed" of:
 - (a) Grey mullets (Mugil spp.)
 - (b) Sparus auratus (=Chrysophrys aurata)
 - (c) Dicentrarchus (=Morone) labrax
 - (d) Solea spp.
 - (e) Mytilus galloprovincialis
 - (f) Crassostrea angulata
 - (g) Ostrea edulis
2. Experiments in the intensive culture of fin fishes using the following variables:
 - (a) Monoculture and culture of combinations of species
 - (b) Different stocking rates
 - (c) Culture with/without supplemental feeding
 - (d) Fertilization with different fertilizers and at different doses
 - (e) Culture in ponds, cages, pens or other enclosures.
3. Experiments in the intensive culture of oysters and mussels, covering:
 - (a) Hanging method of culture
 - (b) Culture in enclosed or protected areas
 - (c) Enhancement of food resources through fertilization or other means
4. Breeding and culture of Penaeus kerathurus and other shrimps

The institutions participating at present in the Programme are listed below by country. Where appropriate, reference is made to the item(s) listed above on which the institutions have agreed to investigate for the benefit of the whole region.

BULGARIA

1. Research Institute of Fisheries and Oceanography (NIRSO)
Boul. Chervenoarmeisky, 4
Varna

FRANCE

2. Centre national pour l'exploitation des océans (CNEXO)
39, Avenue d'Iéna
75 Paris 16e
3. Institut scientifique et technique des pêches maritimes (ISTPM)
Centre de recherches de Sète
1, ancienne route d'Agde
34 Sète
1b,c
3a,b
4
4. Station marine d'Endoume et centre d'océanographie
rue de la Batterie-des-Lions
13 Marseille 7e
1a,b,c
2a,b,c
4
5. Compagnie des salins du midi et des salines de l'est
Service aquaculture et pêches
Salin de Villeroy
route d'Agde
34 Sète
1b
6. Département des travaux, recherches et exploitations océaniques (DTREO)
Tour Atlantique
92 Puteaux
1g

GREECE

7. Institute of Oceanographic and Fishery Research
16, Possidonos boulevard
Paleon Faliron
Athens
1e
2c,d

ISRAEL

8. Fish Culture Research Station
Dor, D.N.
Hof Hacarmel
1a,b,c
2a,b,c,d

ITALY

9. Istituto di idrobiologia e piscicoltura
Via dei Verdi, 75
98100 Messina
3b
10. Istituto di zoologia
Strada dell'Università, 12
43100 Parma
1a
11. Istituto di zoologia
Via Mattioli, 4
53100 Siena
3b
12. Laboratorio centrale di idrobiologia
Piazza Borghese, 91
00186 Roma
3a
4

ITALY (cont'd)

13. Laboratorio per lo studio dello sfruttamento biologico delle lagune
Via Fraccacreta
71010 Lesina 1f
4

ROMANIA

14. Institutul român de cercetari marine
300, Bdul Lenin
Constanta

SPAIN

15. Estación oceanográfica del Mar Menor
Apartado Correos 22
San Pedro del Piñatar (Murcia) 1a,b
2c
16. Laboratorio del instituto de investigaciones pesqueras
Monturiol, 2
Grao-Castellón 4

TUNISIA

17. Institut national scientifique et technique d'océanographie et
de pêche (INSTOP)
Salammbô 3a

UNITED ARAB REPUBLIC

18. Institute of Inland Fisheries and Fish Culture
El Kanatir El Khairia 1a,b
2a,b,c,e
4

YUGOSLAVIA

19. Institut za oceanografiju i ribarstvo
P.P. 114
Split 1a,b
2c,d
3b

PROGRESS OF INVESTIGATIONS

A. CONTROLLED BREEDING

At the Fish Culture Research Station (Israel) the technique of breeding Mugil capito by the administration of hormones has been successfully developed. The rearing of larvae still remains a major problem and work is now in progress to solve this, as well as to breed Mugil cephalus.

The Station marine d'Endoume (France) has initiated studies on the induced breeding of Mugil spp., Sparus auratus and Dicentrarchus labrax. Particular attention will be paid to the rearing of larvae to fry and fingerling stages.

The Istituto di zoologia, Parma (Italy) is concentrating its studies on artificial fertilization and induced maturity of grey mullet in the Venice lagoon and on the Ligurian coast and is planning to extend them to Lesina and Varano lakes.

The Laboratorio per lo studio dello sfruttamento biologico delle lagune (Italy) is planning to undertake experiments in inducing sexual maturity of Crassostrea angulata by thermal stress.

In Spain, the Estación oceanográfica del Mar Menor has set up a system of aquaria with sand filters for experiments in controlled breeding of Mugil spp. and Sparus auratus.

The Salins du Midi (France) are carrying out work on induced breeding of Sparus auratus.

B. INTENSIVE CULTURE OF FIN FISHES

In experiments to evolve suitable methods of intensive culture, both mono and polyculture are being tried.

The Fish Culture Research Station (Israel) has achieved very encouraging results by culturing Mugil spp. along with three freshwater fishes in slightly brackish inland ponds.

The Station marine d'Endoume (France) is trying different stocking rates in both mono and polyculture with artificial feeding. Nutritional studies of Mugil spp. have been undertaken. The preparation of pelleted feeds on a laboratory scale has been successful. A pilot scale mill which can produce 50 kg per day is now in operation and is capable of expansion.

In Spain, studies are under way on artificial feeds and feeding of Mugil spp., and Sparus auratus at the Estación oceanográfica del Mar Menor.

In UAR (El Kanatir Institute) investigations are being carried out on monoculture and culture of combinations of species, with different stocking rates and with or without supplemental feeding on Mugil spp. and various freshwater species.

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C. INTENSIVE CULTURE OF SHELLFISHES

Reorganization of oyster and mussel hanging culture areas in the Thau lagoon has been undertaken by the Centre de recherches de Sète (France) to increase yields through a better utilization of the lagoon plankton. The hanging method of culture of both mussels and oysters was tried in Diana and Urbino lagoons in the island of Corsica, but due to the heavy growth of epiphytic Ascidiens, the experiment had to be abandoned. Oyster culture on the sea bed has therefore been recently started. Culture of oysters in hanging plastic baskets is also being experimented there now.

Experiments on acclimatization and growth of Crassostrea angulata are being carried out successfully in Taranto and Chioggia by the Laboratorio centrale di idrobiologia (Italy).

INSTOP (Tunisia) is concentrating on the culture of Crassostrea angulata in the lakes of Ghar-El-Mehl and Ichkeul.

The Institut za oceanografiju i ribarstvo (Yugoslavia) is undertaking studies on the relationship between growth of oysters and depth of water on oyster beds (0.5 to 5.0 m) with a view to determining the optimum condition for their culture.

D. SHRIMP CULTURE

The Laboratorio del instituto de investigaciones pesqueras at Grao-Castellón (Spain) has developed a successful system of inducing the spawning of Penaeus kerathurus in aquarium tanks. By progressive raising of temperature to 28-29°C, spawning is induced. Hatching of eggs takes place in the tanks and Skeletonema costatum and other phytoplankton are used to feed the early protozoa stage larvae. Artemia nauplius, small copepods and other zooplankton, form the food of more advanced protozoa (Stage III). Environmental conditions are being studied in relation to the larval development of the species.

The Station marine d'Endoume (France) is undertaking basic physiological studies on Penaeus kerathurus with a view to developing techniques for accelerating the growth rate and maturation of this species.

The Laboratorio centrale di idrobiologia (Italy) is carrying out experiments in aquaria on breeding and controlled reproduction of Penaeus kerathurus.

The Centre de recherches de Sète (France) has imported 6 000 post larvae of Penaeus japonicus from Japan for experimental culture.

The Laboratorio per lo studio dello sfruttamento biologico delle lagune (Italy) is studying the culture of Penaeus kerathurus and of Palaemon elegans, Palaemon adspersus and Crangon crangon. Intensive cultivation of phytoplankton is being tried to produce food for larval stages.



GENERAL FISHERIES COUNCIL FOR THE MEDITERRANEAN

COOPERATIVE PROGRAMME OF RESEARCH
ON AQUACULTURE

Third Session

Sète, France, 17-20 February 1975

REPORT

WI/H0051

GENERAL FISHERIES COUNCIL FOR THE MEDITERRANEAN
 REPORT OF THE THIRD SESSION OF
 THE COOPERATIVE PROGRAMME OF RESEARCH ON AQUACULTURE

Sète, France, 17-20 February 1975

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INTRODUCTION

1. The third session of the GFCM Cooperative Programme of Research on Aquaculture (COPRAQ) was held in the premises of the Station de biologie marine et lagunaire, Sète, France, from 17 to 20 February 1975.

2. Mr. J. Paris, Director of the Station, and Mr. J.-M. San Feliu, Director of the Laboratorio del Instituto de Investigaciones Pesqueras, Grao-Castellón, Spain, were appointed as Chairman and Vice-Chairman of the session respectively. The Chairman welcomed the participants (see list in Annex II) and, following his introductory remarks, the Agenda (Annex I) was adopted.

1. REVIEW OF PROGRESS OF COPRAQ AND DISCUSSION OF RESEARCH RESULTS

A. Controlled Breeding and Intensive Culture of Finfish

3. Experiments on induced breeding of mullets (Mugil cephalus and M. capito) have been carried out by the Institute of Inland Fisheries and Fish Culture of Egypt. Trammel and gill nets were used to collect breeders which were transported in floating wooden boxes towed by boats. Mortality, however, was very high due to loss of scales and cutaneous bleeding. The tests were conducted at El Serow and Barrage freshwater fish farms. Partial spawning was induced by injection of either HCG, at the rate of 100-750 IU/kg body weight, or 1-2 homoplastic pituitary glands but fertilization of spawned eggs was unsuccessful. This is attributed to induction of spawning in fresh water.

4. The Institute is now in the process of completing the construction of a new laboratory, for breeding of mullets, at Lake Karoun, a closed brackishwater lake southeast of Cairo. Farming of mullets is being carried out in private farms located in shallow waters near the Delta Lakes. Mulletts are stocked together with tilapia and carp, and total production from such farms is reported to be about 2.5 t/ha/year with intensive feeding. Mullet fry are collected near Alexandria and shipped by truck inland; 2 000 fry of less than 1 g each are transported in 3 l of water supplied with oxygen.

5. The Laboratorio del Instituto de Investigaciones Pesqueras, Cadiz, Spain has carried out initial rearing trials with Sparus aurata. Fry, of 24 mm length and 1 g weight, were collected from saltpan lagoons in March and fed on minced crab meat only. Fry attained an average length of 50 mm and 4 g weight after a growing period of 3 months. Following a second growth period of 3 months during which only artificial trout feed was given, fry grew to 92 mm and 55 g. Fattening of adults (27-31 cm) with trout feed is currently under study.

Observation on growth of mullets (M. cephalus, M. auratus, M. ramada) in saltpan lagoons has also been carried out. Fry entered saltpans in March-April at a length of 4 cm and grew to 17 cm and 45 g in 12 months in the case of a 10 ha saltpan, and to 21 cm and 110 g in a second, 30 ha, saltpan; growth after a two-year period was 24 cm and 160 g and 26 cm and 214 g respectively.

6. Preliminary tests on rearing of trout in cages in sea water have been conducted by NIRSO, Varna, Bulgaria. A total of 2 500 one-year-old trout of 13 cm and 38 g were stocked in one cage and fed with trash fish for a period of two months, after which they attained an average length of 20 cm and weight of 125 g. High mortalities occurred due to asphyxia brought about by deposition of silt, from rain wash-off, on the gills.

7. Work carried out by the Centre océanologique de Bretagne, Brest, France, on rearing of Dicentrarchus labrax larvae in 1974 resulted in the total production of 850 000 viable eggs, obtained from natural spawning of 23 captive breeders. A total of 85 000 larvae, from an initial number of 360 000, survived more than 30 days after hatching. Survival rates in

1/ Written communication

various tests ranged from three (3) to 69 percent with a mean of 23 percent. Conical tanks of about 500 l capacity were used for larval rearing with larval stocking rates of 33-125/l. Water exchange was commenced on initiation of larval feeding at a rate of 1.5 to 2 times tank volume per day. Larval food consisted of Brachionus sp. and artemia nauplii; Tetraselmis sp. was used in low concentrations to maintain Brachionus sp. populations in larval rearing tanks.

D. labrax breeders were collected in 1972 by line fishing and trawling, with the former giving best results. Mortality of breeders in the laboratory was up to 50 percent during the three weeks following collection.

8. The Division aménagements littoraux et aquaculture of C.T.G.R.E.F., France, is engaged in field work on aquaculture, especially through technical assistance. This activity was started five years ago in the southwest of France, including fattening of sea basses and shrimps as well as of eels, mullets and trouts in brackish water. So far, production on a commercial scale has been possible only in the case of trout.

9. Investigations are underway at the Laboratoire de physiologie des poissons, I.N.R.A., on various aspects of reproductive physiology and biochemistry. These include studies on the specificity of teleost gonadotropins, gametogenesis and ovulation at the gonad level, the involvement of environmental parameters (light, temperature, etc.) and steroids in gametogenesis and preservation of sperm. These studies are being carried out on trout, sea bass, sea bream and turbot.

10. Work on the biology and breeding/larval rearing of sea bass and sea bream is being continued at the Station de biologie marine et lagunaire, Sète, France. During 1971-72 investigations were mainly aimed at mass production of juveniles through induced breeding techniques. Since 1973 investigations have been reoriented toward more basic studies including the biology, ecology and ethology of adult and larval stages of sea bass. Accordingly, work has been initiated on establishment of captive brood stock and control of gonadal maturation and breeding under controlled laboratory conditions. In addition, preliminary experiments on artificial feeding of sea bass and sea bream larvae have been carried out in 1974 and are being continued with an aim to determine the response of larvae to the smell, colour, taste, etc. of artificial diets. A total of 913 juveniles (5 months from hatching) were reared from 80 000 fertilized eggs using artificial diets.

Collection of sea bass breeders, before 1973, was by means of trawl nets; mortalities of up to 80 percent were encountered following collection by this method. Since 1973, a captive brood stock has been used in induced breeding tests. Post-spawning mortalities of these brood stocks occurred in 1973 due to asphyxiation from heavy infestation of gills with a monogenetic trematode, Diplectanum aequans, whose entire life cycle takes place in the rearing tanks.

11. The Israel Oceanographic and Limnological Research Ltd. is conducting studies on the culture of marine fish at its Mariculture Laboratory at Elat. The main lines of investigation at present include the breeding/larval rearing of Sparus aurata and the nutritional and environmental requirements of this species.

Sparus breeders were reared in captivity, on artificial feed, from fry collected from the Mediterranean coast. Female breeders (2 years old; 450-700 g) with ovarine eggs measuring 600 μ in diameter spawned after injection with HCG at the rate of 1 IU/g body weight (egg diameter at spawning was 920 μ). No response was obtained with carp pituitary homogenates injected at the rate of 5-10 mg per fish.

In one case, incubated eggs, which are normally buoyant, sank to the bottom and failed to hatch. The reasons for this are not understood. It was noted, however, that eggs from wild spawners were more yellowish in colour than those from captive females.

A live food-chain is being developed for larval feeding purposes. Tetraselmis sp. is used for rearing of Brachionus sp. and cell counts as high as 10^6 /ml have been obtained in

outdoor culture throughout the year; a concentration of 75 Brachionus/ml has been achieved. Special efforts are being made to develop a suitable first stage food for Sparus larvae and mass cultures of the dinoflagellates Cryptomonas sp. and Gymnodinium sp. have been developed for test purposes in this regard.

Other programmes at the Laboratory include breeding/larval rearing of siganids and experimental culture of pearl oysters, Pinctada margaritifera and P. fucata. A new hatchery with facilities for control of water temperature and salinity, as well as eight outdoor seawater ponds are currently under construction at the laboratory site.

12. Research on induced breeding and larval rearing of Mugil cephalus, Dicentrarchus labrax and Sparus aurata are underway at the Istituto di Zoologia dell'Universita di Parma, Italy. During 1974 work was concentrated on S. aurata with good results. Breeders collected during spawning migration were induced to breed with injections of HCG given in three successive doses of 500, 1 000 and 2 000 IU/kg body weight respectively. The second injection was given 3-5 days following initial injection, and the third between the sixth and eighth day. Spawning was obtained in tanks between the sixth and eleventh day after the initial injection in water of 37-38 ppt salinity. It was noted that captive broodstock maintained on artificial granulated feed gave a greater number of eggs of better quality than wild broodstock.

Fertilization and hatching rates of 68 and 33 percent were obtained respectively. Larval feeding commenced on the fourth day from hatching at 20°C; food consisted of copepods, Brachionus sp. and artemia nauplii. Survival rate 90 days after hatching varied between 0.1 and 16 percent. Juveniles were fed on artemia adults, granulated artificial feed and minced fish and shellfish meat.

Tests were also carried out on salinity tolerance of larvae, food preference, thermal stress, light requirements, water flow, etc.

Future activities include improvement of current methods for commercial application, trials with new species of commercial interest (pleuronectidae), studies of environmental conditions in natural breeding areas and survey of Italian coastal areas to identify best sites for collection of breeders and installation of future commercial hatcheries.

13. The Laboratorio per lo Sfruttamento Biologico delle Lagune-C.N.R., Lesina, Italy is continuing its work on induced breeding and larval rearing of Mugil cephalus, S. aurata, D. labrax and Anguilla anguilla.

Female D. labrax were induced to spawn with two injections of HCG at doses of 1 000, 2 000 IU respectively; a third injection is administered if spawning is not obtained 24-36 hours after the second injection. Spawning is induced at water temperature of 17°C and salinity of 36-37 ppt. As regards rearing of Sparus larvae, larval food (live) consisted of a mixture of Brachionus plicatilis, Tisbe sp., Euterpina sp. and Stylonichia sp. Tetra-selmis suecica cultures (1.5×10^6 /ml) were used to culture Brachionus sp. to a density of 200/ml. An artificial larval diet composed of vitamin-fortified lyophilized egg-yolk, yeast, bean meal and dextrin was also used. At fingerling stage, the fish was given artemia metanauplii and crushed mussel meat.

14. S.I.R.A.P., Italy, reports rearing of 400 000 juveniles of D. labrax in 1974. Females were induced to breed in 48 hours with a single injection of HCG (1 IU/g body weight) at 12°C water temperature. A Dunaliella sp. - Brachionus sp. live food-chain was used for the initial stages of larval feeding, followed by artemia.

The same procedures were utilized for the breeding and rearing of S. aurata. In the case of this species, however, high larval mortalities were encountered 30-40 days from hatching (5-6 mm length); the reasons for this are not clear at this time.

B. Controlled Breeding and Intensive Culture of Shellfish

15. The Laboratorio de Grao de Castellón, Instituto de Investigaciones Pesqueras, Spain is planning to establish a new laboratory/hatchery facility 30 km north of Castellón in the marshy zone of Torrelasal. The new location of the laboratory was necessitated by increasing pollution of coastal waters at Castellón.

The Laboratory has been working for the last few years on the breeding and rearing, from the egg stage, of Penaeus kerathurus and Palaeomon serratus.

Adult breeders are collected with trammel nets and transported in narrow-necked plastic tanks with frequent changes of water. Shrimp have also been transported successfully by air in water-filled plastic bags with oxygen and sand substrate.

A total of 20 females are stocked in a tank of 1 200 l capacity; spawning occurs during the first or second night in water of 34-35 ppt salinity and temperatures of up to 29°C.

The developing larvae were fed on diatoms, Skeletonema costatum, Asterionella japonica, Thalassiosira rotula, T. decipiens and some species of Chaetoceros. These were cultured in plastic bags of approximately 500 l capacity, and in seawater of 29 ppt salinity. This water is pumped from a well situated some 100 m from the coast and is sterilized with ultraviolet light before use.

A small unit for the culture of the rotifer Brachionus plicatilis, fed on Tetraselmis suecica at a concentration of 1×10^6 cells/ml has been established. The unit produces some 60 l daily with a concentration of 200 Brachionus/ml.

Black gill disease (Fusarium sp. and Epistylis sp.) reached epidemic proportions causing up to 70 percent mortality in some tanks. The periodic treatment of shrimp with malachite green and formol, at a concentration of 6 ppm wt/vol and 25 ppm respectively, was quite effective in controlling the disease.

Compounded diets for feeding shrimp are presently under investigation. The feed consists of a fish meal base, or soybean, or octopus meal, mixed with cholesterol, beer yeast, vitamins and mineral salts. Alginate has been used as a binder with very good results. The quantity of food consumed by the shrimp increases when the fat content of the diet is reduced to 5 percent. The addition of hexametaphosphate appears to have an unfavourable effect.

In the case of P. serratus, the entire life cycle has been completed in captivity using the same techniques as for P. kerathurus.

16. Studies on mass production of P. kerathurus post-larvae are also underway at the Lesina laboratory.

Breeders are collected in the area between Fiumicino and Santa Marinella and transported by motor-van in oxygenated tanks to Lesina (12 hours). Breeders are placed in 20 l tanks and the water temperature gradually raised to 28°C. Spawning occurs during the first or the second night in thermally controlled tanks and eggs are transferred to a 24 000 l tank for hatching and larval rearing.

Protozoae are fed with S. costatum and Coscinodiscus sp. cultures of 500 000 cells/ml, while mysis stages receive artemia. High mortalities occurred due to fungus infestation of gills in juveniles of 5-8 cm length; formol (25 ppm) and malachite green (15 ppm) were used to treat affected shrimp.

17. Pond production trials with Penaeus japonicus have been carried out since 1971 at the Station de démonstration, expérimentation et valorisation de l'aquaculture, Maguelone, France. Juvenile shrimp were imported from Japan and reared on minced crab and mussel; highest production was obtained in 1974 when 1.5 t of small-size shrimp were harvested from a 0.8 ha pond area.

In 1974 maturation of breeders in captivity was recorded; about ten viable spawnings were obtained yielding 500 000 eggs from which several hundred post-larvae were reared successfully.

A new station, located between Maguelone and Palavas, was completed in mid-1974 and work commenced on the breeding and rearing of P. japonicus and D. labrax; S. aurata will be added to the species under study at a later date.

Grow-out trials with P. japonicus and P. kerathurus are also underway in the aquaculture programme of C.T.G.R.E.F.

II. SPECIAL DISCUSSION ON INDUCED BREEDING AND LARVAL REARING

18. A special discussion period was held during the session (18-19 February) to consider technical problems in the field which constitute major constraints to the mass production of stocking-size juveniles of the major cultivable finfish and crustaceans in the Mediterranean region. Discussion topics included aspects of the collection, transport and maintenance of broodstocks, induced breeding techniques, hatchery design, methods for the mass production of phyto- and zooplankton for larval rearing techniques. The discussion was open to, and attended by, members of the private sector with special interest in aquaculture development in the region.

III. DEMONSTRATIONS ON INDUCED BREEDING OF Dicentrarchus labrax

19. A number of demonstrations on methods used at the Sète Station for induced breeding of captive sea bass broodstock were arranged by resident staff. Demonstrations were scheduled according to the condition of the fish and timing of spawning and included (a) handling of breeders and hormone (HCG) injection, (b) examination of ovulated eggs prior to fertilization, (c) hand stripping and fertilization of eggs, (d) egg incubation, and (e) larval rearing techniques including experiments underway on use of artificial feed.

IV. FUTURE ACTIVITIES

20. The future activities of COPRAQ were discussed at some length.

21. Although induced breeding of finfish does not constitute a major problem in the research programme there is need for further research input on the biology and ecology of larvae, particularly on environmental requirements and behaviour.

22. Successful mass production of finfish and crustacean larvae continues to be dependent on live food which requires space, involves handling of large volumes of water and consequently presents logistic problems. There is need to simplify such procedures, especially in the case of D. labrax, for which techniques for mass rearing of larvae have been developed, and to intensify research on artificial larval diets.

23. Noting that the special discussion on induced breeding and larval rearing was of particular assistance in focusing attention on major research problems in the COPRAQ programme and furthering detailed technical discussions on these matters, it was decided to continue

the special discussions in future COPRAQ meetings. These meetings will continue to be forums for general discussions on aquaculture research and development in the GFCM region but the major part of each session will be devoted to a specialized technical discussion on a subject matter decided beforehand.

24. The meeting suggested that the institutions whose representatives participated in the special discussion prepare manuscripts on their activities and achievements in the field relevant to the discussion, according to an outline to be prepared and distributed by the GFCM Secretariat; these manuscripts would then be printed in the Series GFCM Studies and Reviews.

25. The topic for the special discussion during the next meeting will be "Problems of Larval Food Production and the Effects of Food and Environmental Conditions on Larval Survival and Growth".

V. ADOPTION OF THE REPORT AND RESOLUTIONS

26. Due to various reasons, and particularly to lack of time, the report, with the exception of the two resolutions below, could not be adopted before the closure of the session. It was decided that the Secretariat would complete and forward it in draft form, for approval, to the participants. This was subsequently done and the present document represents the approved report of the session.

27. The following resolutions were adopted unanimously.

RESOLUTION AQ/75/1

The third session of COPRAQ

Noting that induced breeding of Dicentrarchus labrax, Sparus aurata and Mugil spp. has been carried out successfully by various COPRAQ member institutions,

Further noting, however, that induced breeding techniques often rely on subjective criteria and consequently vary according to individual circumstances,

Recommends that basic studies on the reproductive biology of these species including physiology, behaviour and ecology, be intensified with an aim to permit the future establishment and management of broodstocks and provide objective guidelines for induced breeding techniques.

RESOLUTION AQ/75/2

The third session of COPRAQ

Noting that mass rearing of larvae of Dicentrarchus labrax, Sparus aurata, Mugil spp. and Panaeus kerathurus is not yet perfected,

Recognizing that the resolution of problems relative to larval survival is related to better understanding of nutritional and environmental requirements of larvae,

Aware that the size of live food required by the initial stages of Sparus aurata and Mugil spp. larvae as well as terminal larval stages of all species under consideration constitutes a critical obstacle to further progress in the rearing of these larvae, and being of the opinion that the use of efficient artificial feed might resolve these difficulties,

Recommends that studies on environmental requirements of larvae, in particular as related to changes in water chemistry brought about by food and feeding procedures, be expanded and intensified,

Further recommends that research be conducted to identify and mass produce suitable micro-zooplankton for the initial stages of Sparus aurata and Mugil spp. larvae, and macro-zooplankton for the terminal larval stages of all species mentioned above; that simultaneously research on the development of efficient artificial larval feed should be continued.

VI. DATE AND PLACE OF THE FOURTH SESSION

28. The fourth session of COPRAQ will take place in October 1976. The venue will be announced by the Secretariat at a later date.

AGENDA

1. Opening of the session and nomination of the Chairman and Vice-Chairman
2. Organization of the session
3. Review of progress of COPRAQ and discussion on the results achieved so far
4. Special discussion on induced breeding and larval rearing
5. Visit of the Station facilities and demonstrations of hormone injection and artificial spawning
6. Date and place of the fourth session of COPRAQ
7. Suggestions for future activities
8. Adoption of the report and resolutions

LISTE DES PARTICIPANTS
LIST OF PARTICIPANTS

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