ANNEX V

Biological Considerations to Project I (Descriptive Surveys), presented by Mr J.P. Troadec and Prof. G. Hempel

As far as the research of fish resources existing in the CINECA area is concerned, the CINECA framework will provide good opportunities to implement surveys on resources estimation (in relative or absolute value), as well as their time and space variations. Among the surveys which would improve very much our knowledge in this field, the main ones are the following :

- echosounding surveys, in particular those aiming at providing absolute estimates;
- egg and larval surveys, related with fecundity studies;
- apart from these surveys, it must be noted that the acitivities in terms of catch per unit effort of some fleets are already recorded on a grid of small resolution (a few days, half or one degree squares). These data could also provide valuable estimates of relative abundance of stocks.

In addition to their major interest for the exploitation of fish resources (inventory and nature of resources, time and space variation of their distribution) such surveys, by providing estimates of the tertiary production, would be very valuable for analysing the overall processes of upwelling phenomena through the various levels of the food chain.

Drift of plankton and the migration of fish and cephalopods transport the products of the coastal upwelling areas into the open ocean. So far it is not known how far off-shore this transport has a measurable effect on the living resources in different seasons. It is therefore necessary to extend the grid of observations a few hundred miles off-shore and to repeat it at different seasons.

Echosounding and fish egg and larval surveys require that the coverage of the whole area should be carried out in a short time. Otherwise, movements of fish and - to a lesser extent - of eggs and larvae, could make the analysis of the data intricate.

To cover the whole area in a short enough period, it is necessary to have at disposal several vessels (2-4).

Such surveys in which fast methods to record the environmental conditions (BT, Secchi disc, sea surface temperature continuous recording and perhaps for the best equipped and staffed vessels, automatic recording (STD) and analysis (technicon)) have also to be used in order to provide an overall description of the upwelling along the coast at a given time.

In fact, the intensity of upwelling shows large differences along an axis parallel to the coast, differences which could not be taken into consideration by observations on a small scale.

Another point which is of major interest, is the extension toward the north and during the summer of the surface tropical and low salinity waters along the coast. This layer and the cold waters related with upwelling are separated by a water "front". Migrations of many pelagic stocks in relation with the northward movement of this front are known (tuna) or suspected (sardinella, mackerel, horse-mackerel and scads). A study of the movements of the water masses and of the extent to which it governs the distribution of fish will be of great interest in two fields :

- the description of these patterns of migration is very important for fisheries and fisheries management.
- the ecological and trophic links which exist between the fish concentration following the front and the environmental conditions are not simple. An analysis of the processes through the food chain would improve very much our knowledge of the ecology of these fish.

From the point of view of a fishery biologist, the following scheme for a multi-ship survey of the Canary Current region would seem particularly desirable:

a) in summer and winter one survey each covering the entire area from about 35°N to 10°N and extending 300 miles off-shore. The distance of the sections might be wide, major emphasis should be on continuous recording of surface hydrography and on echo-sounding. Stations for sampling fish eggs and larvae and for subsurface hydrography might also be widely spaced.

b) On the shelf and slope between about 22°N and Dakar (?) echo surveys and wherever possible exploratory fishing, should be carried out on a narrower grid. Data on surface temperature (salinity and oxygen) should be collected and sampling of fish eggs and larvae would be desirable.

c) About three standard sections which start in the upwelling area between Nouakchott and Cap Blanc should run 300 miles in south-western direction into the open ocean. To trace the far-distant biological effects of upwelling, echo-sounding and plankton sampling are required.

COOPERATIVE INVESTIGATIONS OF THE NORTHERN PART OF THE EASTERN CENTRAL ATLANTIC (CINECA)

CINECA NEWSLETTER

3