



Coordination to Support Fisheries Management in the
Western and Central Mediterranean. CopeMed Phase II



TRAINING COURSE ON ICHTHYOPLANKTON

Sampling strategies methods and gears

by

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Sampling strategies, methods and gears

Sampling strategy will be the manner by which the researcher selects a sampling distribution to accomplish a determined objective of the study

Sampling stations will depend on the objectives of the study accommodation available ship time and costs

Thus, sampling strategy of an ichthyoplankton study will depend on:

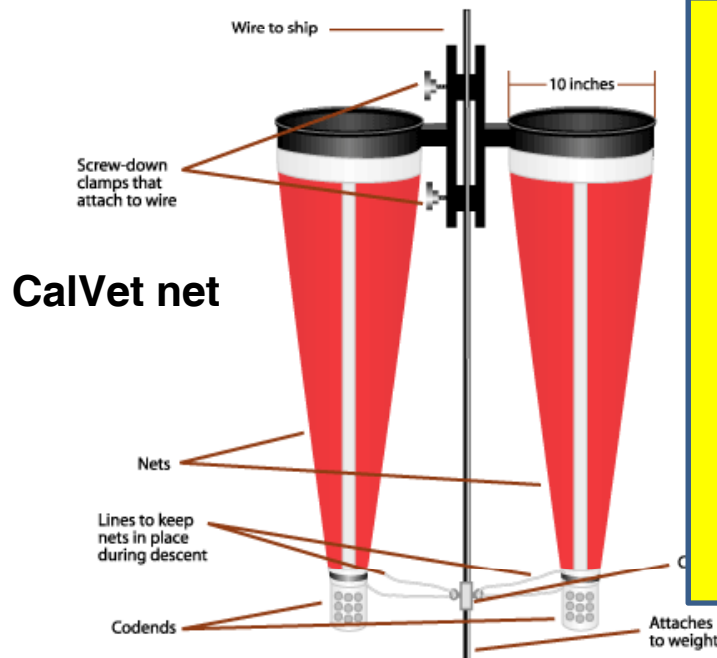
- 1) The objective of the study to be undertaken**
- 2) Studies for analyzing distribution of ichthyoplankton in general have a systematic grid of sampling stations, e.g., DEPM**
 - Station grid may be approached with a FIXED trajectory**
 - or ADAPTATIVE depending on the analysis of species on board**

Sampling strategies, methods and gears

Many ichthyoplankton studies have the objective of **estimating the biomass of adult fish stocks**, either using eggs or larvae

When applying the **Daily Egg Production Method (DEPM)**, the gear employed is the **CalVet net**

And the **sampling strategy** consists of sampling many stations arranged in a regular grid, with a short distance between stations



DEPM MODEL

$$B = k \cdot A \frac{P \cdot W}{R \cdot F \cdot S}$$

The DEPM aims to construct an estimation biomass model based on 5 basic parameters, 1 related with the egg population and 4 with the adult population:

P - Daily Egg Production (number of eggs produced per sampling unit per day).

W - Average Female Weight (average weight of mature females in g).

F - Batch Fecundity (number of eggs spawned per mature females per batch).

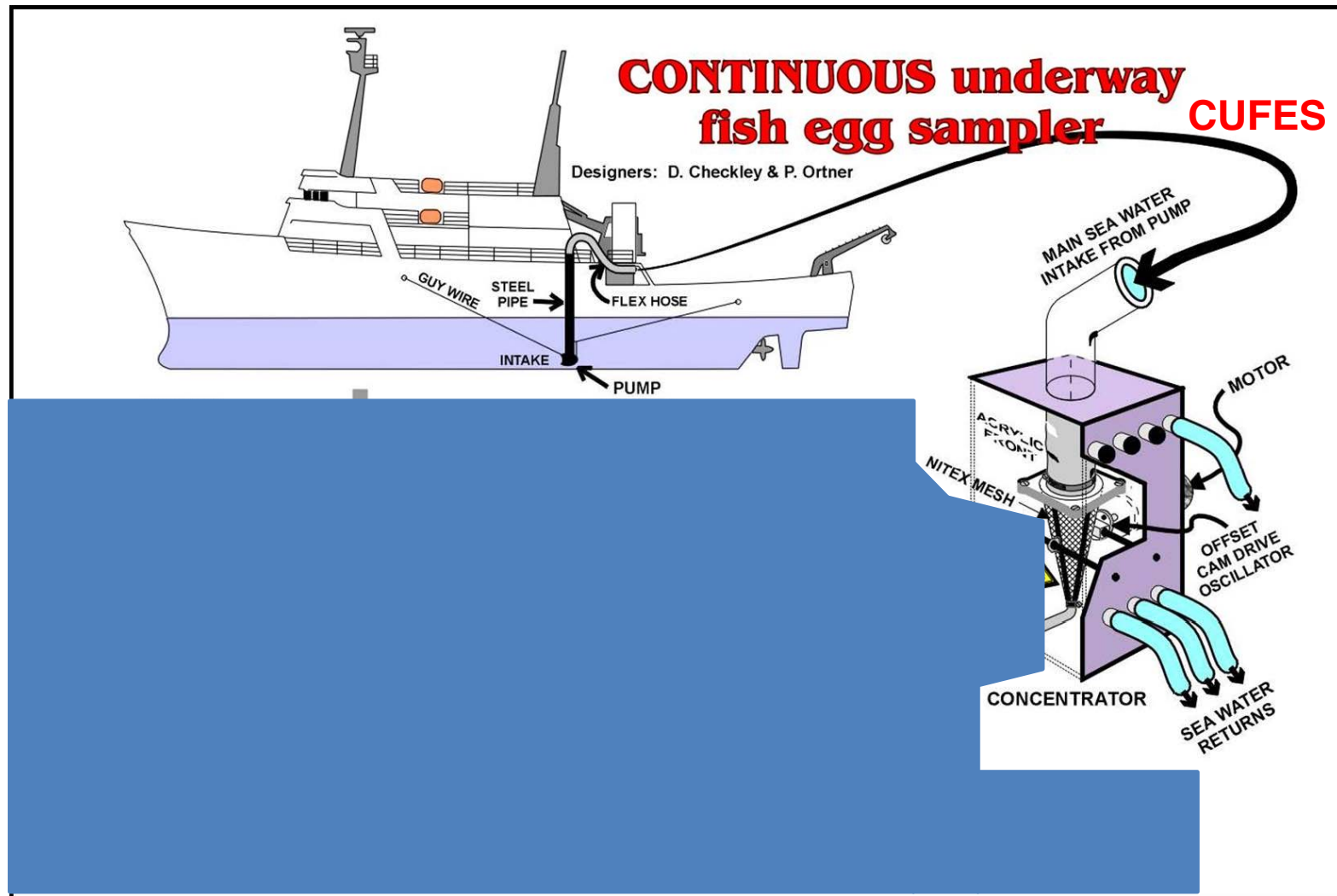
S - Spawning Fraction (the fraction of mature females spawning per day).

R - Sex Ratio (fraction of population that are mature females, by weight in g).

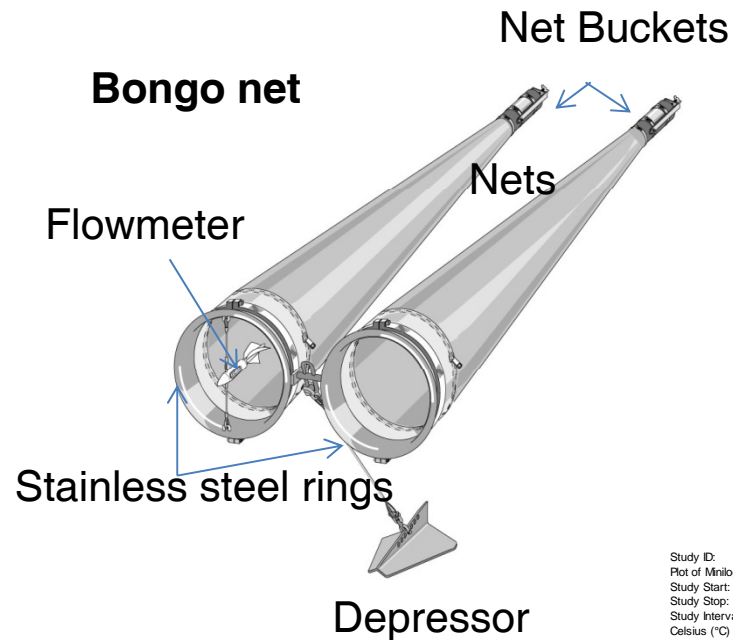
The spawning biomass estimate is based on Stauffer and Picquelle (1980) equation:

The **sampling methodology** consist of carrying out vertical hauls, to 70 m depth

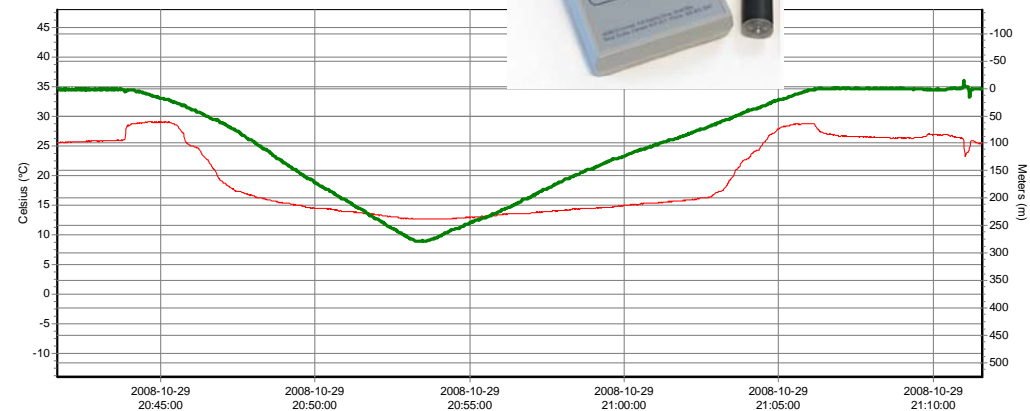
CUFES collects plankton while the research vessel is moving. Water is pumped aboard the vessel from 3 m depth at 640 liters/min. The water is sent through a concentrator where it passes through a net, and the plankton is diverted to a collector. While CUFES is running, a data logger is recording the date, time, and position for each sample as well as other environmental data from the ship's sensors



The **sampling methodology of the ANNUAL EGG PRODUCTION METHOD (applied by ICES) for *S. Scombrus* and *T. Trachurus*** consists of undertaking oblique hauls, from the surface to 200 m depth or to 5 m above the bottom, at shallower station

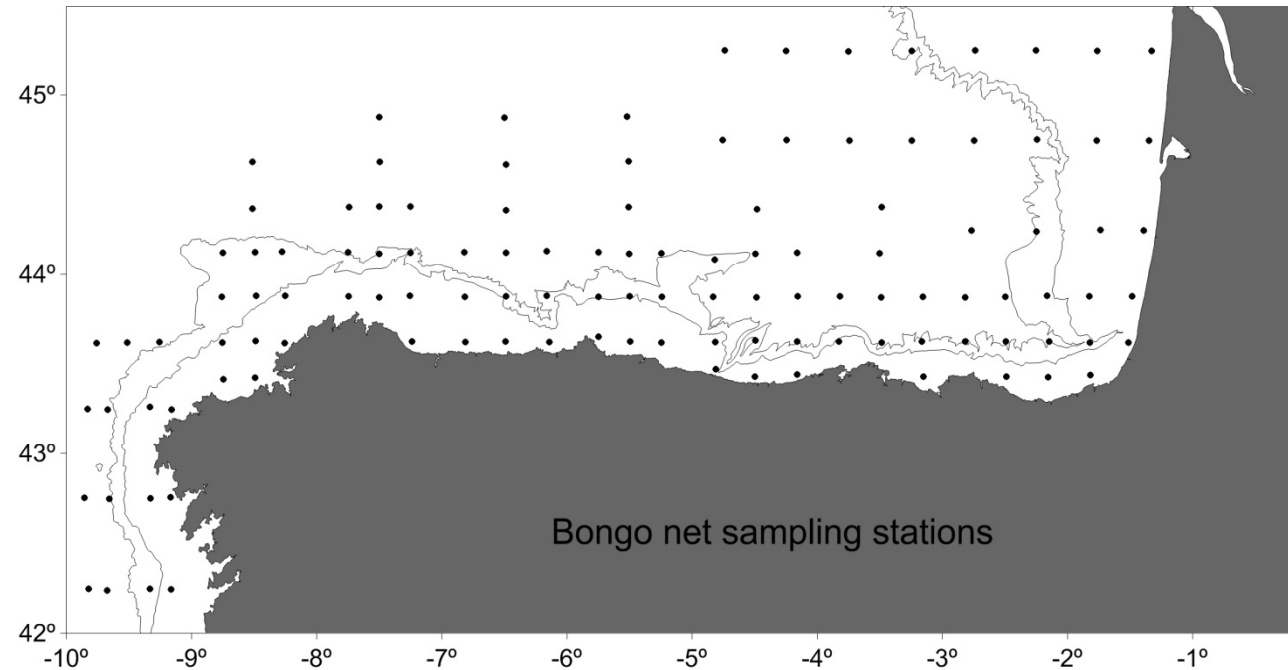


Study ID: bissau0810-st 12
 Plot of Minilog-TD File name: C:\Archivos de programa\Venoco\Minilog\data\Bin4078.01
 Study Start: 2008-10-29 20:31:47
 Study Stop: 2008-10-29 21:11:46
 Study Interval: 00:00:01
 Celsius (°C) StdDev:5.48 Mean:20.61 Min:12.56
 Meters (m) StdDev:90.78 Mean:73.58 Min:13.95



One can install a time, temperature depth recorder, as a Minilog or a small CTD in the mouth of the net.

And the **sampling strategy** consists of sampling a regular grid of stations. The distance between station is larger than when applying the DEPM

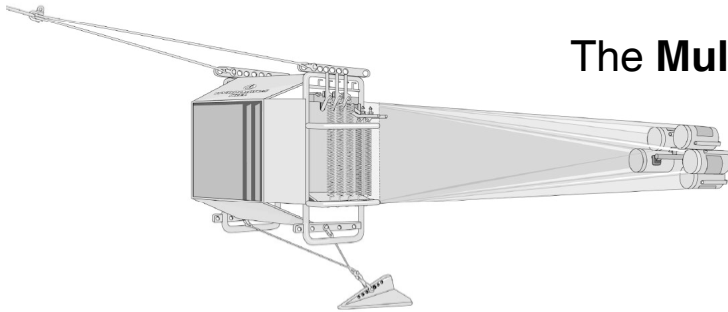


This sampling strategy and sampling methodology is also used when the aim is the study of the **ichthyoplankton ecology**

When the aim of ichthyoplankton studies is to investigate the **vertical distribution** and/or the **vertical** (diel and/or ontogenetic) **migrations***, we use multineets

The most common multineets used are:

The **MultiNet**



The **MOCNESS** net



*Only fish larvae are able of carrying out diel vertical migrations

Other samplers are:

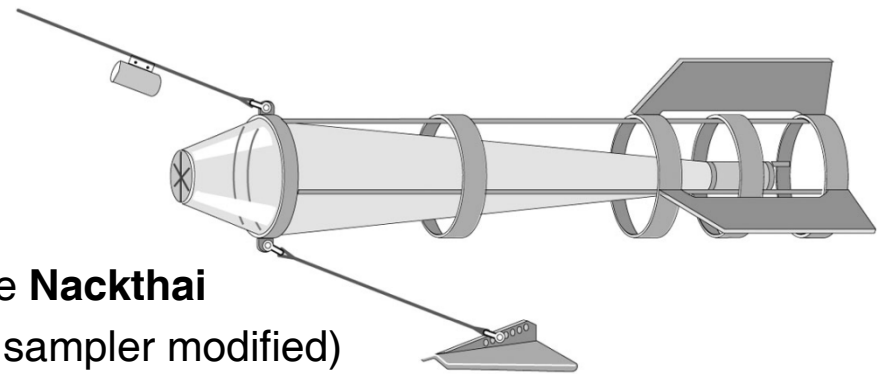
The **Gulf V**



The **Longhurst Hardy Plankton Recorder (LHPR)**



The **Nackthai**
(a Gulf V sampler modified)

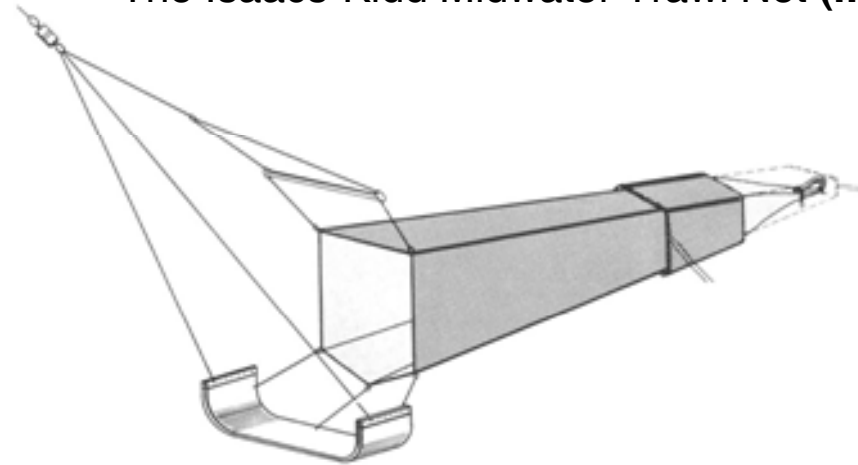


All the anterior are sampler **without bridles in front of the mouth net**. The bridles create turbulence than may be detected by larvae increasing net avoidance

The Ring Trawl (**CalCOFI**) Net

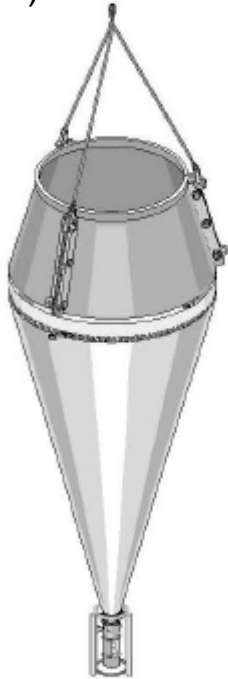


The Isaacs-Kidd Midwater Trawl Net (**IKMT**)



Vertically towed nets

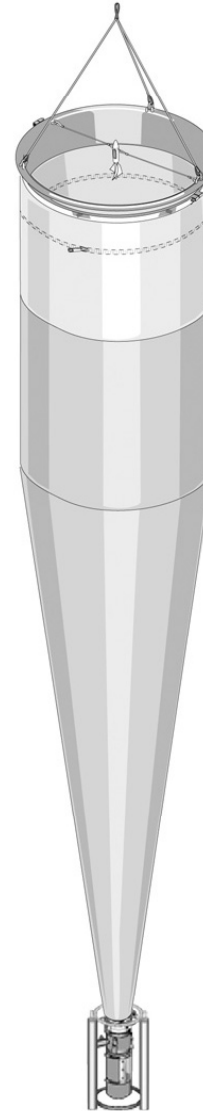
The **Hensen-Egg net**
(70 cm mouth \varnothing , 1.3 m net length)



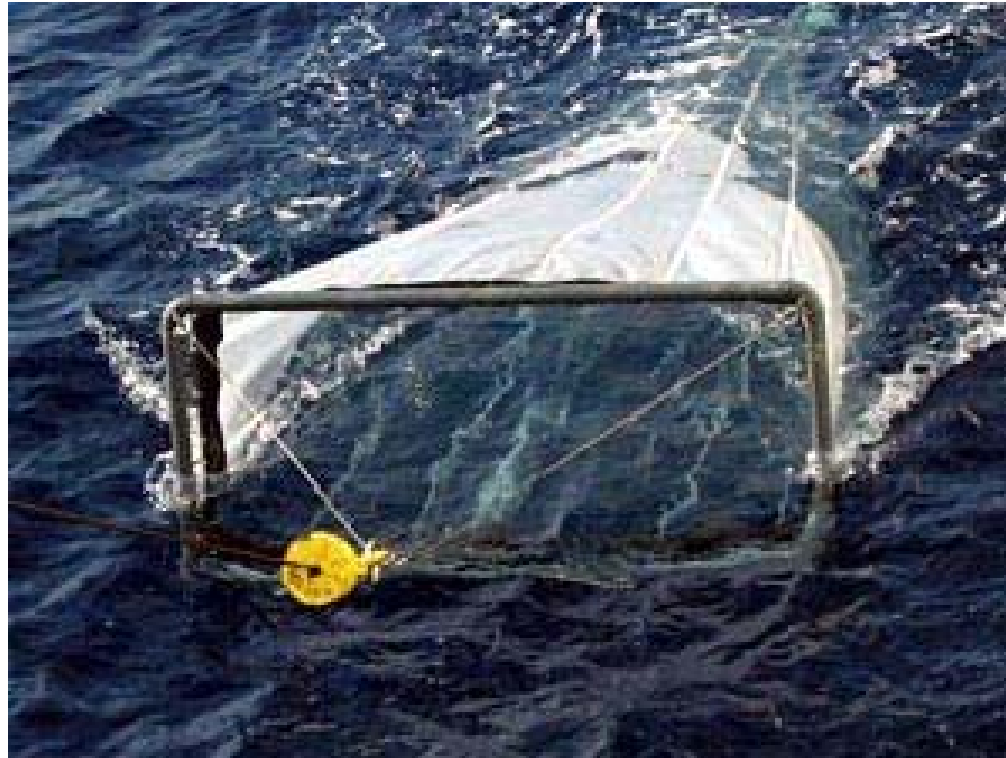
The **Heligoland-larva net**
(143 cm mouth \varnothing , 2.23 m net length)



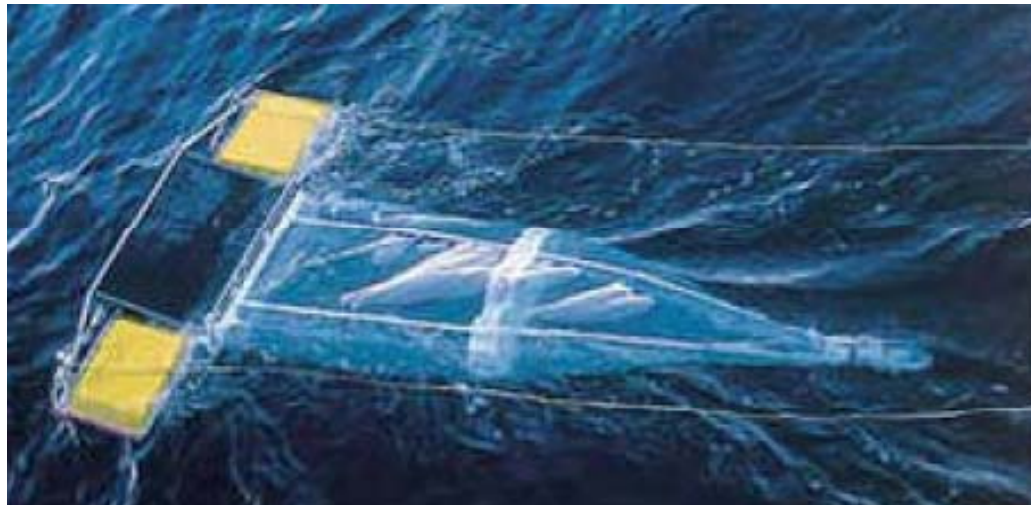
The **Indian Ocean Standard Net**
(113 cm mouth \varnothing , 4.7 m net length)



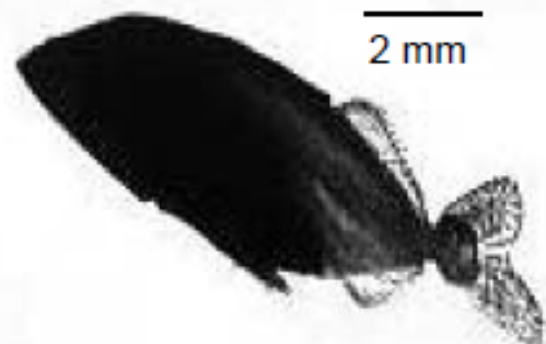
The **Neuston** net



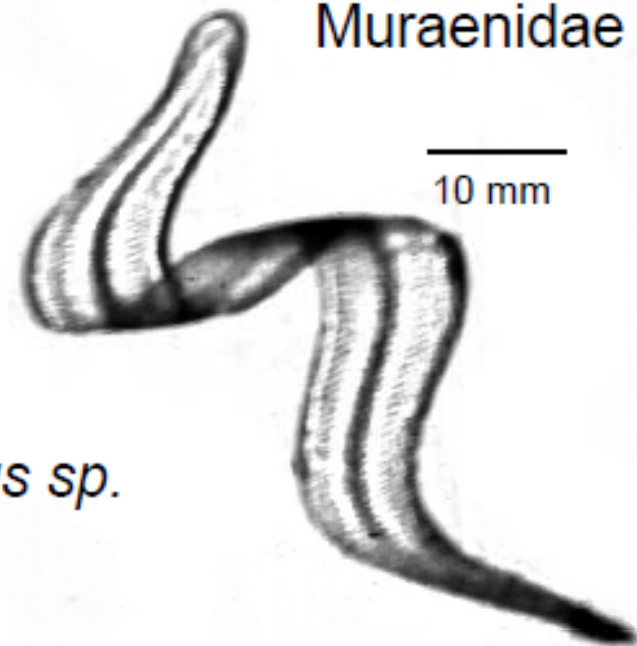
The **Manta CalCoFi** net



Carangidae



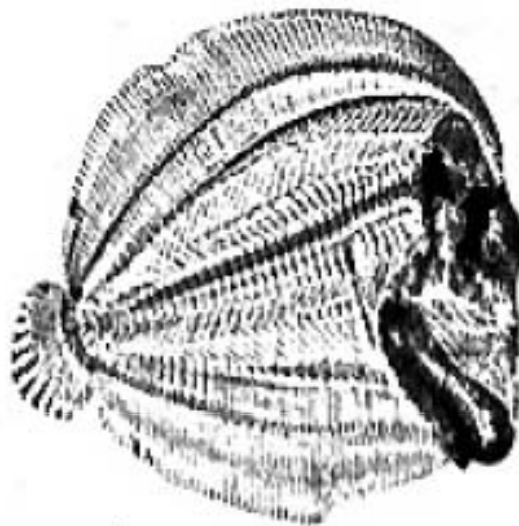
Muraenidae



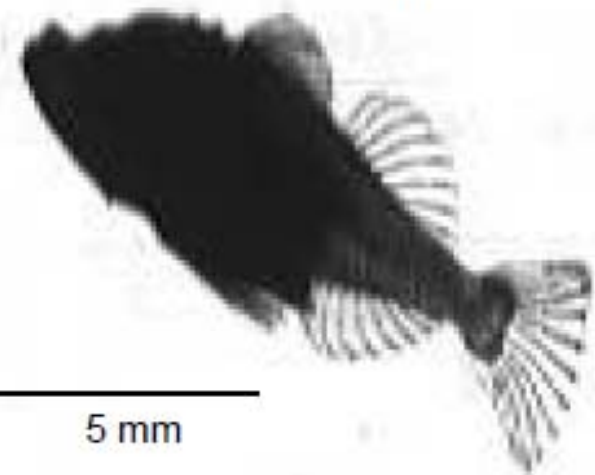
Serranidae – *Epinephelus* sp.



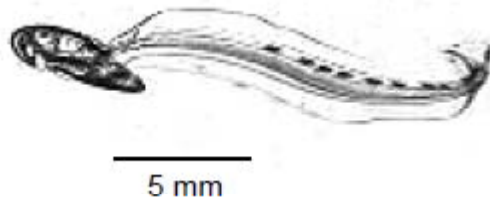
Bothus sp.



Triglidae



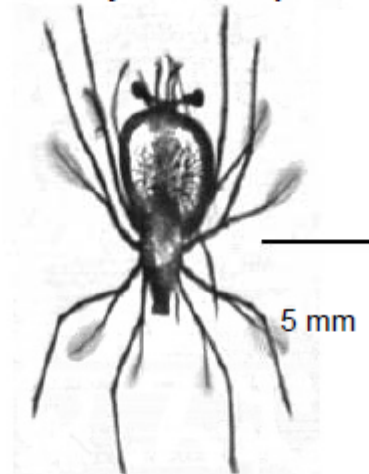
Larvacean
Oikopleura sp.



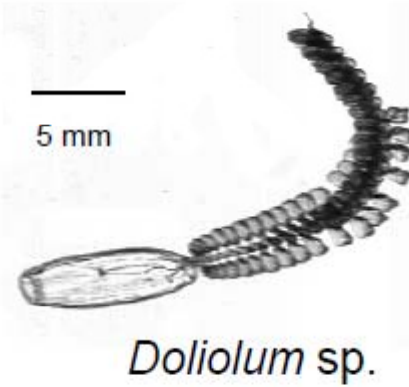
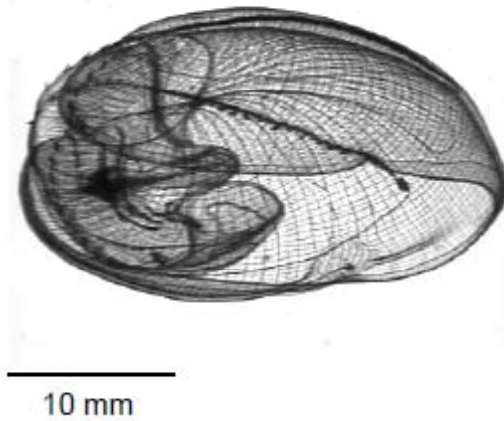
Copepod



Scyllarus sp.



Ctenophore

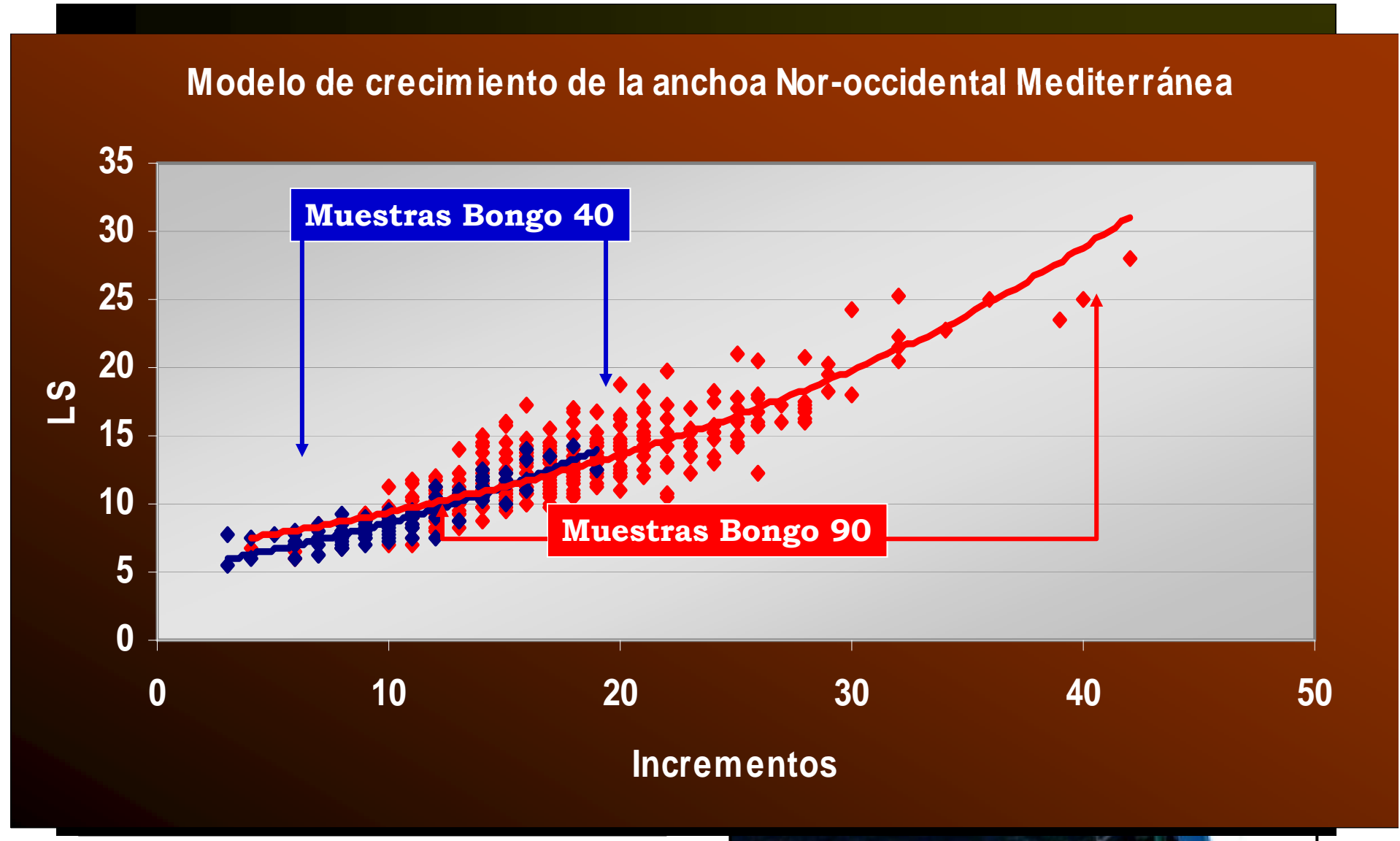


Doliolum sp.

Or using specific nets designed for acquiring larger sized larvae and for nighttime use as the BLACK TINTED Bongo 90.



➤ Comparative sampling of Bongo 90 and Bongo 40 were undertaken to verify larval size differences in the samples.

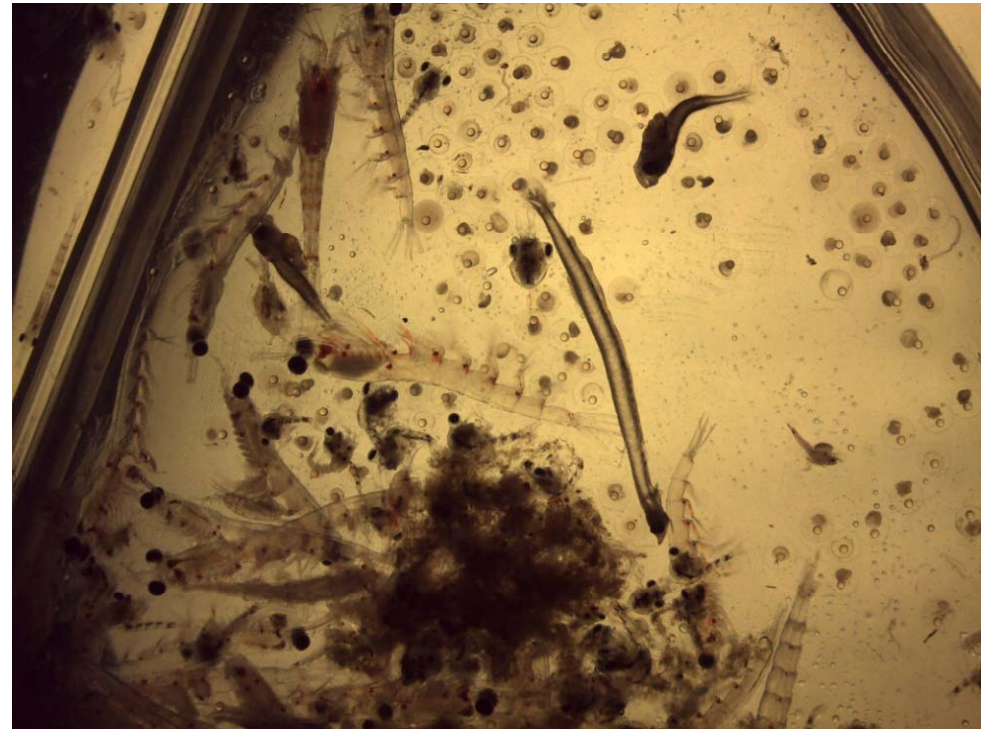


Choice of plankton mesh:

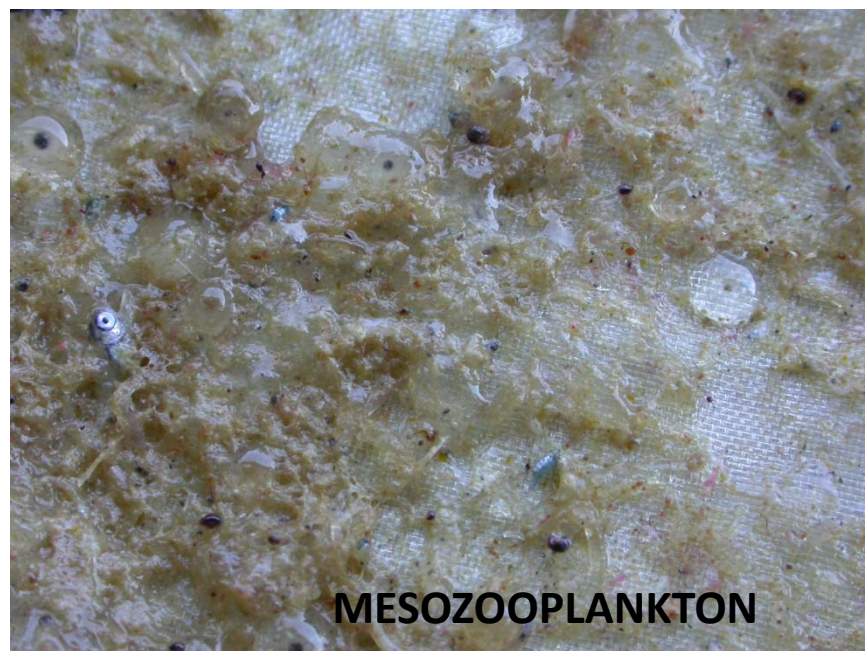
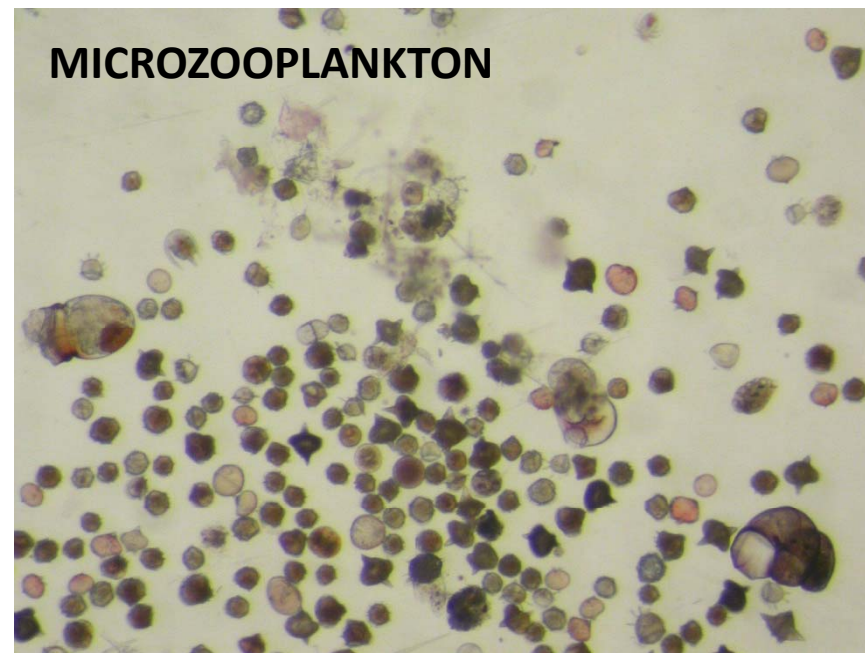
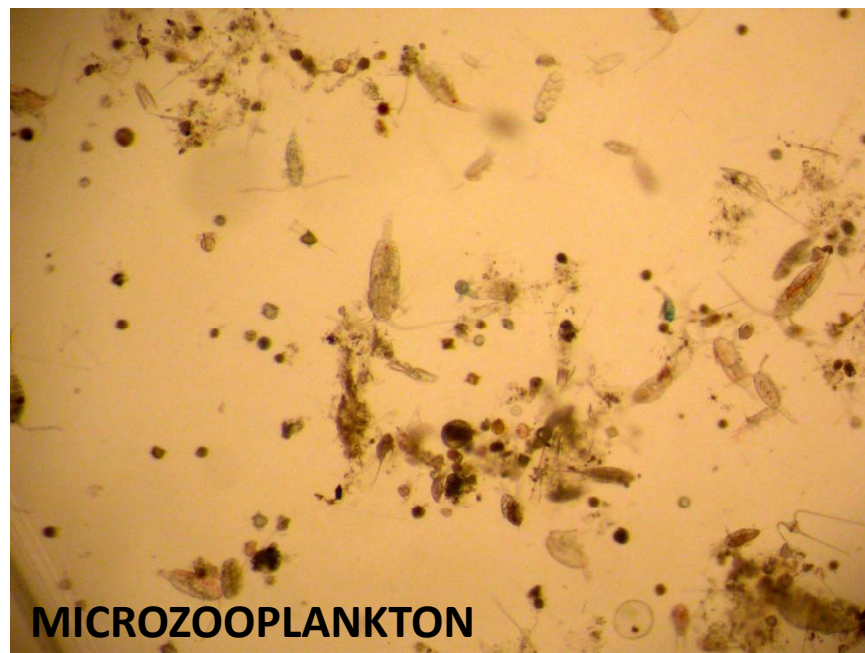
The standard mesh in ichthyoplankton is 333 μ m

However, in determined multidisciplinary approaches one may use different meshes to segregate by size fractions that comprise plankton.

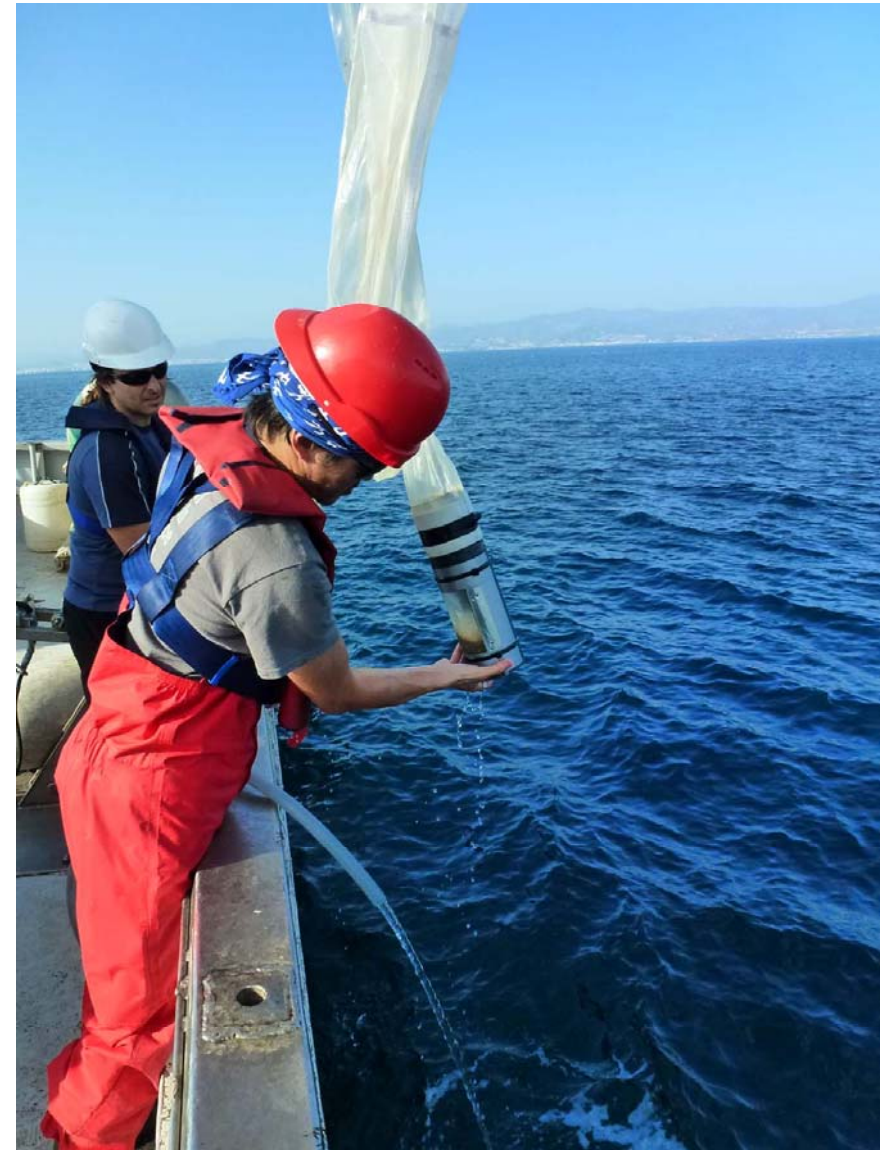
For example, in trophic studies it is interesting to have data food availability for larvae.



In our trophic studies, we segregate plankton components by using a 55 μ m mesh (CalVet). The sample acquired is filtered on board by a 200 μ m mesh, thus establishing a size fraction of 50-200 μ m mesh and >200mm distinguishing micro- from mesozooplankton



And never forget to wash the nets and sample collector



Thank you