TRAINING COURSE ON ICHTHYOPLANKTON

Introduction to ichthyoplankton research and its application in ecology and fisheries studies

by

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What is ichthyoplankton?

It is the plankton fraction corresponding to fish eggs and larvae subject to the mercy of currents and drifts of the circulation pattern in a given area.

Why research on ichthyoplankton?

- Concerns acquiring basic knowledge towards understanding the functioning of a pelagic ecosystem
- Essential knowledge in implementing ecosystem based approach to fisheries
- Provides important knowledge on fisheries assessment, as:
  - Spatial delimitation of the spawning grounds of commercial fish
  - Spawning seasonality
  - Both necessary for recommending seasonal/spatial closures to fisheries administration
    - Ichthyoplankton based methods for estimating pelagic resources
      - Daily Egg Production Method (DEPM) (small pelagics)
      - Larval Index Method (bluefin tuna)
- Defining larval fish assemblages and its relationships with hydrographic circulation patterns
But above all, ichthyoplankton research implies multidisciplinary approaches.

Advances in research is product of TEAM WORK..., by creating network of researchers interested in acquiring a BROADER standpoint in defining and understanding the habitat of spawning ecosystems

And hopefully, by creating ichthyoplankton experts network
Proyects on Small and Large Pelagic species

RESEARCH GROUP
LARVAL FISH ECOLOGY

Distribution and Ichthyoplankton Abundance
Ichthyoplankton Assemblages
Hydrography
Growth, Condition, Larval trophic ecology Genetics
Biological Oceanography
Ichthyoplankton based evaluations

Objetives
- Defining spawning habitats
- Influence of mesoscale processes, Transport/drift processes, Characterization of physical and chemical properties
- Microzooplankton distribution, feeding availability for larvae, biological characteristics of microzooplankton
- Taxonomic studies, Fish larval assemblages, Species associations
- Growth modeling, larval condition indices, larval production, mortality estimates, development of tools for ageing etc.
- DEPM, Larval indices

MODELING
Ichthyoplankton related fields of research:

**Larval growth**
- Most species comply with the growth-mortality hypothesis (Anderson, 1998) that relates larval survival with fast growth by 3 mechanistic ways
  - Stage-duration during larval ontogeny
  - Bigger is better
  - Growth rates
  - Therefore, if fast growth relates to survival, it further relates to RECRUITMENT, and thereby, useful for fisheries advice

**Larval trophic ecology**
- Larval survival is also intimately related to feeding availability in the larval habitat

**THESE FIELDS OF RESEARCH CAN HELP UNDERSTANDING RECRUITMENT SUCCESS/FAILURES**
ENVIROMENTAL DRIVERS

MATERNAL EFFECTS

TEMPERATURE

FOOD AVAILABILITY

GROWTH

RECRUITMENT

TOOLS NEEDED FOR ASSESSING GROWTH AND TROPHIC CONDITION
10 day old larval bluefin

Showing growth large differences by weight and size that can cause important consequences on recruitment
Otolith

- Larval otoliths

- Subject to continuous processes of growth

- Growth is expressed as the daily deposition of rings or increments (Pannella, 1971). In sardines and anchovies, increments are accreted daily.

- Increments are deposited daily (otolin) and calcium carbonate (Morales-Nin, 1987).

- These act as auditive organs, perceiving noises and have the function of equilibrium (Wright y col., 2002)


The heavy isotope of nitrogen $\delta \text{N}^{15}$ of a consumer is greater than its diet and this difference is trophic enrichment.

$\delta \text{N}^{15}$ is an indicator of the trophic position of a consumer in the trophic web.
\[ \delta^{15}N_{depredador} = 3.0 + \delta^{15}N_{presa} \]
THANKS FOR YOUR ATTENTION