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INTRODUCTION

This work investigated variation in abundance and distribution of in Atlantic mackerel (*Scomber scombrus*), horse mackerel (*Trachurus trachurus*) and sardine (*Sardina pilchardus*) eggs in relation of changes in physical conditions along the last decade (2000's).

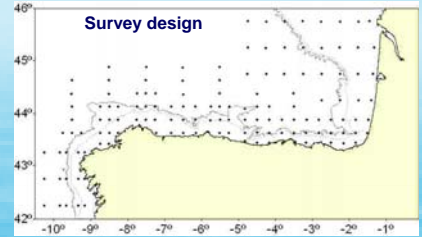
Studies of Ichthyoplankton have shown that fish Eggs abundance and distribution may have temporal and spatial patterns that are caused by physical factors such as salinity and temperature.

MATERIAL & METHODS

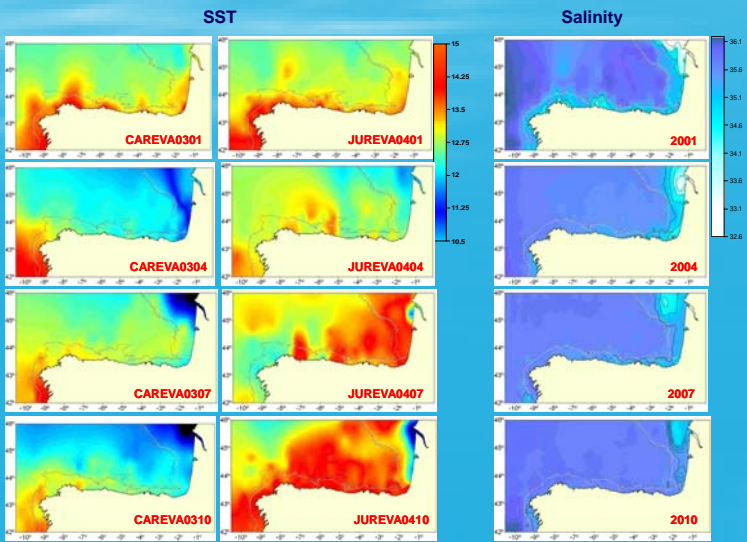
Eight ichthyoplankton surveys were conducted during spring period along 2000's decade with the aim of estimate the spawning stock biomass of in the North East Atlantic by Annual Egg Production Method (ICES 2010). These Surveys are coordinated internationally every 3 years and the aim is to estimate the spawning stock biomass of the North-east Atlantic mackerel and horse mackerel stocks.

The southern area is surveyed by Instituto Español de Oceanografía on board the R/V Comide de Saavedra cover the north-western Iberian Peninsula waters and the inner part of the Bay of Biscay (ICES Divisions VIIIc, VIIIb and Subdivision IXa North). Two surveys are carried out triennially during March (CAREVA) and another one in April (JUREVA). Right map shows survey design in the sampling area. Ichthyoplankton samples and temperature and salinity profiles were obtained in every station (ICES 2009).

Egg abundance of mackerel, horse mackerel and sardine from these surveys were analyzed. Moreover Sea Surface Temperature (SST) at 5m and Salinity at 20 m were analyzed. T-S plots were performed egg density. The T-S plots allow inference about the water masses sampled and provide a characterization of the egg distribution in relation to combinations of temperatures and salinities. Egg densities lower than 1 have been omitted.

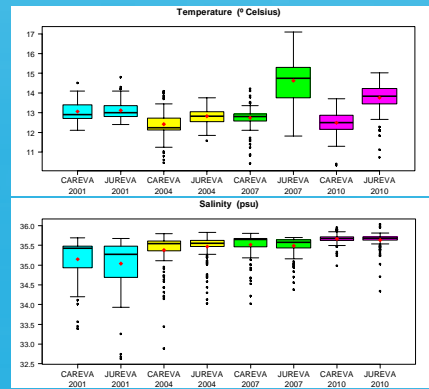


RESULTS AND DISCUSSION

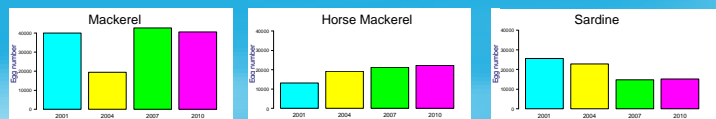


The distribution of SST tends to be zoned: warmer water was found in West Iberian coast in March (CAREVA), however in April (JUREVA) warmer waters appear in the Bay of Biscay respect west coast in the last years (2007 and 2010).

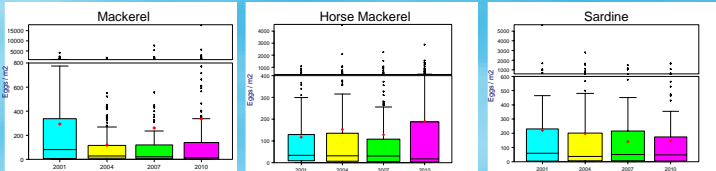
Fresh water inputs have a local effect on the distribution of salinity, lower salty water was found near rivers. Low salinity band close to the coast was noted during the beginning of decade (2001).



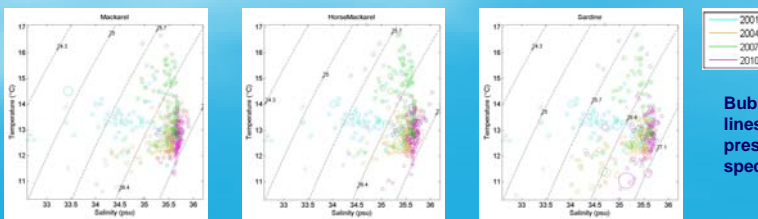
Inter-annual SST variability show a different pattern along the decade. Higher temperatures in April (JUREVA survey) are noted in the early 00's respect to the late 00's. However no significant differences intra-annual salinity (March- April) was noted although a wide salinity range is showed in the early decade (2001) respect narrower salinity range in the late decade



Bar plots allow us to distinguish that maximum abundances were found in mackerel comparing to horse mackerel and sardine ones. For mackerel similar egg abundances were observed along decade except for 2004. However an increasing and a decreasing egg abundances along 2000's were noted for horse mackerel and sardine, respectively.



Box plots show no significant interannual variability for egg density (egg/m2) in the three species collected during these surveys. However a wider density range and bigger egg densities are noted for mackerel in 2001. Red dots means arithmetic mean.



Bubbles in Temperature-Salinity plots represent egg densities (egg/m2). Dotted lines are isolines of equal water density (pycnocline). In the early 2000's egg presence was observed in a wider pycnocline range than in the late decade in all species

CONCLUSIONS

- Higher temperatures during April are noted in in the late decade respect to the early decade in the 2000's. By other hand narrower salinity range is observed in the late decade opposite to early decade.
- No interannual variability for egg density (egg/m2) in the three species along the decade was observed.
- At the beginning of the decade egg presence was observed in a wider pycnocline range than at the end decade in all species.

REFERENCES

- ICES 2010. Report of the Working Group on Widely Distributed Stocks (WGWD). ICES CM 2010/ACOM:15.
- ICES 2008. Report of the Working Group on Mackerel and Horse Mackerel Egg Surveys (WGMEGS). ICES CM 2008/LRC:09.