Bourne, 1987). Production of somatic and shell component was estimated by the mass specific growth method (Crisp, 1984).
Growth parameters were estimated as Loo= 109.6 mm, K=1.0/year and to=0.02. Mean annual scallop abundance was 2.20 $ind.m^{-2}$, which represented a mean annual biomass of 104.09 $g.m^{-2}$. Total annual production was estimated to be 187.68 $gm^{-2}y^{-1}$ (243.80 $kJm^{-2}yr^{-1}$) and the mean annual turnover rate, 1.80. Somatic weight decreased during autumn and winter and began to increase in spring, showing maximum values in summer. On the opposite, shell weight decreased during summer, started to increase during winter and registered the maximum value in spring. Gonadic weight showed two peaks, one in December (summer) and the other in autumn (May). The ANCOVA showed significantly heavier somatic tissue in spring and summer ($p<0.001$), while gonadic tissue showed significant differences between the four seasons ($p<0.001$). Shell tissue showed significant differences between seasons ($p<0.001$), except for autumn and winter ($p>0.05$). According to its production, *A. purpuratus* is likely to play a significant role in the trophic web of Tortugas Bay.

References

Crisp, D. J. 1984. Energy Flow Measurements. En: Holme, N.A. & A.D. McIntyre (eds.), Methods for the Study of Marine Benthos, IBP Hand Book 16. Blackwell Scientific Publications, pp: 284-372
MacDonald, B.A. & N. F. Bourne. 1987. Growth, Reproductive output, and energy portioning in weathervane scallops, *Patinopecten caurinus*, from British Columbia. Can. J. Fish. Aquat. Sci. 44: 152-160.

HCS178 - IBM for the anchovy in the Northern Humboldt Current Ecosystem: identification of processes affecting survival of early life stages.

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We focus on the northern/central stock of anchovy (*Engraulis ringens*) in Humboldt upwelling region off Peru. We use an Individual Based Model (IBM) of the first stages of life coupled with a hydrodynamic output from the Regional Ocean Model System (ROMS) model to investigate the factors driving eggs and larval survival rates variability.
Our approach consists in a Pattern Oriented Modeling (POM) of the spawning time and locations. Environmental parameters influencing larval survival are added one by one to the model. Both climatological and interannual hydrodynamic outputs are used, to study independently the seasonal and interannual effect on (pre)recruitment.
In a first time we define the spawning success with a coastal retention criteria, and investigate the spawning tactics to approach the observed patterns. We found that (1) observed real spawning date and areas relatively match variations in coastal retention rate, with an exception during the summer peak of spawning; (2) the depth of spawn and the vertical behavior of the larvae have a great influence on coastal retention time, and the best place to enhance retention is the deepest that the oxycline allows; (3) Finally, the ENSO didn't have a great influence over the coastal retention rates, suggesting a biggest importance of temperature mortality effect.
Our modeling approach produced a set of hypothesis on spawning locations and larval behavior that could be tested empirically by collecting new data.

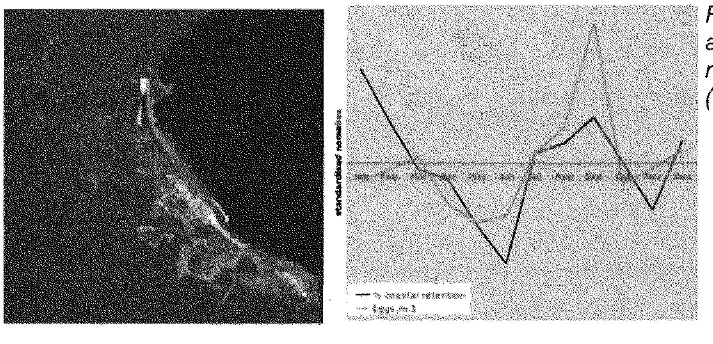

Figure 1. left, Simulated transport of anchovy eggs and larvae; right, Coastal retention (%) and egg concentracion (ind.m-3).

References

Cury P et al. (2000) Small pelagics in upwelling systems: patterns of interaction and structural changes in "wasp-waist" ecosystems. Ices Journal of Marine Science 57:603-618.
Fogarty MJ (1993) Recruitment in randomly varying environments. ICES Journal of Marine Science 50:247-260.
Mullon C, Fréon P, Parada C, van der Lingen C, Huggett J (2003) From particles to individuals: modelling the early stages of anchovy (*Engraulis capensis/encrasicolus*) in the southern Benguela. Fisheries Oceanography 12:396-406.

Brochier Timothee, Tam J., Ayon P. (2006).

IBM for the anchovy in the northern Humboldt current ecosystem : identification of processes affecting survival or early life stages. In : Climate ocean dynamics, ecosystem processes and fisheries : the Humbolt current system : book of extended abstracts.

La Paz (BOL) ; La Paz : IMARPE ; IRD, p. 158.

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