



Distribution and community structure of ichthyoplankton from the northern and central California Current in May 2004-2006



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Outline

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- Methods
- Results
 - Environmental variables/indices
 - Dominant taxa
 - Cluster/MDS analyses
 - Larval concentrations: depth, annual, latitudinal, cross-shelf
 - Environmental correlations and multivariate analysis
- Conclusions

Why do we care about fish early-life stages??

- Recruitment



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- Trophic interactions



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- Recruitment
- Trophic interactions
- Spawning location

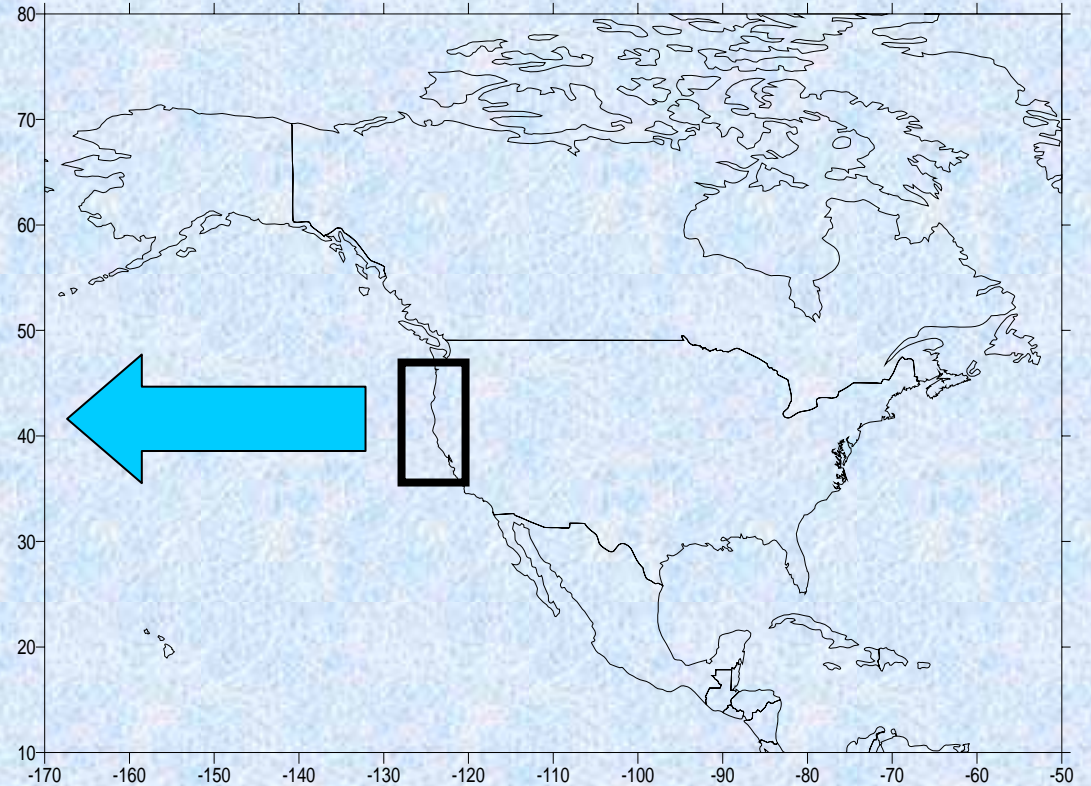
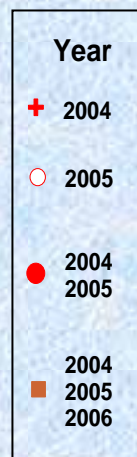
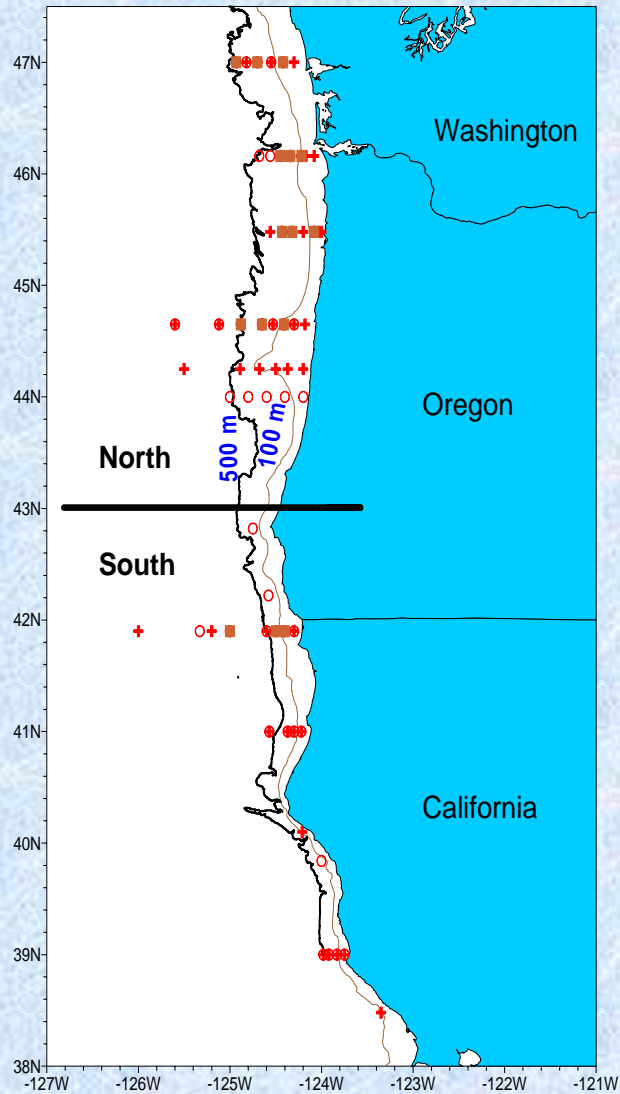


Why do we care about fish early-life stages??

- Recruitment
- Trophic interactions
- Spawning location
- Environmental indicators



Sampling stations

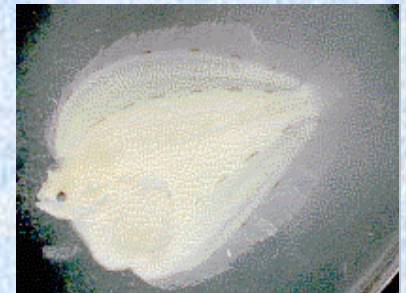


Sample collection



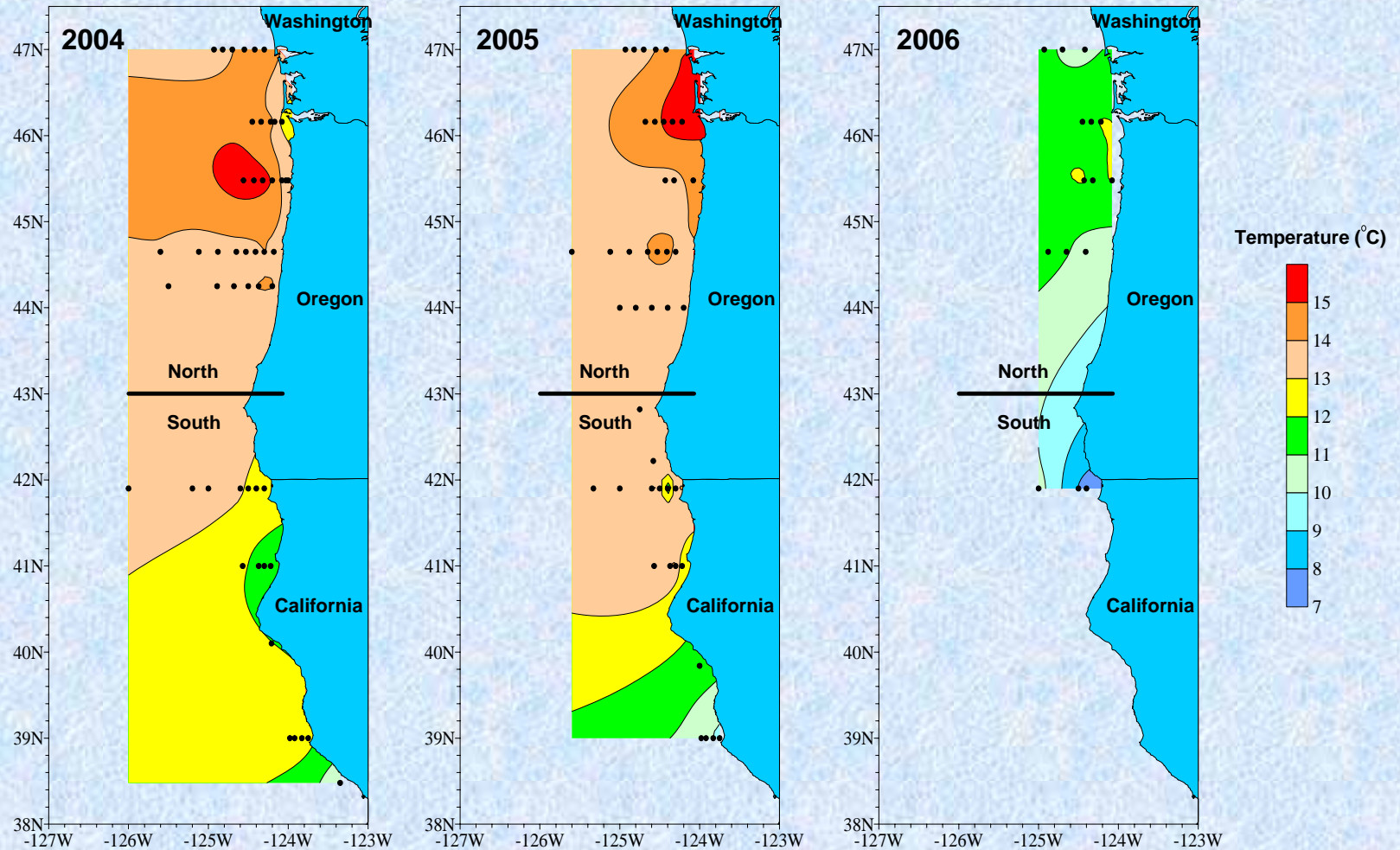
- 1-m² Tucker trawl
- Oblique tow
- Two 335- μ m meshed nets
- Depths: 20-100 & 0-20 m

Sample preservation and sorting

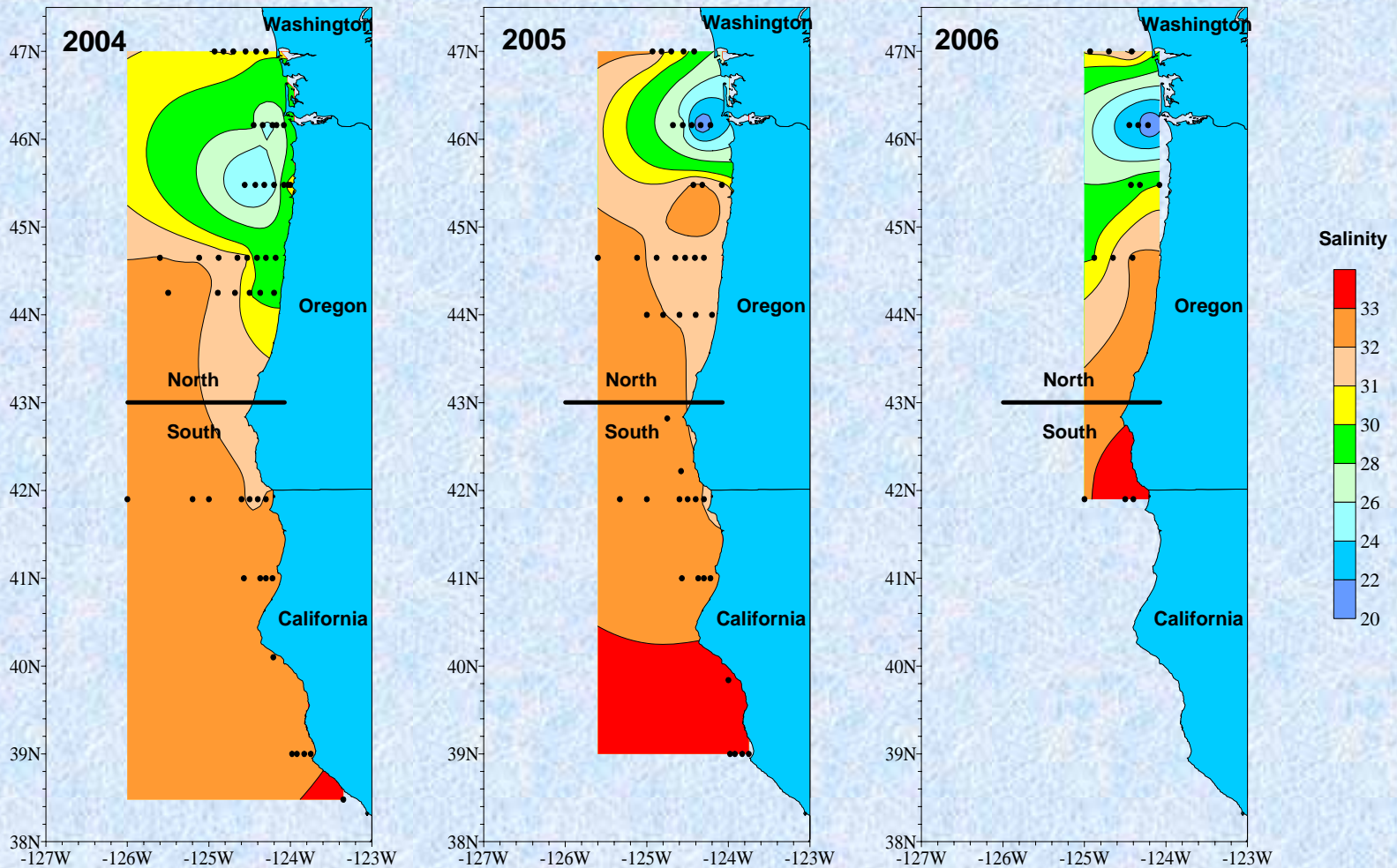


- Preserved in a 10% buffered-formalin seawater solution.
- Enumerated, measured (0.1mm), and identified to the lowest taxonomic level possible in the lab.

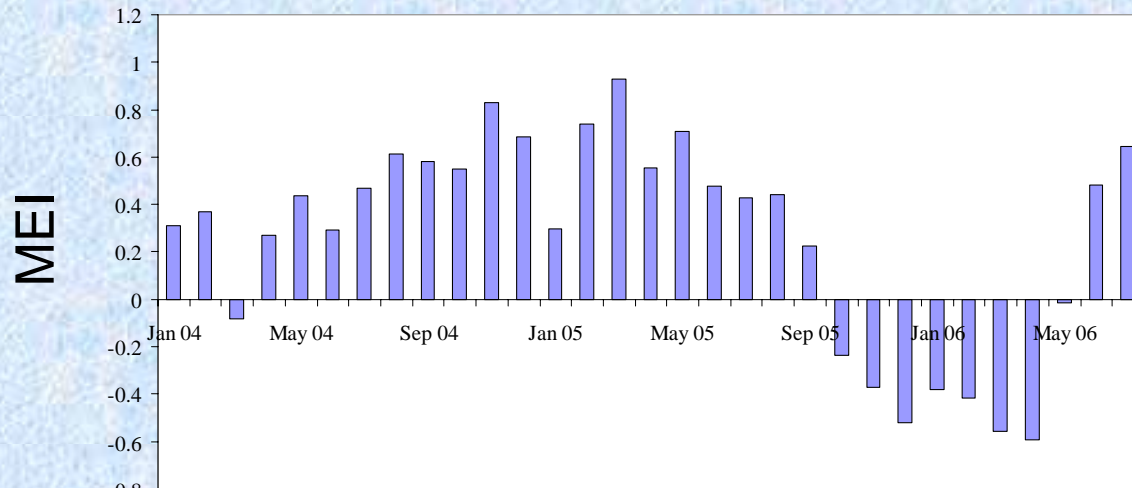
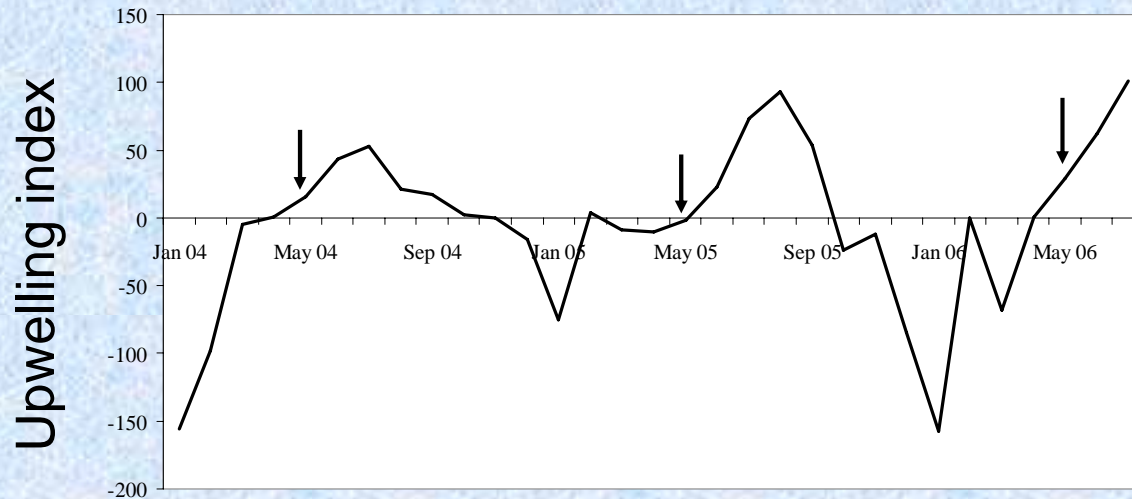
Sea surface temperature (SST)



Sea surface salinity (SSS)



Environmental indices



Date

Dominant Taxa



Citharichthys spp.



Engraulis mordax



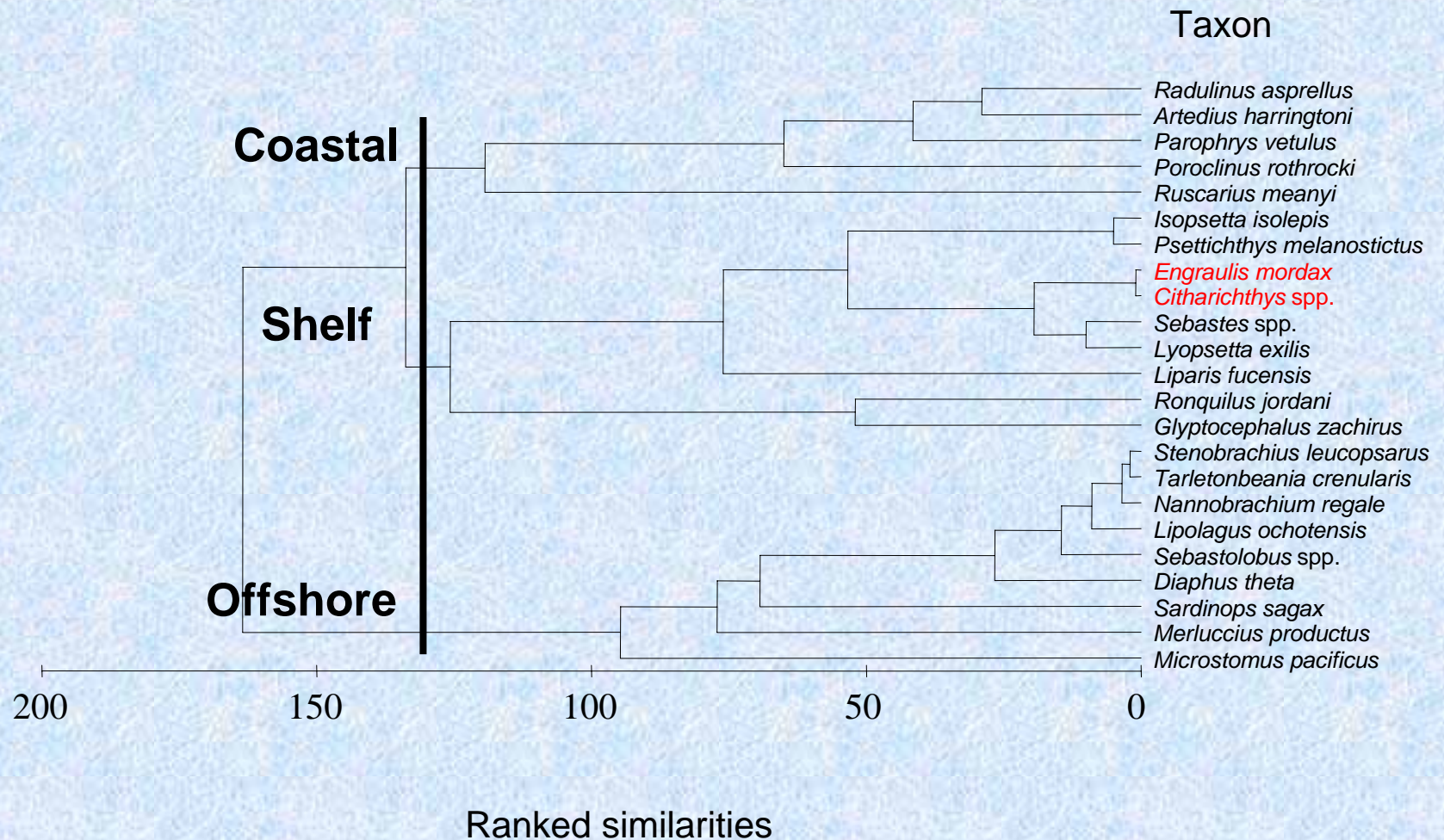
Sebastes spp.



Stenobranchius leucopsarus

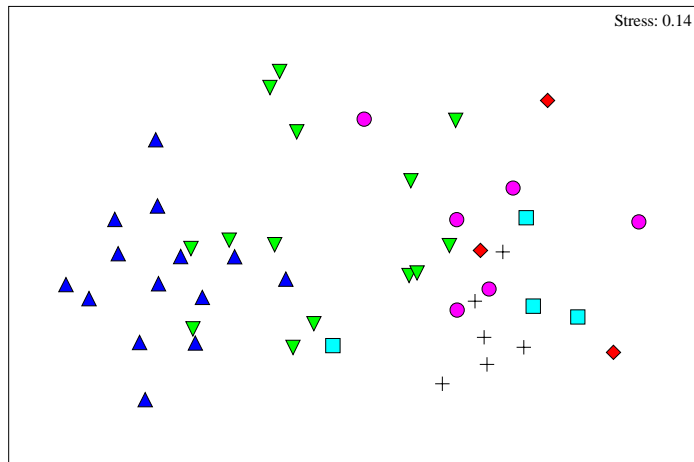
- 170 depth-stratified samples (106 hauls)
- 14,819 fish larvae
- 56 taxa in 23 families
- Four dominant taxa = 78% of total mean larval density
- Noteworthy larvae found:
 - Pacific sardine
 - Pacific hake

Taxon clusters

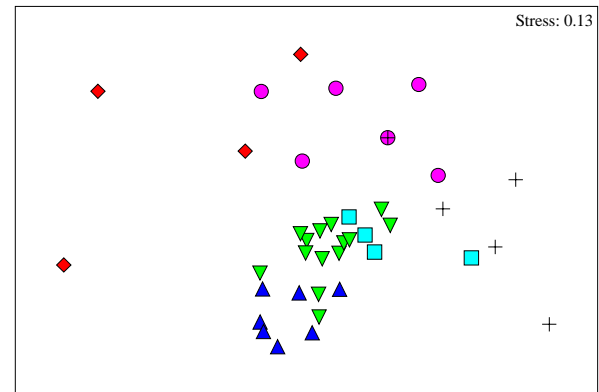


Station MDS

2004

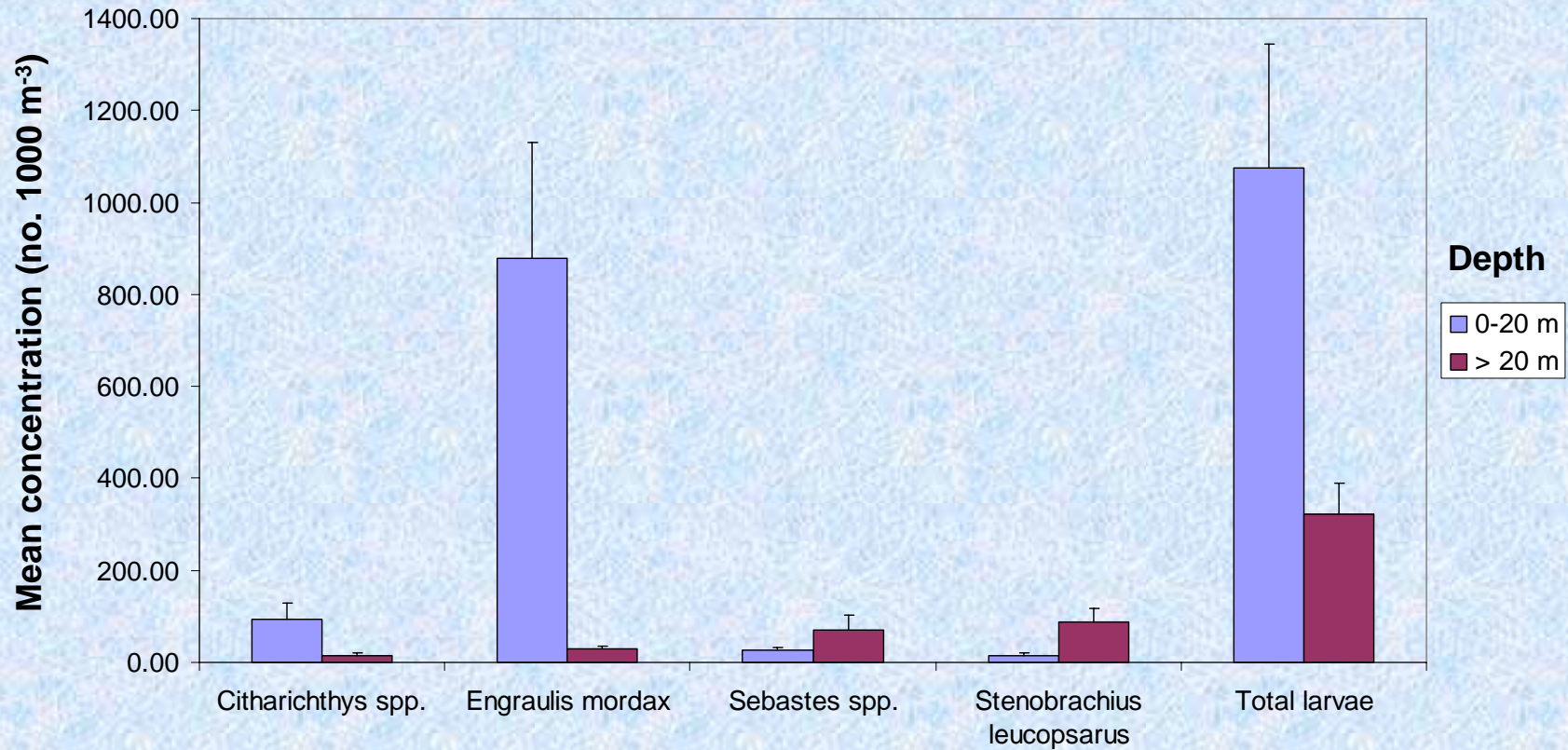


2005

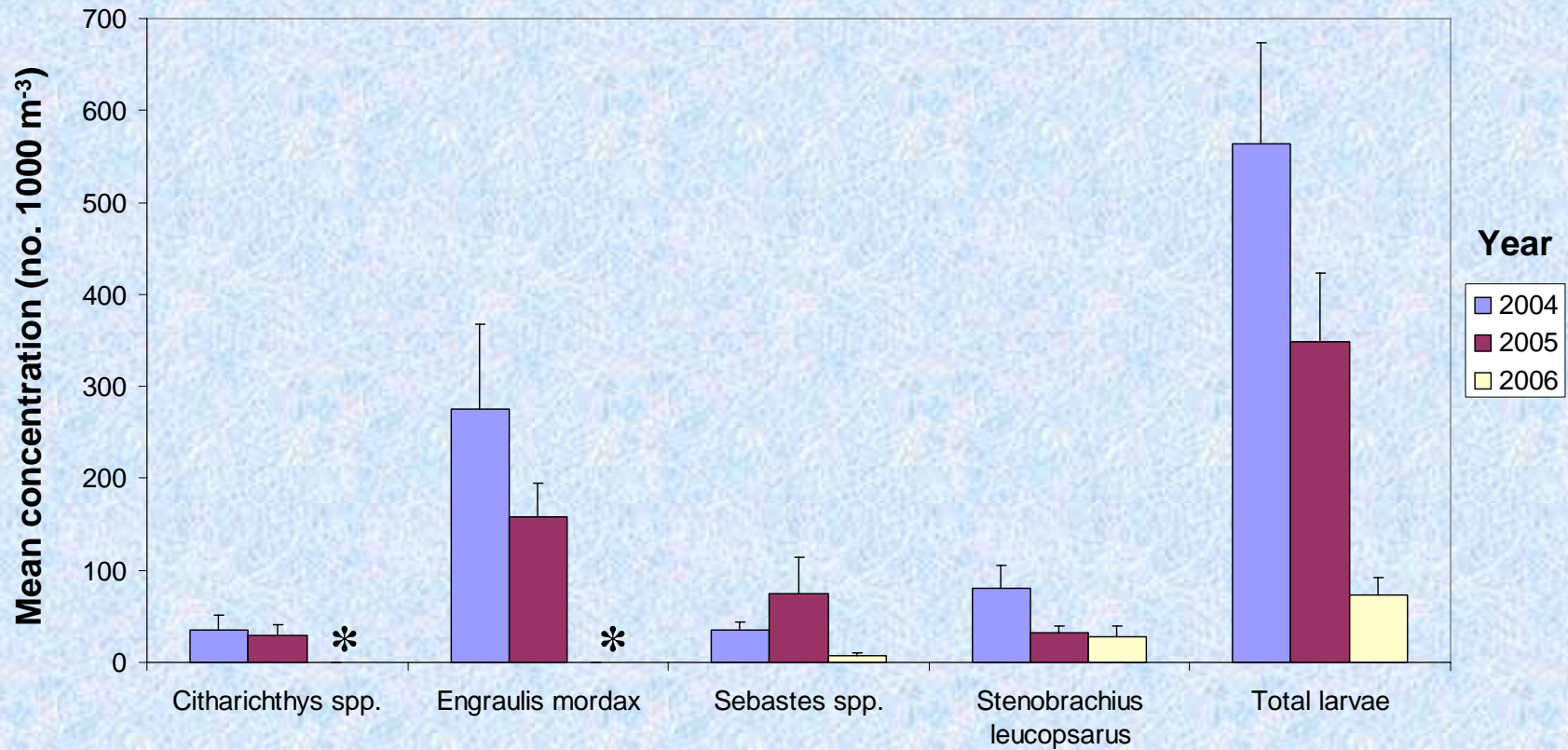


- ▲ NC
- ▼ NS
- NO
- ◆ SC
- SS
- + SO

Depth concentrations

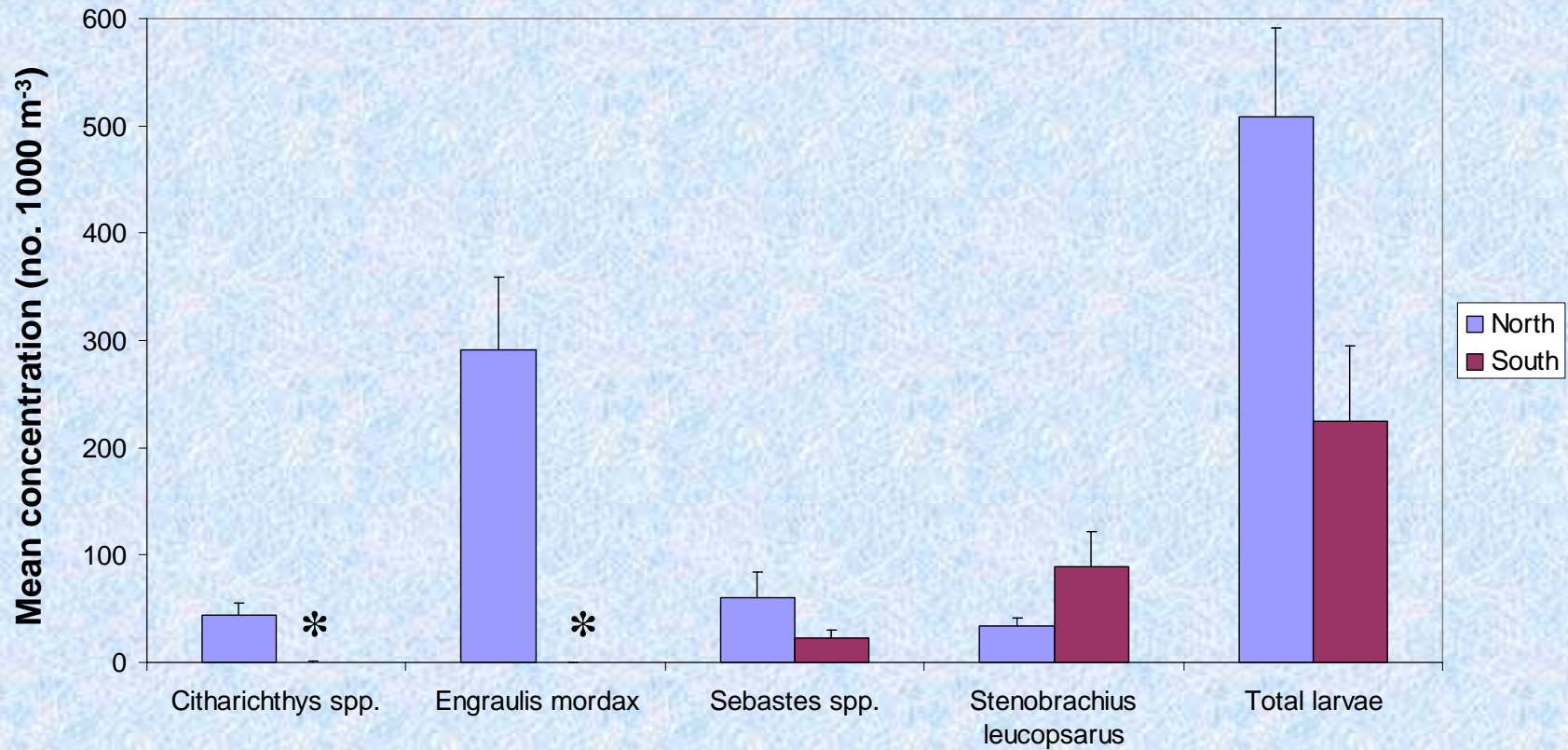


Annual concentrations



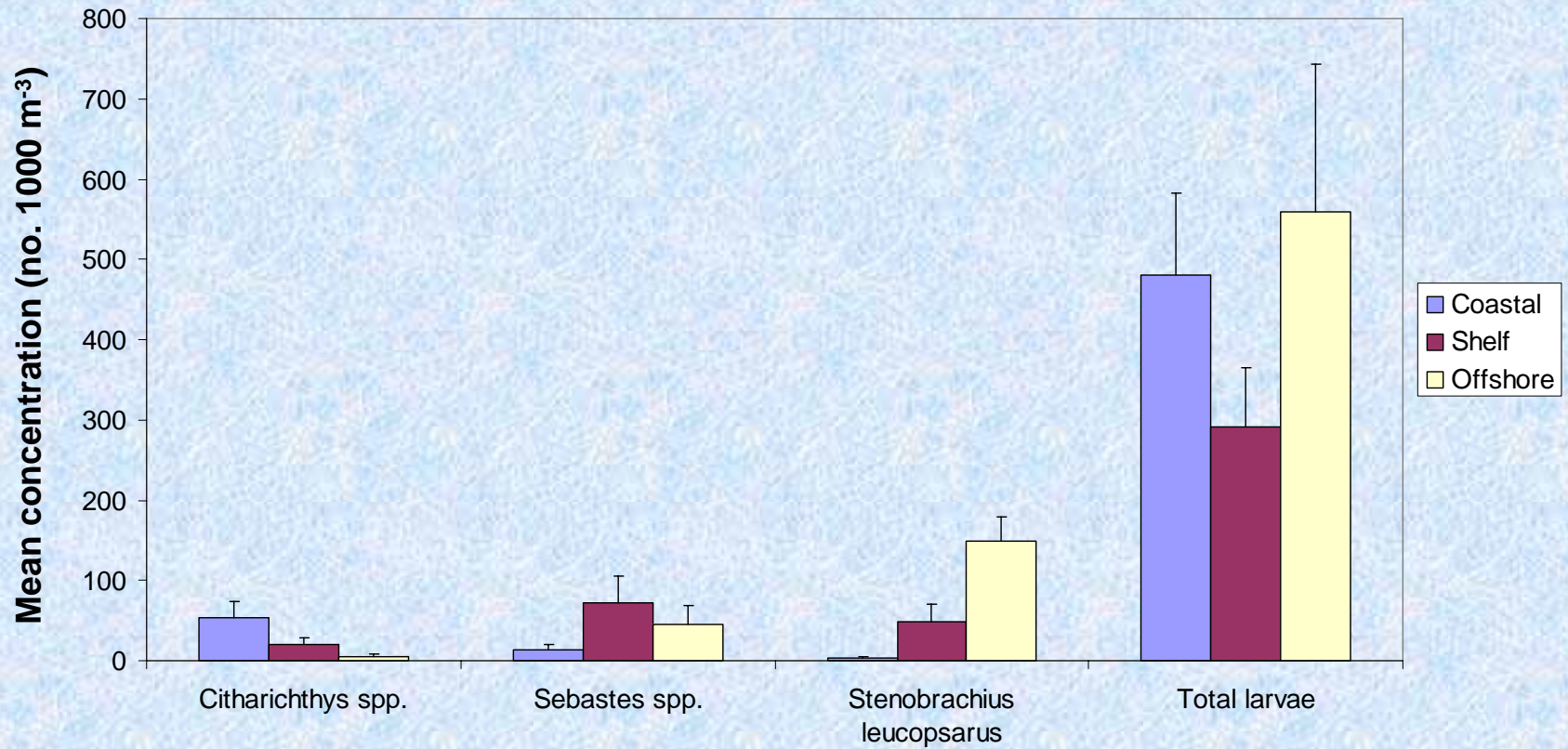
* ≤ 1 larva found

North/South concentrations



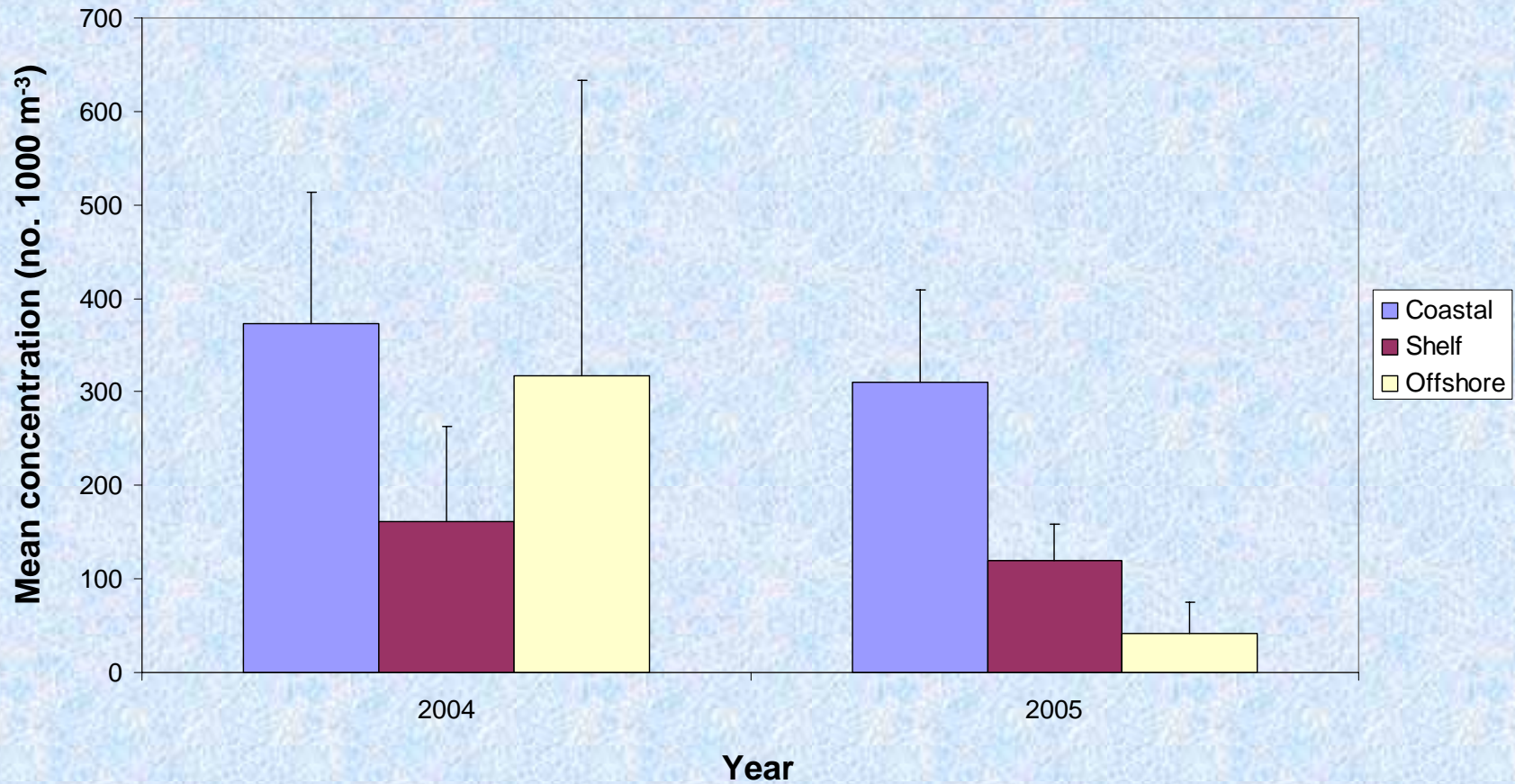
* ≤ 8 larvae found

Cross-shelf concentrations



Cross-shelf concentrations

E. mordax



Correlations

	Temperature (°C)	Salinity
Salinity	-0.43	-
<i>Citharichthys</i> spp.	0.57	-0.28
<i>Engraulis mordax</i>	0.58	-0.41
<i>Sebastes</i> spp.	0.18	0.01
<i>Stenobranchius leucopsarus</i>	0.17	0.18
Total larvae	0.44	-0.20

$P < 0.05$

Multivariate BIO-ENV

- **Model variables:** latitude, station depth (m), distance from shore (km), temperature (°C), and salinity
- **Significant variables:** latitude, station depth, and temperature ($p_w = 0.48$)

Conclusions

- **Dominant taxa:** *Citharichthys* spp., *E. mordax*, *Sebastes* spp., *S. leucopsarus*
- **Assemblages:** combination of latitude (north, south) and cross-shelf (coastal, shelf, offshore)
- **Concentrations:**
 - *Citharichthys* spp., *E. mordax*, total larvae: 0-20 m; *Sebastes* spp. and *S. leucopsarus*: > 20 m
 - 2004 & 2005 > 2006
 - North > South
 - *Citharichthys* spp.: coastal; *E. mordax*: upwelling dependent; *Sebastes* spp.: shelf; *S. leucopsarus*: offshore; total larvae: coastal/offshore
- **Environ. correlations:**
 - + temperature, - salinity



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