Bivalves' biodiversity and distribution on the Aquitain coast (Bay of Biscay, France)

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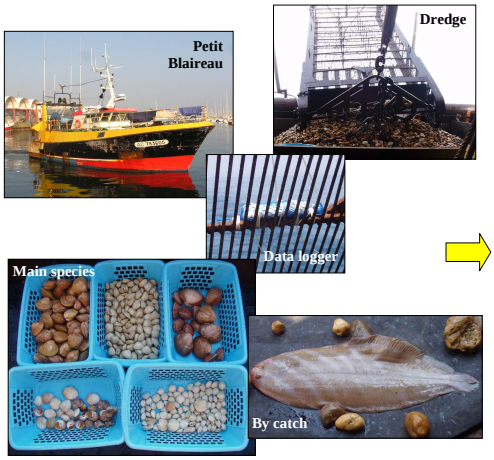
Introduction

At the request of professionnal fishermen (CRPMEM of Aquitaine), a sampling program on bivalves was implemented in 2006. The main objective was to determine the possibility of diversifying the fishing ativity for Aquitain trawler fleet. Few elements were available in the bibliography on the bivalves population and their potentialities of exploitation in this area. The main results concerning species composition, biometric characteristics as well as their location according to the depth and the bottom nature are presented.

Materials and Methods



Sampling survey

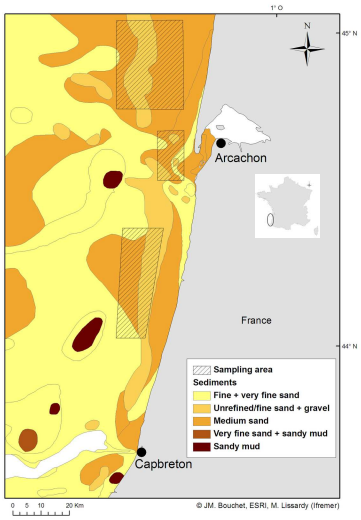
Ship: professional trawler «Petit Blaireau » chartered for 8 campaigns (length 16 m ; power 258 kW) during summer 2006

Dredge: small bivalves dredge (space between bars 11-12 mm opening 1,37 m). Dredge was instrumented with a data logger for seawater temperature and depth of the fishing gear

Sampling strategy: a stratified sampling according to the nature of sediments with 1 fishing hauls (of 10 mn) by 0,75 miles ² and a depth between 20 and 80 m

Biological data: identification, individual number, total weight, individual length, by catch species listed.

Statistical approach: spatial distribution of the main species according to bottom nature and bathymetry is presented as well as their structures in size (after division in classes with the rule of *Sturge*). Non parametric *Kruskal-Wallis (H)* was applied and a comparison test was used.



Results

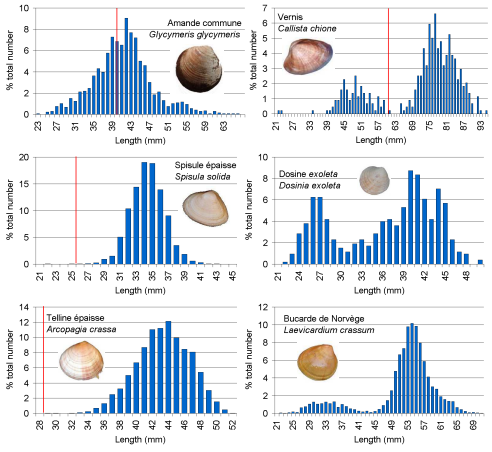
Bivalves' biodiversity on Aquitain coast: 22 species

Family	Genus species	
Cardiidae	*Acanthocardia echinata*	(Linné, 1758)
Cardiidae	*Acanthocardia tuberculata*	(Linné, 1758)
Cardiidae	***Laevicardium crassum***	**(Gmelin, 1791**
Glycymeridae	***Glycymeris glycymeris***	**(Linné, 1758)**
Mactridae	*Lutraria magna*	(Da Costa, 1778)
Mactridae	*Mactra corallina*	(Linné, 1758)
Mactridae	*Mactra glauca*	(Born, 1788)
Mactridae	***Spisula solida***	**(Linné, 1758)**
Myidae	*Mya truncata*	(Linné, 1758)
Pectinidae	*Pecten maximus*	(Linné, 1758)
Pinnidae	*Atrina fragilis*	(Pennant, 1777)
Solenidae	*Ensis arcuatus*	(Jeffreys, 1865)
Solenidae	*Ensis ensis*	(Linné, 1758)
Solenidae	*Ensis siliqua*	(Linné, 1758)
Solenidae	*Solen marginatus*	(Pennant, 1777)
Tellinidae	***Arcopagia crassa***	**(Pennant, 1777)**
Veneridae	***Callista chione***	**(Linné, 1758)**
Veneridae	*Chamelea gallina*	(Linné, 1758)
Veneridae	***Dosina exoleta***	**(Linné, 1758)**
Veneridae	*Dosina lupinus*	(Linné, 1758)
Veneridae	*Venerupis rhomboidees*	(Pennant, 1777)
Veneridae	*Venus verrucosa*	(Linné, 1758)

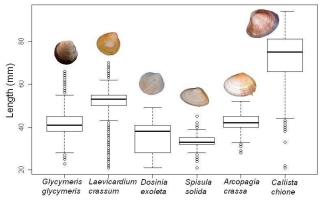
Among those, 6 are considered to be potentially exploitated. They are well represented in the area and their densities are correct.

And by catch
1 annelid - 6 échinoderms
9 crustaceans - 11 molluscs - 19 fishes

Only one cohort was sampled for *G. glycymeris*, *S. solida* and *A. crassa*. For *C. chione*, *D. solida* and *L. crassum* two cohorts can be seen. Only the second one can be exploited for *C. chione*.



Red bars represent limit of length for exploitation for some species. There is no limit in length for others.



Boxplot present a high variability of length for each species mainly explained by nature seabed and bathymetry

Results for bathymetric distribution

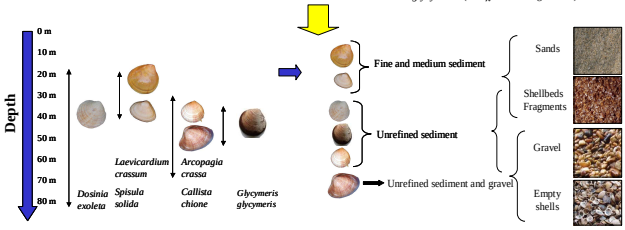
Homogeneous distribution of size classes: *S. solida* and *L. crassum* according to the depth ($H < \chi^2$ test significatif).

Heterogeneous distribution of size classes ($H > \chi^2$ test non significatif): *D. exoleta* and *A. crassa* with the biggest individuals in the less deep zones. The opposite for *C. chione* and *G. glycymeris*.

Results for seabed nature

Homogeneous distribution of size classes: *S. solida*, *D. exoleta*, *A. crassa* and *C. chione* according to the substratum ($H < \chi^2$ test significatif).

Nature of sediment influences the distribution of size classes for *L. crassum* and *G. glycymeris* ($H > \chi^2$ test non significatif).



Discussion and Conclusion

Main results are synthesised in this table and on the map.

They concern the location of exploitable fraction (upper the legal size) for the main bivalves' populations according to depth and substratum.

	Depth (m)	Substrat	Location
G. glycymeris	**40 - 50**	**Gravels**	south area
L. crassum	20 - 40	**Sands**	north area
S. solida	20 - 40	Sands	north area
D. exoleta	**20 - 50**	different types	south area
A. crassa	**30 - 40**	different types	south area
C. chione	**40 - 50**	different types	north area

Dominating parameters are indicated in bold face

Biological approach

Oceanic conditions unfavourable for bivalves population generally exploited in more sheltered areas and less deeper (Fahy et *al*., 2003; Gaspar et *al*., 2001).

Absence of high commercial value species as *Pecten maximus* or *Clamys varia*. Probably explained by oceanic conditions and biogeographical factor.

Main exploitable ressources are in ascending order: *S. solida*, *G. glycymeris* and *C. chione*.

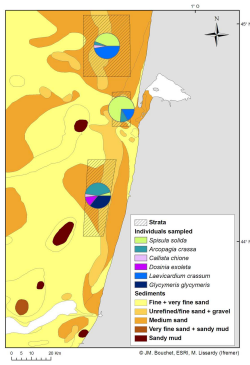
Low levels densities of those 6 species with regard to the other area exploited (Tunberg, 1984).

L. crassum is the most important population. Considered as accessory (Veale et *al* ., 2000; Gaspar et *al*., 2001); marketing modalities must be define to allow an exploitation (Coiffec, 2006).

Socio-economic approach

Only a complementary activity for some units for Aquitaine trawler fleet (Duclercq et *al*., 2006).

Location of main bivalves ressources



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