Morphometry and growth of a Bivalve : the common cockle *Cerastoderma edule* in the Bay of Somme

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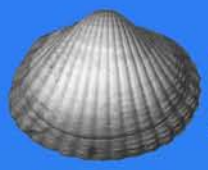
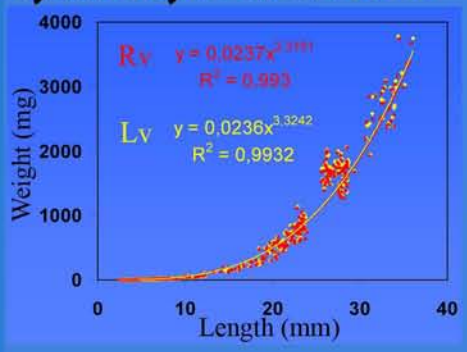


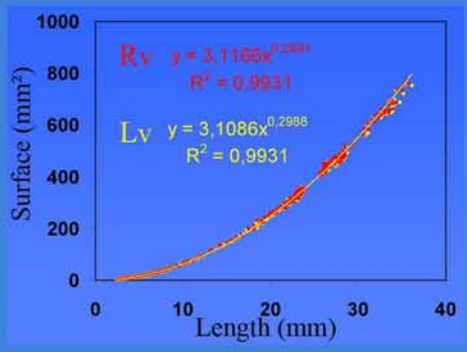
The common cockle is an economically important species in the Northeast Atlantic Ocean, from the Barents Sea in the North, to the Mauritanian coastline in the South. The Bay of Somme is the first French field with a production amounting to 3000 tons per year on average. However, the biology of this bivalve hasn't been studied a lot yet, especially its growth. So, this analysis is looking at the symmetry of the two valves in one hand and at a statistical age modelling based on morphological data, obtaining from the shell, in the other hand.

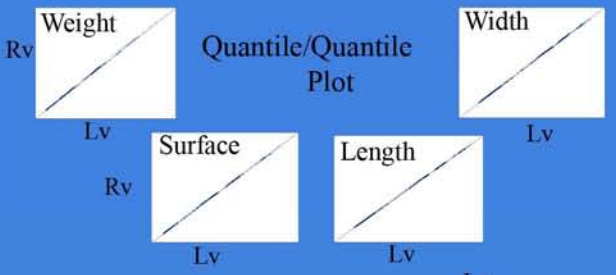
Materials and Methods

- 524 cockles were sampled and the two valves of the shell have been identified, referenced and processed separately : weight with a 0.1 mg precision.
- Length, width and surface were collected from high-resolution pictures analysis performed with the TNPC software (Digital Processing for Calcified Structures) with a 1.10^{-4} millimeter accuracy.
- Some valves were embedded in epoxy resin, sectioned and mounted on slides, then polished with successively finer grits of carbide paper and observed under microscope (60x magnification, mosaic image processing).

Symmetry of the 2 valves







Spearman Rank Correlation Matrix (N=524)

Rv \ Lv	SURFACE	WIDTH	LENGTH	WEIGHT
SURFACE	1.000	0.999	0.999	0.993
WIDTH	0.999	0.998	1.000	0.992
LENGTH	0.999	0.999	0.998	0.994
WEIGHT	0.993	0.994	0.992	1.000

The symmetry of the valves was tested with the length, the width, the surface and the weight. The statistical analyses show no significant difference between the left valve and the right valve with the significance threshold of 1%. There is no consequence using data from the Left valve (Lv) or the Right valve (Rv).

Predicting the age

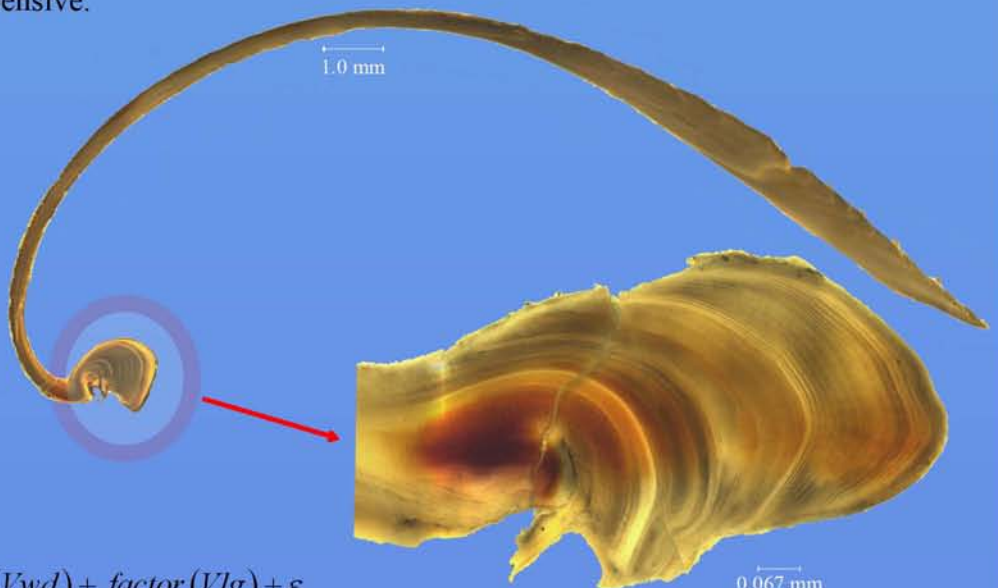
The valve is formed by accretion which can be counted to estimate the age. This method of ageing by internal microstructures analysis can be laborious and expensive.

sectioning
polishing

An alternative method uses the morphometric data as descriptors of the age (Francis & Campana, 2004 ; Ochwada *et al.*, 2008) with :

- Valves Weight (Vw)
- Valves Length (Vlg)
- Valves Surface (Vs)
- Valves Width (Vwd)

$$Age = factor(Vw) + factor(Vs) + factor(Vwd) + factor(Vlg) + \varepsilon$$



Outlook

> To identify a reading scheme in the internal microstructures
> The use of age data to calibrate the model
>To establish model with morphometric data for the stock assessment

Reference
Francis & Campana, 2004. Can. J. Fish. Aquat. Sci., 61 (6) : 1269-1284
Ochwada et al., 2008. Fisheries Research, 90 : 187-197.