

A modelling approach of Brown Ring Disease in the Manila clam,  
*Ruditapes philippinarum*

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**Financial support:** [PRIR MODEL MAB](#) founded by Région Bretagne

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**Period:** 2004-2007

**Description of the project:**

Manila clam, *Ruditapes philippinarum*, is an infaunal bivalve mollusc, which constitutes natural population in intertidal zone along French Atlantic coasts and in Mediterranean lagoons. This species was introduced in France for aquaculture purposes at the end of the 70's and represents today a substantial part of French bivalve production.



The Manila clam, *Ruditapes philippinarum*

The Brown Ring Disease disrupts growth and is characterized by the deposition of brown conchiolin at the periphery of the inner shell of *R. philippinarum*. In severely affected clams, this deposit gets thicker and forms a brown ring. This disease is induced by the bacteria *Vibrio tapetis* and can induce important mortalities. The development of the disease seems to be closely controlled by environmental factors such as temperature. This disease mainly occurs in winter and in cold-water areas. A modeling approach has been undertaken in order to better understand the complex linkages between the environment, the physiology of the host and the pathogen during the development of this disease.



Photo of a Manila clam infested by the Brown Ring disease

As a first step for this work, a bioenergetic individual model of the Manila clam, based on the DEB theory, is developed. This model allows the simulation of the growth and reproduction under forcing of temperature and available trophic sources. In order to detail the energetic interaction between the host and its pathogen, this model is further coupled to the *V. tapetis*. The aim of this work is to test of hypothesis concerning the energetic cost to the host of the development of this pathology. This model will be used to better understand the influence of the environment on the development of this disease.

**List of accepted publications related to this subject:**

Flye Sainte-Marie, J., Jean, F., Paillard, C., Ford, S., Powell, E., Hofman, E., Klinck, J. 2007. Ecophysiological dynamic model of individual growth of *Ruditapes philippinarum*. *Aquaculture*, 266, 130-143.

Flye Sainte-Marie, J., Pouvreau, S., Paillard, C., Jean, F. In press. Impact of Brown Ring Disease in the Manila clam, *Ruditapes philippinarum*. Sous Presse. *Journal of Experimental Marine Biology & Ecology*.