



## **A new opportunity for the study of the photosynthesis-calcification relationship in alga-bivalve association**

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The processes of photosynthesis and calcification display a number of interactions which are the subject of intensive studies, in particular, in alga-invertebrate associations because some organisms convert CO<sub>2</sub> into exoskeleton (CaCO<sub>3</sub>). To date, valuable information has been obtained after the observation of the symbiosis between unicellular algae of the genus *Symbiodinium* (“zooxanthella”) and frame-building corals and between zooxanthella and giant clams (*Bivalvia*).

The aim of this work is to show that the new case of photosynthesis-calcification interactions is induced by the facultative parasitism between unicellular green microalgae *Coccomyxa* sp. and several of their hosts - wild mytilid mussels (including *Mytilus edulis* L.). Infection with these algae results in the most drastic and stable through time pathogenic effect ever observed among bivalves irrespective of the causative agent, i.e. - the formation of the L-shaped shell deformity (LSSD) through disturbance of calcification process. While the conceptual model of LSSD formation has been proposed by Zuykov et al. (2018), further work is required to validate it. Here we contribute to shed light on this issue through the discussion of data of new field-based observations on possible correlation between calcification and infestation rates, morphological (SEM) and geochemical (ICP-MS) studies of shells obtained from *Coccomyxa*-infested mussels collected in the Lower St. Lawrence Estuary (Canada). The results show that in the studied alga-bivalve association photosynthesis seems to be able to stimulate shell calcification. This association will be further explored as it may provide insight into the stimulation of pearl formation in bivalves as this process is an extension of the normal process of shell biomineralization.

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