



University  
of Victoria

Graduate Studies

Notice of the Final Oral Examination  
for the Degree of Master of Science

of

**MAËVA PEREZ**

BSc (Université de Montréal, 2011)

“Intra- and Inter-Population Diversity of the *Gammaproteobacteria Endorifita Persephone* in Vestimentiferan Tubeworms from the Eastern Pacific.”

School of Earth and Ocean Sciences

Friday, May 13<sup>th</sup>

8:30 A.M.

David Turpin Building

A137

Supervisory Committee:

Dr. Kim Juniper, School of Earth and Ocean Sciences, University of Victoria (Supervisor)

Dr. Diana Varela, School of Earth and Ocean Sciences, UVic (Member)

Dr. Réal Roy, Department of Biology, UVic (Outside Member)

Dr. Francis Nano, Department of Biochemistry and Microbiology, UVic (Outside Member)

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Dr. Robert Young, Molecular Ecology, University of Southampton

Chair of Oral Examination:

Dr. Wanda Hurren, Department of Curriculum and Instruction, UVic

Dr. David Capson, Dean, Faculty of Graduate Studies

## **Abstract**

Vestimentiferan tubeworms of the eastern Pacific Ocean are often keystone species in vent communities. These polychaetes are host to intracellular *Gammaproteobacteria* symbionts. In this association, the siboglinid worms supply their symbionts with the compounds necessary to chemosynthesis while the sulfide oxidizing bacteria provide their host with the organic molecules necessary for their metabolism. The adult worms lack a digestive system and are therefore completely dependent on their symbionts for their nutrition. Given the obligate nature of the association for the host, it is surprising that the symbionts are not transmitted from parents to offspring but are acquired *de novo* from the environment at each generation. In other known cases of horizontally acquired mutualism (e.g. *Rhizobium*-legumes, dinoflagellates-corals), obtaining symbionts from the environment benefit the hosts by allowing for a degree of partner choice. According to the partner choice hypothesis, tubeworms that associate with the best-adapted partner(s) to a specific range of habitat conditions are in turn better adapted to this environment. Of course, this hypothesis assumes that there is diversity within the symbiotic partners. Phylogenetic analyses on the other hand seemed to indicate that nearly all species of vent tubeworms of the eastern Pacific were associated with the same species of symbionts: Candidatus *Endoriftia persephone*. However, these studies focussed on a few molecular markers. In this thesis, I used *in situ* hybridization and next generation sequencing to characterize the symbiont diversity at the species and strain level, as well as within individual hosts and across host species.