

ESR 13 – NEXT-GENERATION MICROBIAL POPULATION GENETICS USING SINGLE-CELL GENOMICS

Research project	The objective of this project is to develop a method based on single-cell genomics to study population genetics and genetic structure of phytoplankton. Specifically, the focus will be on genomic variation in <i>Gonyostomum semen</i> (raphidophyceae), a harmful invasive microalga. Populations of <i>Gonyostomum</i> have expanded invasively across N. Europe, but populations in N. America are less invasive and display less disruptive phenotypes despite similar environments. A population genomic approach can be used to explore the detailed dispersal patterns, and to understand the genetic basis of the differentiation among populations. By using single-cell genome amplification, the effort and bias of algal culturing is circumvented. The PhD student's project will include developing, testing, and optimizing a single-cell population genomic method, and performing population genomic analyses. <i>Gonyostomum</i> cells will be sampled across Europe and in N. America. A second part of the project will involve a comparison of marine and freshwater raphidophytes, to explore how the different habitats affect population differentiation. The PhD project will also include designing field sampling, culturing of microalgae, analysis of high throughput sequencing data, and scientific writing.
Supervisor	<u>Name:</u> Karin Rengefors <u>Email:</u> karin.rengfors@biol.lu.se <u>Website:</u> rengforslab.org
Host institution	Lund University (LU) Lund, Sweden
PhD program	Biology, Lund University
Expected results	A protocol for obtaining reproducible RADseq libraries from SCG amplifications. A comparison of standard RADseq sequencing results with those from SGC amplifications. Data on population genetic structure, direction of gene flow, and loci under positive selection in freshwater versus marine raphidophytes.
Planned secondments	CNRS-B - Month 18 (3 m) - Sharing expertise on genome content and variability in microalgae CSIC-ICM - Month 26 (3 m) - Population genetics for marine species in a wider ecological context GS - Month 35 (3 m) - Exploring the potential of genomic information for biotechnological exploitations
Required profile	Master's degree or equivalent in biology with a specialization on evolution and ecology
Special conditions	The postgraduate training comprises four years of full time studies. The position can be combined with up to 20 % of teaching assistantship, which will then prolong the position accordingly. More information about postgraduate studies at Lund University and formal requirements are available at http://www.science.lu.se/education/phd-studies . Applicants for this position must also apply through the Lund University job application portal by selecting the current position on: http://www.science.lu.se/about-the-faculty/job-vacancies .