



MASTS PECRE Final Report: Techniques for investigating the life history of *Schizoporella japonica*; a unique and troublesome non-native fouler

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Host Institutions

St Petersburg State University, Russia – Assoc. Prof Andrey Ostrovsky, host

Environmental Research Institute, UHI, Thurso, UK – Dr. Jen Loxton, host

ICIT, Heriot-Watt University, Orkney, UK – Assoc. Prof. Joanne Porter, host

Natural History Museum, London, UK – Mary Spencer Jones, host

Background

Our exchange aimed to investigate the life history of the non-native bryozoan *Schizoporella japonica*. This is a Japanese species which is occurring with increasing frequency in Scotland, including on renewable energy devices in Orkney. It is anticipated that an increased understanding of its life history and growth will help to mitigate engineering and ecological risks associated with excessive fouling of renewable energy devices.

PECRE provided for a two way exchange between Russia and Scotland. Dr Jennifer Loxton spent an initial month in St Petersburg with Assoc. Prof Andrey Ostrovsky learning and applying histological techniques for the examination of the reproductive strategy and fecundity of *S. japonica*. The second part of the exchange brought Uliana Nekliudova and Ekaterina Shevchenko from Russia to the UK to give Dr Loxton the benefits of their experience in bryozoan life history analysis in the field, laboratory and aquarium. In the laboratories at the ERI, settlement panels were examined to determine seasonality of settlement, growth rates and sexual maturity. Larval swimming experiments were conducted in ICIT (Heriot-Watt) and a shoreline survey and marina sampling were also conducted while in Orkney (host – Assoc. Prof Jo Porter). Historic samples were examined and high resolution imaging was conducted at the Natural History Museum (host – Mary Spencer Jones). The exchange enabled the sharing of knowledge and methods between Scotland and Russia as well as generating a high volume of new data for this species. It is hoped that this is the first of many successful collaborations between Russia and MASTS institutions.

Interaction with MASTS community

During the fellowship visit to Scotland, Ms. Nekliudova and Ms. Shevchenko were active members of the ERI, a MASTS institution. Interaction was with other research groups as well as with faculty and graduate students in the college. During time spent at ICIT (Heriot-Watt University Orkney campus), Dr Loxton, Ms. Nekliudova and Ms. Shevchenko presented about the project background, aims and methodology to the full faculty and graduate students. While in St Petersburg Dr Loxton took the

opportunity to give a seminar to the faculty and students at SPSU, introducing Scotland, UHI and MASTS.

Outputs completed and expected

1. **Knowledge exchange:** During the fellowship, the fellows and hosts exchanged information about past applications of experimental methodologies and life history analysis techniques. These were adapted and applied to investigate the reproductive strategy, fecundity and reproductive structures of *Schizoporella japonica*.
2. **Method development:** During the fellowship, new *S. japonica* specific methodologies were developed for the triggering of larval release within aquaria, and measurements of larval swimming speed, distance and duration. This was done in collaboration with Dr Helen Jenkins from the Marine Biological Association, Plymouth.
3. **Life history measurements:** A wide range of methods were applied to determine:
 - Reproductive strategy and sexual structures in *S.japonica*
 - Seasonality of settlement (first 6 months analysis complete, experiments will continue until July 2015 to complete full annual cycle).
 - Growth rate and age at which sexual maturity is reached (first 6 months analysis complete, experiments will continue until July 2015 to complete full annual cycle).
 - Larval release triggers and larval light/ dark response
 - Larval swimming preferences, maximum duration and speed.

It is anticipated that once a full annual cycle has been examined this data will be prepared by the fellows for publication in a peer reviewed journal.

4. **Survey of rocky shoreline in Stromness:** During the fellowship, a survey was conducted in Stromness, Orkney to establish a baseline of *S. japonica* presence and absence from the rocky shoreline.
5. **Examination of historic samples:** During the hosted visit at the Natural History Museum, the fellows examined over 550 historic samples of *Schizoporella* to search for commonalities between the breeding mechanism of *S. japonica* and other members of the same Genus.
6. **Conferences:** Dr Jen Loxton anticipates the preliminary results of this fellowship will be presented at the MASTS Annual Science Meeting and at least one international conference during 2015.
7. **Invited seminars:** During the fellowship, Dr Jen Loxton gave two invited seminars on her research to the staff and students of St Petersburg State University.

Future plans enabled by PECRE

It is hoped that the collaborations between ERI and St Petersburg State University will continue in the future. Dr Loxton and Assoc. Prof Ostrovsky are already collaborating on a new study investigating the phylogenetics of another invasive bryozoan, *Bugula neretina* and it is anticipated more opportunities for co-operation will arise in the future. Dr Loxton hopes to continue to develop the research produced from this exchange to help inform the planning of marine renewable energy developments in Scotland.