MASTS Small Grant Award Scheme

SG349 Funding Report: Using large spatial scale phytoplankton data to compare between phenotypic and genetic diversity
15 November 2016

Overview. MASTS funding was used to cover the travel expenses of Prof. G. Tsirtsis (University of the Aegean, Greece) to visit the Institute of Biodiversity Animal Health and Comparative Medicine, University of Glasgow, for one week (10-14 October 2016). The aim of the visit was (a) the analysis of an extensive phytoplankton dataset collected in the Aegean Sea during July 2014 and the preparation of an original research article, (b) collaboration meetings with staff of the Institute and MSc and PhD students and (c) offering of a webinar entitled 'Phytoplankton ecological variation in a regional sea: Do neutral or niche processes predominate?' on Friday 14th October.

Preparation of the research article. An extensive dataset was analysed including phytoplankton species abundance data identified by both microscopy and molecular methods, and abiotic information. The group of researchers included Dr S. Spatharis, Lecturer, Dr R. Mancy, Research Fellow in the Institute of Biodiversity, Animal Health and Comparative Medicine, and Dr E. Smeti, visiting researcher. The dataset was collected in nine Aegean gulfs during July 2014 in the framework of the ECOGENE project (Tsirtsis et al. 2015). The aim of the analysis was the comparison of phenotypic and genetic diversity and the identification of possible abiotic factors and mechanisms regulating diversity. Monte-Carlo based models needed for the assessment of (a) random effects in sampling and (b) the role of rare species in diversity, were formulated after collaboration and discussions. Methodologies to be used to resolve the role of phytoplankton spatial structures in fine and broad scales were also discussed. Among them, the recently proposed methods of Generalized Dissimilarity Modelling (Ferrier et al. 2007) and eigenvector decomposition of spatial matrices (Principal Coordinates of Neighbor Matrices and Asymmetric Eigenvector Maps) (Dray et al. 2012) were selected as the most appropriate.

Collaborations and meetings. A number of meetings was organised for collaboration, feedback and exchange of ideas. Among those, a short presentation of the methods to be applied for the spatial analysis of phytoplankton ecological variation and possible links with abiotic factors took place on Monday 10th October to the research group of Prof. Jason Matthiopoulos in the Institute of Biodiversity Animal Health and Comparative Medicine. The group included researchers, post-doctorals, PhD and MSc students. An extensive discussion followed about the selection of methods for spatial analysis, possible advantages and disadvantages, and future use of the proposed methods by the researchers of the group.

Webinar on Friday 14th October. A webinar was offered by Prof. G. Tsirtsis on Friday 14th October at 12.00 p.m. to the scientific community of the University of Glasgow, as well as to the MASTS community. The title was 'Phytoplankton ecological variation in a regional sea: Do neutral or niche processes predominate?'. The talk included (a) short presentation of the aims, the design and the main findings of the ECOGENE project, (b) presentation of state-of-the-art methods in assigning ecological variation to environmental factors, (c) first results from the application of those methods for the analysis of phytoplankton spatial trends in the Aegean in Eastern Mediterranean and (d) a

first evaluation of the importance of niche and neutral mechanisms in shaping phytoplankton communities in regional seas.

References

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