

Review  
of the Dissertation of Marina Varfolomeeva  
submitted for the degree of Doctor of Philosophy in Biology  
at the Saint-Petersburg State University

The dissertation consists of 97 pages, including 65 pages of 6 published papers. The papers presented were published in the period of 2007 – 2013 years in the following International journals: *Hydrobiologia*, *Oecologia*, *Marine Ecology Progress Series*, *Experimental Marine Biology and Ecology*.

Generalizing part of the dissertation, which includes Introduction, Brief description of results, Discussion with brief conclusions and References - consists of 30 pages and contains 3 additional figures (apart from the original illustrations in the articles).

The dissertation is an important contribution to the field of Marine biology and Ecology of communities. The work is based on extensive material. It comprises long-term data on the dynamics of communities, the data of field experiments, the analysis of composition of isotopes.

In general, the material can be characterized as an extensive and carefully selected to address the specific objectives of the study. Some material was collected by author together with other members of the Dr. Yakovis research group. Note that the text of the thesis shows a particular author's contribution to the collection of material quite clearly, and this contribution is significant.

The methods used allow the author to solve tasks (see page 6 of the thesis): to characterize communities, to assess long-term dynamics of their spatial structure, to undertake an analysis according to several temporal and spatial scales of variation, to explore the role of coexisting but functionally different foundation species in generating community structure. The experimental work is planned carefully, its results allow to make reliable conclusions. I would like to emphasize that the selection of statistical methods of data processing and interpretation of the test results shows a serious qualification of the author in this field. Carefully planned experimental work, long-term monitoring studies conducted by thought-out plan, and adequate statistical analysis of the results lead to well-founded conclusions of the dissertation.

Thesis is structured as a series of essays, each of them solving a particular task of the study. However, they are all together designed to build a complete picture of the views on the formation, structure and dynamics of the entire community. An important fundamental question arising in the work is how different trends in certain spots (parts of community associated with individual edificators) provide the stable characteristics at the level of the entire community (the

set of such spots). For consideration of this problem the author draws on the views of the hierarchy scale of spatial and temporal structure of the community. As a strong side of the work, I would like to mention the ability to author to see morpho-functional integrity of the community based on private, complex and multi-scale interactions of organisms.

The published papers presented in the thesis show that M.Varfolomeeva freely and, I would say, is creatively oriented in the modern literature on marine communities. The entire text of the thesis confirms this impression. Moreover, it is nice to note that the author uses a broad context to illustrate her views, mentioning data not only on the aquatic, but also on the land-based communities. The author freely operates various modern ecological concepts.

The thesis presents new data on biotic interactions, which generally seem to be a factor determining the community features on the microscale level. The author proves the idea that the more edificator species are involved into the community, the greater is number of associated species.

The data obtained by M.Varfolomeeva is a significant step in understanding the mechanisms that regulate the stability of communities. Long-term study shows that the large-scale climatic factors have the greatest value in the regulation of edificator species. Local patch conditions (substrate availability or abundance of adults) have secondary importance for the community as a whole. The results confirm that small-scale spatial variability is high in soft-sediment macrobenthos and that long-term coexistence of foundation species at the metacommunity scale is maintained by asynchronous dynamics at smaller scale of the local communities.

The contribution of the author to the development of the concept, collecting and processing of the data, discussing and writing of manuscripts is indicated in the text of the dissertation on each of the cited publications. A generalization of the entire series of works in the form of a thesis is entirely the author's contribution.

The dissertation of M.Varfolomeeva does not exhaust a complex problem of the key factors that determine the structure and dynamics of such communities. But it indicates the direction of further research. This advantage of the investigation can be also seen from the point of view of the lack of the thesis' integrity. Indeed, the work has obviously not been following a single plan from the very beginning. The direction of its development was corrected in the process of obtaining results. But from my point of view these corrections are inherent in any alive developing work and they were fruitful in case of this work.

On the basis of the above-mentioned criteria, the review comes to a conclusion that the dissertation of M.Varfolomeeva fully complies with the international standard for PhD dissertations in the corresponding field.

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10.06.2013