

## REVIEW

of the Dissertation of Marina Varfolomeeva

**“Biotic interactions, structure, and long-term changes in marine benthic assemblages”**

submitted for the degree of Doctor of Philosophy in Biology

at the St.Petersburg State University

**The significance and status of the dissertation.** The dissertation thesis by Marina Varfolomeeva consists of 97 pages and contains Introduction, Brief Description of Results, Discussion, Conclusion, 3 figures, reference list of 108 citations and 6 articles, published in international peer-reviewed journals (with tables and figures therein). The dissertation deals with the functioning of marine benthic assemblages, their spatial and temporal patchiness and the role of biotic interactions and abiotic influence in maintaining their structure. The objectives studied by the author are among the most important in system ecology, and the thesis reviewed is a new contribution to the studies in this area.

**The sufficiency and quality of the material.** The material studied by the author is extensive enough for realisation of the tasks in view (listed), however in a specific aspect it was partially borrowed from A. Naumov.

**The adequacy of the methods used.** The author used both natural observations, and well planned experiments. For statistical handling of the outcomes the optimal and simple enough methods, understandable for biologists, were chosen.

**The validity of results.** Outcomes obtained by the author do not invoke doubts as they were substantiated by statistical calculations. They are based on the extensive actual and thoroughly analysed material.

**The logic of the dissertation's structure.** The logic of a thesis, unlike the similar dissertations defended according to Russian standards, in many respects is specified by the published material and outcomes.

**The knowledge and use of literature in the field.** The author of the dissertation applied the modern methods of statistical handling and the analysis of the outcomes obtained. But sometimes the usage of methods becomes somewhat "mechanic" and chaotic. The author uses wrong information presented to her by creators of software programs. For example, everywhere the authorship in the design of one of the common similarity indexes is attributed to Brey and Curtis. But this index was known a long time ago under the authorship of Czekanowski and Sorensen. The index of Shannon-Weaver for some unclear reason is called index of Shannon-Wiener. N. Wiener was cyberneticist and had no direct relation to information theory developed by C. Shannon and advertised by his chief – W. Weaver. Such inaccuracies can show insufficient knowledge of the special literature by the author of dissertation.

**The project's contribution to the research area.** The project is directed to elaboration of part of the big and challenging problem. The results obtained by the author will be beneficial not only to the further development of researches in the chosen direction, but also can be useful in practice. In particular, they could be applied at monitoring observation and organising of actions for extirpation of bioencrustations on technical constructions in aquatic environment.

**The author's input into the achievement of the dissertation results.** The contribution of the author to the defended thesis is comparable with the contribution of the supervisor, but could be greater, especially in respect of the project concept. Unfortunately the concepts of the publications only in half of cases and only partially belonged to the author. However her essential participation in collecting and handling of material mostly corrects this disadvantage.

**Language.** The language of the thesis is modern and competent, quite conforming to demands of editions in which the basic results of investigation were published.

**The shortcomings of the manuscript.** I had not seen the legible plan and concrete conclusions, however, it is specific for the majority of theses of the hydroecological directions responding to the "western" standards, except for faunistic or floristic descriptions or taxonomy researches.

In description of statistical methods the details of fulfilled evaluations are not always shown, and that allows variously to understand the outcomes received by the author of thesis. So, for example, at evaluation of multiple regression parameters it is unclear, what is the type of regression – with intercept or not. If the intercept is not present, and that was shown in the resultant table, the obtained coefficient of determination could be strongly overestimated, because not all regressions can make sense at independent variables equal to zero.

As a whole, the reviewed thesis cannot be considered as the completed research. There is no uniform outline or the plan in it. The thesis begins with somebody else's schemes, slightly modified, and ends by very general conclusions. Publications are linked among themselves only by reasoning about spatial and temporal scales of specific associations and by set of studied species. The last publication is very strange. Its title begins with a word "growth", however nothing specific about growth or rates of growth increase was shown in the text. There were digits of growth rings numbers, but nothing about the dimensions or mass corresponding to them.

**Conclusion.** Despite the criticism expressed by me, I come to conclusion that the thesis by Marina Varfolomeeva satisfies the requirements of the international standards for theses of the doctor of philosophy in the field of biology and ecology.

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