

REVIEW

By: prof. Valko Biserkov from IBER-BAS, member of the Scientific jury, according to Order № 1 from 03.01.2023 г.

Regarding: the materials by assoc. prof. Valentina Rouseva Todorova, candidate in the competition for academic академична post „Professor”, Domain of higher education: code 4. „Natural sciences, Mathematics and Informatics”, Professional track: code 4.3. „Biological sciences”, Scientific specialty: „Hydrobiology”, Scientific Track: „Macrozoobenthos”, published in State Gazette Ed. 87/01.11.2022 г.

General description of the submitted materials

The scientific publications of the candidate include 86 titles, 47 of which are relevant to the current competition. Of those 29 are referenced in Web of Science and/or Scopus (28 journal articles and 1 book chapter). Of those 23 are in journals with the following quartiles: Q1 – 11 articles; Q2 – 2; Q3 – 3; Q4 – 7.

General characteristic of the scientific, scientific-applied, and pedagogical activities

In the scientific work of the candidate the applied activities dominate the fundamental and pedagogical ones.

The brightest aspects of the candidate's work are related with the structure, functional characteristic, and the ecology of the Black Sea benthos, as well as the mapping and modeling of the benthos habitats. An important part of assoc. prof. Todorova's work is also the development of an indicator system for the evaluation of the ecological status of marine ecosystems, as well the elaboration of methodological standards when applying in Bulgarian the European Union law regarding the marine environment.

Scientific contributions of the candidate and their value for science and/or society

- ***Scientific contributions***

- *Original contributions in the knowledge of biodiversity*

- a) the communities of macroalgae in the lower infralittoral are distinguished in four groups, dominated respectively by *Phyllophora crispa*, *Apoglossum ruscifolium*, *Zanardinia typus* and *Gelidium spp.* The highest primary production is found *Cystoseira barbata* и *Cystoseira bosporica* in the upper infralittoral, followed by macroalgae in the lower part of the infralittoral.
(8.B.1.6.)

- b) A three-degree scale for integral assessment of the ecosystem goods and services¹, provided by 56 types of marine benthos habitats is developed. The habitats are level 4 of the EUNIS classification. In the article the natural habitats of level 4 are called biotopes. The assessment of the relative value of ecosystem goods and services is a modern field of research. It is widely assumed that it will be the foundation of future governance of marine areas. That's why the 8.B.1.9. is the most cited title from the list of submitted publications.
- c) An approach is proposed for creating an ecological network of marine protected areas, where the connectivity between the individual zones depends on the sea currents, the dispersal capacity of the propagules of target species, the duration of the larval stage, the genetic connectivity of the populations and the beta-diversity. The subject of the the study are the benthos species *Mytilus galloprovincialis*, *Tritia neritea*, *Scorpaena porcus* and *Zostera noltei*. *Tritia neritea* has no larval stage and therefore no larval dispersal. This is the basis for a strong genetic divergence of populations in the Black Sea. (8.B.2.4). In *M. galloprovincialis* the long larval stage is beneficial for their dispersal over large distances and a homogenous genetic structure at the basin level (8.B.2.16). The situation is similar with *Scorpaena porcus*, which has a long pelagic larval stage. (8.B.2.5). The distribution of *Zostera noltei* happens via seeds over short distances and sporadically through floating vegetative propagules over long distances (8.B.2.9). Based on all of the above, recommendations are made for using the appropriate scale for ecosystem management. To that end the concept of "Cells of Ecosystem Functioning" based on the oceanographic and genetic connectivity of the species (8.B.2.20). This approach is also a methodological novelty.
- **Applied science contributions.**
 - *Contributions which represent a methodological novelty*
- a) See above the note at the end of contribution c) from Scientific contributions.
- *Contributions related to the enrichment and completeness of existing knowledge*
- a) The population of *Flexopecten glaber* is assessed with regards to its conservation and sustainable use (8.B.1.1.)
- b) The status GES (Good Environmental Status) in the six widely occurring types of biotopes in the shelf sediments in the Black Sea is defined, and the analysis shows that in the Southern part of the shelf GES is not attained (8.B.1.2.)
- c) Assessment of the impact of bottom-trawl fisheries on benthos habitats (8.B.1.3.)
- d) Assessment of the vulnerability of seabed biotopes, with regards to the ecosystem benefits and services provided, to ensure their sustainable use and management (8.B.1.9).

¹ The goods and services are classified in categories adapted from the proposal by MEA (Millennium Ecosystem Assessment).

- e) Assessment of the impact of presence of propagules on the population-genetic structure of marine benthos organisms in creating marine ecological networks with the aim of conserving genetically isolated populations as well (8.B.2.4, 8.B.2.5, 8.B.2.9, 8.B.2.16, 8.B.2.20).

Critical notes and recommendations

Recommendation: The candidate uses an example of *Rapana venosa* to discuss the possibilities of overcoming the adversity of economic interests against maintaining the ecosystem in good (8.B.1.8.). The work would benefit if it was discussed that the adversity is a result of chasing short term gains and is pointless when applying sustainable use of the biological resources.

Financial contributions for the development of scientific & technical infrastructure of IO-BAS. Assoc. prof. Todorova is leading the project ISMEIMP which bought equipment for 380 000 BGN.

Pedagogical activities. Supervising doctoral students.

The candidate was a scientific supervisor of a full-time doctoral student at IO-BAS

Significance of the results

- *Citations in scientific literature*

Total number of articles cited: 28. Total citations: 337, all of them positive.

- *Usage of the publications with applied focus*

The results obtained are the basis of making informed management decisions.

Conclusion

The candidate has provided materials that prove that they match all requirements relevant to the competition for the academic post "professor".

The candidate's profile completely matches the thematic profile of the competition.

The candidate has a clearly defined scientific research profile as a marine benthosologist with affinity towards ecosystem- and conservation inquiries.

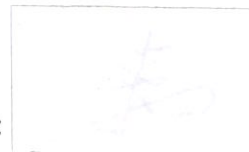
Assoc. prof. Todorova is an established scientist in her field and a successful leader of big research projects, which is a guarantee for the success of her future work.

In conclusion, I propose that assoc. prof. Valentina Todorova be appointed as professor with specialty Hydrobiology at IO-BAS. I am convinced that at this position she will contribute for the successful development of the department, as well as the institute as a whole.

28.02.2023

Sofia

Signature:



/prof. V. Biserkov/