

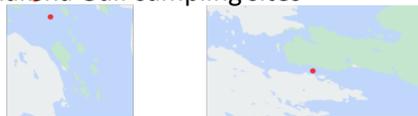
Symbionts of bivalve molluscs of the Kandalaksha Gulf and the Onega Bay of the White Sea

WILDP3

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The Kandalaksha Gulf sampling sites



The Onega Bay sampling sites



Figure 1. The sampling sites.

The composition of symbiofauna of mass species of bivalve molluscs in the southern and western parts of the White Sea was studied.

Sampling.

The sampling was done during the field seasons of years 2009-2021 at different White Sea biological stations. We sampled 2499 bivalve specimens from subtidal and intertidal zones at the three areas in the Kandalaksha Gulf and the Onega Bay (separated by tens to hundreds of kilometers) (1-20 sampling sites at each area). We sampled bivalves belonging to 24 species (8 to 393 specimens of each).

The symbionts.

The 17 taxa of metazoan symbionts were recorded, belonging to 4 phyla. Regarding their host-specificity and the type of their relationship with a host these symbionts could be classified as follows.

Commensals with a wide host range.



Urastoma cyprinae *Paravortex* sp.

Symbiotic Rhabdocoelans are representatives of this group. *Urastoma cyprinae* inhabited mantle cavity of many mytilids and cardiids while *Paravortex* sp. was recorded in gut and hepatopancreas of molluscs of different families.

Commensals with high host specificity.



Malacobdella grossa *Metopa glacialis*



Anonyx affinis

Some commensals were recorded in only one host species. Such are amphypods *Anonyx affinis* and *Metopa glacialis*

from *Musculus discors* and *Malacobdella grossa* from *Arctica islandica*.

Parasites with medium host specificity.



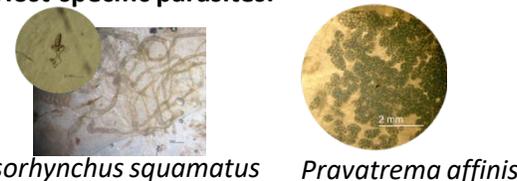
Himasthla sp. *Renicola roscovita* *Orthosplanthus arcticus* in host



Zoogonoides viviparus *Gymnophallus bursicola*

All the digenean metacercariae are recorded from more than one bivalve species. *Renicola roscovita* and *Zoogonoides viviparus* had the widest host ranges (the latter was always found in few specimens with low infection intensities).

Host-specific parasites.



Proisorhynchus squamatus *Pravatrema affinis*

Partenitae of Digenea are known to rarely use more than one mollusc species as the first intermediate host. *Proisorhynchus squamatus*, inhabiting two host species, was an exception.

The molluscs.

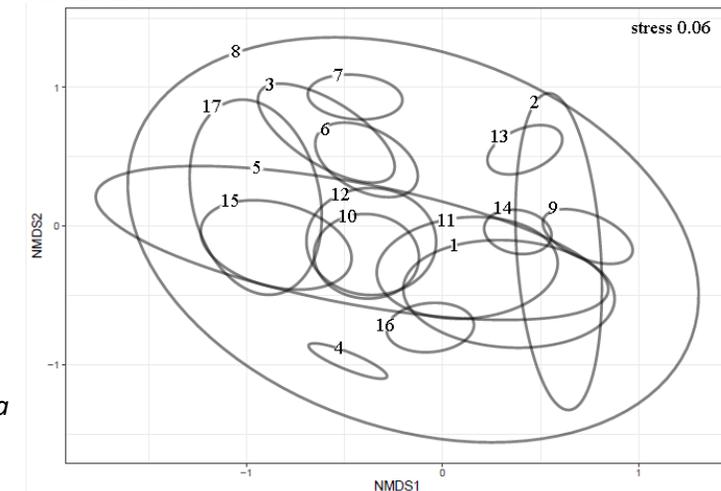


Figure 2. Non-metric multidimensional scaling (nMDS) ordination of individual molluscs infected with turbellaria and trematoda based on the matrix of Bray-Curtis dissimilarities calculated for symbionts abundance data. Ellipses represent 95% confidence intervals of host species centroids.

1 *Arctica islandica*; 2 *Astarte borealis*; 3 *Chlamis islandica*; 4 *Ciliatocardium ciliatum*; 5 *Ennucula tenuis*; 6 *Hiatella arctica*; 7 *Limecola balthica*; 8 *Macoma calcarea*; 9 *Modiolus modiolus*; 10 *Musculus discors*; 11 *M. discors* (*v. laevigatus*); 12 *M. niger*; 13 *Mytilus edulis* (intertidal); 14 *M. edulis* (subtidal); 15 *Nuculana pernula*; 16 *Serrepes groenlandicus*; 17 *Yoldia hyperborea*.

The distribution of symbionts among the bivalve species was not uniform. The composition of symbiofauna of the studied bivalves was correlated with the host's phylogenetic position and ecology.