1871
ИнБЮМ – IBSS

Морской биологический журнал
Marine Biological Journal
2024, vol. 9, no. 3, pp. 113–117
https://marine-biology.ru

UDC 595.142.241(262.54)

ABOUT FINDING *POLYDORA WEBSTERI* HARTMAN IN LOOSANOFF & ENGLE, 1943 (ANNELIDA: SPIONIDAE) IN THE SEA OF AZOV

© 2024 **E. Lisitskaya, M. Popov, and N. Chelyadina**

A. O. Kovalevsky Institute of Biology of the Southern Seas of RAS, Sevastopol, Russian Federation
E-mail: *e.lisitskaya@gmail.com*

Received by the Editor 22.01.2024; after reviewing 26.03.2024;
accepted for publication 27.08.2024; published online 09.09.2024.

The research was carried out in 2023–2024 near the Kazantip Peninsula (the Sea of Azov). In this area, blisters were found in the shells of the mussel *Mytilus galloprovincialis* for the first time. The blisters occupied ⅕ to ⅓ of the shells area. The blisters contained boring polychaetes. Polychaetes were identified as *Polydora websteri* Hartman in Loosanoff & Engle, 1943 (Annelida: Spionidae). The results obtained must be taken into account when planning and organizing mussel farms in this area.

Keywords: Polychaeta, invasive species, *Mytilus galloprovincialis*, mariculture

The Sea of Azov is a promising area for aquaculture development. Already in the middle of the XX century, there were recommendations to farm the bivalve *Mytilus galloprovincialis* Lamarck, 1819 in the northern Sea of Azov [Spichak, 1979]. Another potential commercial species is the bivalve *Anadara kagoshimensis* (Tokunaga, 1906), the mollusc that invaded the Sea of Azov and formed dense settlements there [Syomin et al., 2021]. When selecting areas for the organization of mariculture farms, data are required on biology and ecology of molluscs under natural conditions. Studying morphophysiological characteristics of the above-mentioned species, we found cavities filled with black detritus, *i. e.*, blisters containing polychaetes, in *M. galloprovincialis* shells. The aim of this work is to identify polychaetes registered in the bivalve shells from the Sea of Azov.

The research was carried out June 2023 to January 2024 in the Kazantip Peninsula vicinity (the Sea of Azov) (Fig. 1). Bivalves were sampled in the Russkaya Bay (45°26′58″N, 35°49′29″E; 0.1-m depth; sandy-silty sediments), the Golubniki Bay (45°27′14″N, 35°49′6″E; 1.5-m depth; coastal rocks), and the Shirokaya Bay (45°28′19″N, 35°51′8″E; 0.5-m depth; rocky-sandy sediment).

To determine salinity, an OHAUS Starter ST20S meter was used. The value in the bays was of 12.9‰. Monthly, 30 specimens of each species were sampled in the bays investigated. The hydrobionts were measured with a caliper with 0.1-mm accuracy and opened with a scalpel. The contents of the blisters were viewed under an MBS-10 binocular. The polychaetes found in the blisters were removed and placed in Petri dishes with seawater for further identification. Photographs were taken with a Sony Cyber-shot camera.

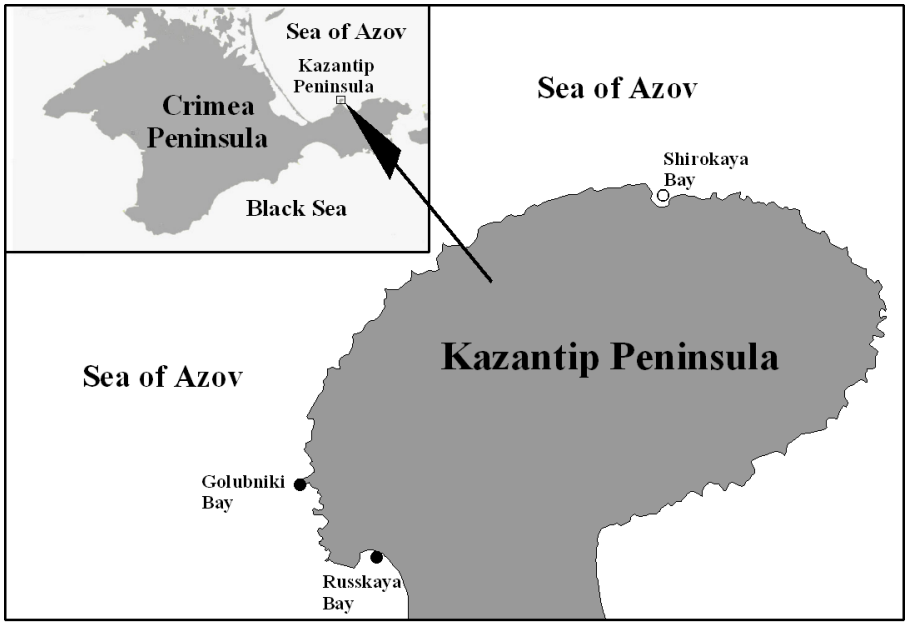

Fig. 1. Map of the study area

Blisters on the inside of the shells were registered in mussels sampled in September and December 2023 in the Russkaya Bay. Out of 30 hydrobionts examined, 2 specimens were affected which amounted to 7% of the sample. In the Golubniki Bay in November, the blisters were noted in 8 specimens which accounted for 27% of the sample. Sizes of the affected mussels were as follows: shell length, (57.7 ± 2.9) mm; height, (30.1 ± 1.6) mm; and width, (22.0 ± 1.4) mm. The blisters occupied ⅕ to ⅓ of the shell surface (Fig. 2A). In the Shirokaya Bay, affected mussels were not recorded. In *A. kagoshimensis* shells, there were no blisters.

One live polychaete was found inside each blister in the shells of mussels from the Russkaya Bay. The blisters of specimens from the Golubniki Bay were filled with black detritus with the smell of hydrogen sulfide; extracted worm fragments were macerated, and only 2 live polychaetes were extracted from one blister. A total of 6 worms were extracted. The live polychaetes were yellow, with translucent red blood vessels (Fig. 2B). The body length was 20–25 mm, and the number of chaetigers was 80–90.

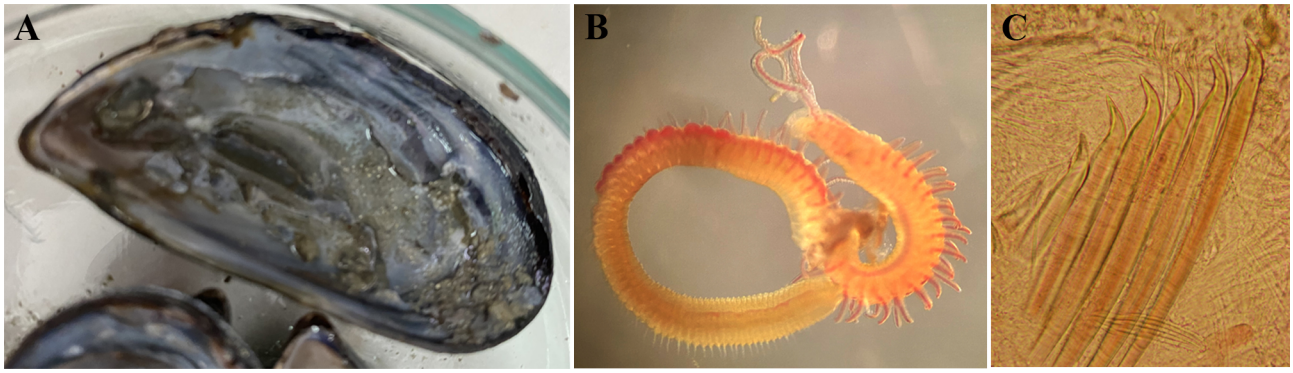

Fig. 2. *Polydora websteri*: A, a mussel shell with a blister; B, *Polydora* from a blister; C, chaetae of chaetiger V

The maximum-size worm had 97 chaetigers and reached 28 mm in length and 0.6 mm in width. Prostomium with small notch in front. Caruncle to middle of chaetiger III; no occipital papilla. Eyes 2 pairs, black in color. Palps long (to about 10–12 chaetigers), transparent, with 2 black longitudinal pigmented stripes along the groove. Notochaetae absent on chaetiger I, with 3–4 simple chaetae in neuropodia. From chaetiger II to chaetiger IV, only chaetae in dorsal and ventral branches of parapodia. Chaetiger V with large specialized dorsal chaetae (6–7), without lateral denticle; in some specimens, a ridge is clearly visible, and accompanying chaetae are lanceolate (Fig. 2C). Abdominal chaetae capillary. In neuropodia from chaetiger VII, hooded bidentate hooked chaetae appear (5–9), while in notopodia, only capillary chaetae appear. Branchiae begin from chaetiger VII; those are absent on the last 24–32 chaetigers. Pygidium small, in the form of a rounded anal papilla, with a notch on the dorsal side. By morphological characters, the polychaetes extracted from the blisters corresponded to the descriptions of *Polydora websteri* Hartman in Loosanoff & Engle, 1943 [Radashevsky, 1999; Read, 2010; Surugiu et al., 2012] and also were similar to *Polydora* representatives found earlier in the Black Sea and in the Kerch Strait [Lisitskaya et al., 2010; Syomin et al., 2021]. The obtained material is stored in IBSS Collection of Hydrobionts of the World Ocean (IBSS.bent.: 1Ann.aa.v1; 2Ann.aa.v2; 3Ann.aa.v3).

P. websteri is a widespread species in the World Ocean. This *Polydora* representative perforates calcareous substrates, as well as shells of gastropods and bivalves; it is one of the main pests of molluscs grown on marine farms [Read, 2010]. In the Black Sea, *P. websteri* was registered for the first time in 2005 among rocks off the Romanian coast [Surugiu, 2005]. In the following years, the polychaete widely distributed in the northern Black Sea. This worm was reported from shells of cultured oyster *Crassostrea gigas* (Thunberg, 1793), shells of the invasive mollusc *Rapana venosa* (Valenciennes, 1846), and limestones off the Crimean coast [Boltachova et al., 2021; Bondarev, Boltachova, 2021; Lisitskaya et al., 2010; Surugiu et al., 2012]. In the Black Sea, *P. websteri* was not found on mussel shells. In the Sea of Azov, this species was not registered earlier [Kiseleva, 2004]. In 2020, this boring polychaete was noted in the Kerch Strait on the invasive bivalve *A. kagoshimensis* [Syomin et al., 2021].

The expansion of ranges of both native and invasive species is likely to result from an increase in the Sea of Azov salinity up to 14.83‰ [Berdnikov et al., 2022]. As believed, the mass development of *Anadara* in the Sea of Azov after the salinization contributed to the distribution of the boring polychaete [Syomin et al., 2021]. *Polydora* larvae are known to settle on calcareous substrate. In the Sea of Azov, rocky sediments are rare, and native mollusc species have thin-walled shells. Apparently, due to the lack of substrate required, *P. websteri* larvae can settle not only on denser *Anadara* shells, but also on mussel shells.

Thus, our results show that the polychaete *Polydora websteri* has distributed in the Sea of Azov. This fact should be taken into account when planning and organizing mussel farms in this area.

This work was carried out within the framework of IBSS state research assignment "Comprehensive study of the functioning mechanisms of marine biotechnological complexes with the aim of obtaining bioactive substances from hydrobionts" (No. 124022400152-1).

Acknowledgments. The authors express their gratitude to PhD V. Timofeev (IBSS) for his help in material sampling.

REFERENCES

1. Berdnikov S. V., Dashkevich L. V., Kulygin V. V. A new state in the hydrological regime of the Sea of Azov in the 21st century. *Doklady Rossiiskoi akademii nauk. Nauki o Zemle*, 2022, vol. 503, no. 1, pp. 65–70. (in Russ.). https://doi.org/10.31857/S2686739722030057
2. Bondarev I. P., Boltachova N. A. Consorts of gastropod *Rapana venosa* (Valenciennes, 1846) in the northern Black Sea. Part V: Annelida (Polychaeta). *Morskoj biologicheskij zhurnal*, 2021, vol. 6, no. 2, pp. 18–32. (in Russ.). https://doi.org/10.21072/mbj.2021.06.2.02
3. Kiseleva M. I. *Mnogoshchetinkovye chervi (Polychaeta) Chernogo i Azovskogo morei.* Apatity : Izd-vo KNTs RAN, 2004, 409 p. (in Russ.). https://repository.marine-research.ru/handle/299011/5647
4. Lisitskaya E. V., Boltachova N. A., Lebedovskaya M. V. New Ukrainian fauna species *Polydora websteri* (Hartman, 1943) (Polychaeta: Spionidae) from the coastal waters of Crimea (Black Sea). *Morskoj ekologicheskij zhurnal*, 2010, vol. 9, no. 2, pp. 74–80. (in Russ.). https://repository.marine-research.ru/handle/299011/1073
5. Spichak S. K. Mussel as an item for mariculture in the North Azov Sea. *Trudy VNIRO*, 1979, vol. 138, pp. 116–119. (in Russ.)
6. Boltachova N. A., Lisitskaya E. V., Podzorova D. V. Distribution of alien polychaetes in biotopes of the northern part of the Black Sea. *Russian Journal of Biological Invasions*, 2021, vol. 12, no. 1, pp. 11–26. https://doi.org/10.1134/S2075111721010033
7. Radashevsky V. I. Description of the proposed lectotype for *Polydora websteri* Hartman in Loosanoff & Engle, 1943 (Polychaeta: Spionidae). *Ophelia*, 1999, vol. 51, iss. 2, pp. 107–113. http://doi.org/10.1080/00785326.1999.10409402
8. Read G. B. Comparison and history of *Polydora websteri* and *P. haswelli* (Polychaeta: Spionidae) as mud-blister worms in New Zealand shellfish. *New Zealand Journal of Marine and Freshwater Research*, 2010, vol. 44, iss. 2, pp. 83–100. http://doi.org/10.1080/00288330.2010.482969
9. Syomin V. L., Kolyuchkina G. A., Ptushkin M. D., Timofeev V. A., Simakova U. V. *Polydora websteri*– A commensal of *Anadara kagoshimensis* in the Azov–Black Sea Region. *Russian Journal of Biological Invasions*, 2021, vol. 12, iss. 3, pp. 309–316. https://doi.org/10.1134/S2075111721030139
10. Surugiu V. Inventory of inshore polychaetes from the Romanian coast (Black Sea). *Mediterranean Marine Science*, 2005, vol. 6, no. 1, pp. 51–74. https://doi.org/10.12681/mms.193
11. Surugiu V. Systematics and ecology of species of the *Polydora*-complex (Polychaeta: Spionidae) of the Black Sea. *Zootaxa*, 2012, vol. 3518, pp. 45–65.

О НАХОЖДЕНИИ *POLYDORA WEBSTERI* HARTMAN IN LOOSANOFF & ENGLE, 1943 (ANNELIDA: SPIONIDAE) В АЗОВСКОМ МОРЕ

Е. В. Лисицкая, М. А. Попов, Н. С. Челядина

ФГБУН ФИЦ «Институт биологии южных морей имени А. О. Ковалевского РАН»,

Севастополь, Российская Федерация

E-mail: *e.lisitskaya@gmail.com*

Исследование проводили в 2023–2024 гг. в районе полуострова Казантип, Азовское море. Впервые в раковинах мидии *Mytilus galloprovincialis* обнаружены заполненные детритом блистеры, которые занимали от ⅕ до ⅓ площади створок. В блистерах находились полихеты-перфораторы. Полихеты идентифицированы как *Polydora websteri* Hartman in Loosanoff & Engle, 1943 (Annelida: Spionidae). Полученные данные необходимо учитывать при планировании и организации мидийных ферм в этом регионе.

Ключевые слова: Polychaeta, инвазивные виды, *Mytilus galloprovincialis*, марикультура