**ФЕДЕРАЛЬНОЕ ГОСУДАРСТВЕННОЕ БЮДЖЕТНОЕ УЧРЕЖДЕНИЕ НАУКИ
ЗООЛОГИЧЕСКИЙ ИНСТИТУТ РОССИЙСКОЙ АКАДЕМИИ НАУК**

**Группа научных специальностей: 1.5. Биологические науки
Шифр научной специальности: 1.5.16. Гидробиология**

ПОРТФОЛИО АСПИРАНТА

Манойлиной Полины Андреевны

Санкт-Петербург 2023

1. Общие сведения

Дата рождения: .09.07.1999
E-mail: polinamanoilina@yandex.ru
Телефон: +79212237199
Образование: СПбГУ, 2022, магистр
Лаборатория: ББС «Картеш»
Тема диссертационной работы: Особенности межвидовой и внутривидовой конкуренции у *Halichondria panicea* (Pallas, 1766) в мелководных эпибентосных сообществах Белого моря.
Научный руководитель: доктор биологических наук, главный научный сотрудник Халаман Вячеслав Вячеславович.
Год поступления в аспирантуру: 2022.
Форма обучения: очная.

2. Публикации

Статьи:

1. Khalaman, V.V., Komendantov A.Y., Golubovskaya N.S., Manoylina P.A. 2021. Comparative efficiency of *Mytilus edulis* as engineering species for shallow-water fouling communities on artificial structures in the White Sea. Journal of the Marine Biological Association of the United Kingdom 101.3: 511-525.
2. Khalaman V.V., Golubovskaya N.S., Komendantov A.Y., Malavenda S.S., Manoylina P.A., Mikhaylova T.A., Raznovskaya S.V. 2021. Balance between biological and physical components in the impact of *Mytilus edulis* on associated organisms. Mar. Ecol. Prog. Ser. 674: 15-35.

Тезисы:

3. Участие в конференциях

1. Конференция «Ломоносов – 2020». Секция «Гидробиология и общая экология». Московский государственный университет имени М.В. Ломоносова, г. Москва, 13-17 апреля 2020 г.
2. Конференция «Беломорская студенческая научная сессия СПбГУ — 2020». Санкт-Петербургский государственный университет, г. Санкт-Петербург, 6-7 февраля. Постерный доклад.
3. XIV ВСЕРОССИЙСКАЯ КОНФЕРЕНЦИЯ С МЕЖДУНАРОДНЫМ УЧАСТИЕМ «ИЗУЧЕНИЕ, РАЦИОНАЛЬНОЕ ИСПОЛЬЗОВАНИЕ И ОХРАНА ПРИРОДНЫХ РЕСУРСОВ БЕЛОГО МОРЯ» посвящается памяти профессора Виктора Яковлевича Бергера. Санкт-Петербург, 4-7 октября 2022 г. Постерный доклад.
4. Конференция «Беломорская студенческая научная сессия СПбГУ — 2023». Санкт-Петербургский государственный университет, г. Санкт-Петербург, 2-3 февраля. Постерный доклад.

4. Участие в грантах

- Грант РФФИ № 18-04-00062a «Роль вида – эдификатора в формировании комплекса ассоциированных организмов в мелководных сообществах обрастания Белого моря».
- Грант РФФИ № 20-54-15002 НЦНИ_а «Онтогенетическая динамика токсичности беломорской губки *Halichondria panicea* (Demospongiae) и изменение ее токсичности в ответ на внешние воздействия – подтверждение или опровержение теории оптимальной защиты?».

5. Научно-педагогическая деятельность

Научное руководство бакалаврами, магистрами, специалистами: нет.
Чтение лекций, проведение семинарских и практических занятий:нет.

6. Дополнительная информация (дипломы, грамоты, именные стипендии, премии, стажировки, молодежные школы и т.п.)

7. Сведения об освоении основной образовательной программы подготовки научно-педагогических кадров в аспирантуре (результаты сданных экзаменов, зачетов, кандидатских экзаменов, сведения о педагогической практике). Указать название дисциплины, время (месяц и год) сдачи, полученную оценку.

Сведения о сдаче кандидатских экзаменов

№ п/п	Дисциплина	Дата сдачи	Оценка	Место сдачи
1	История и философия науки	08.04.2023	отлично	ЗИН РАН
2	Иностранный язык (английский)	28.05.2023	отлично	ЗИН РАН
3	Гидробиология			ЗИН РАН

Journal of the Marine Biological Association of the United Kingdom

cambridge.org/mbi

Comparative efficiency of *Mytilus edulis* as engineering species for shallow-water fouling communities on artificial structures in the White Sea

Vyacheslav V. Khalaman[1], Alexander Yu. Komendantov[1], Nina S. Golubovskaya[2] and Polina A. Manoylina[3]

[1]Zoological Institute RAS, Saint-Petersburg 199034, Russia; [2]Murmansk State Technical University, Murmansk 183010, Russia and [3]Saint-Petersburg State University, Saint-Petersburg 199034, Russia

Original Article

Cite this article: Khalaman VV, Komendantov AYu, Golubovskaya NS, Manoylina PA (2021). Comparative efficiency of *Mytilus edulis* as engineering species for shallow-water fouling communities on artificial structures in the White Sea. *Journal of the Marine Biological Association of the United Kingdom* 1–15. https://doi.org/10.1017/S0025315421000424

Received: 7 December 2020
Revised: 15 April 2021
Accepted: 19 May 2021

Key words:
Associated fauna; ecosystem engineer; fouling community; *Mytilus edulis*; *Styela rustica*; White Sea

Author for correspondence:
Vyacheslav V. Khalaman,
E-mail: VKhalaman@gmail.com

Abstract

Currently, there is little comparative data on 'efficiency' of different engineering species, i.e. species richness, density and biomass of the associated organisms that have been supported by engineering species. The use of fouling communities makes it possible to compare the efficiency of different engineering species under the same conditions, which is necessary to obtain correct estimates and difficult to do when studying natural bottom communities. In this study, we have analysed the fouling communities in four different mussel culture farms in the White Sea to test the following hypotheses. (1) Different engineering species (mussel *Mytilus edulis*, solitary ascidian *Styela rustica*, sponge *Halichondria panicea*) have different assemblages of the associated vagile fauna. (2) *Mytilus edulis* is the most efficient engineering species, i.e. species richness, species diversity, density and biomass of the associated vagile fauna is higher in the mussel communities than in those dominated by *Styela rustica* or *Halichondria panicea*. The first hypothesis was confirmed, while the second was rejected. In all the culture farms studied, all parameters of the mussel-associated vagile fauna were not higher and in most cases were even lower than those of the fauna associated with ascidians or sponges. The reason for this seems to be the very dense packing of mussels in patches. Therefore, *Mytilus edulis* is not the most efficient engineering species among fouling organisms, at least in the conditions of the subarctic White Sea. The data obtained are particularly important in view of the ever-increasing volume of anthropogenic substrate and fouling communities in coastal marine ecosystems.

Introduction

Mass aggregations of some epibenthic organisms are commonly known to serve as a habitat for a variety of motile, sessile and sedentary fauna providing food and refuge from predators or adverse environmental conditions (Gutiérrez *et al*., 2011). These properties have been shown for the populations of ascidians (Monteiro *et al*., 2002; Castilla *et al*., 2004), sponges (Abdo, 2007; Gerovasileiou *et al*., 2016), algae and seagrass (Crowe *et al*., 2013; McCloskey & Unsworth, 2015), corals (Curdia *et al*., 2015; Ponti *et al*., 2016), tubicolous worms (Albano & Obenat, 2009; Gravina *et al*., 2018), shared populations of barnacles and ascidians (Yakovis *et al*., 2007). The environmental modification caused by these organisms and their impact on the associated and surrounding fauna are so significant that these organisms have been termed ecosystem engineers, bioengineers or foundation species (Jones *et al*., 1994, 2010; Crain & Bertness, 2006). The well-known representatives of engineering species are bivalves, most notably various species of mussels: *Mytilus edulis* L. and *Mytilus trossulus* Gould (Tsuchia & Nishihira, 1985, 1986; Günther, 1996; Commito & Rusignuolo, 2000; Khaitov *et al*., 2007; Arribas *et al*., 2014), *Mytilus galloprovincialis* Lamarck (Emrić, 1996), *Mytilus californianus* Conrad (Suchanek, 1992), *Perumytilus purpuratus* (Lamarck) (Tokeshi, 1995; Thiel & Ullrich, 2002); *Mytilus edulis platensis* d'Orbigny and *Perna perna* (L.) (Borthagaray & Carranza, 2007), *Semimytilus algosus* (Gould) (Tokeshi, 1995; Tokeshi & Romero, 1995), *Septifer virgatus* (Wiegmann) (Seed, 1996) and others.

A wide geographic distribution of mussels, a large number of published studies and the ecological as well as commercial importance of these molluscs have created the notion of their high efficiency as engineering species (Gutiérrez *et al*., 2003). One of the outcomes of ecosystem engineers' activity is high species diversity of associated organisms that can serve as an estimation of engineering species efficiency. A number of studies have now been conducted to determine the factors that promote high species diversity and abundance of associated fauna in the populations of engineering species. In the majority of these studies, the spatial or structural complexity produced by the population of engineering species, i.e. the physical component, is treated as the leading factor in the formation of the associated fauna. The role of the fact that the space is organized by a living organism is not separated from the overall effect or interpreted as a much less significant factor (Myers & Southgate, 1980; Dean, 1981; Crooks & Khim, 1999; Lee *et al*., 2001; Abdo, 2007; Palomo *et al*., 2007). Some studies,

Vol. 674: 15–35, 2021
https://doi.org/10.3354/meps13813

MARINE ECOLOGY PROGRESS SERIES
Mar Ecol Prog Ser

Published September 16

Balance between biological and physical components in the impact of *Mytilus edulis* on associated organisms

Vyacheslav V. Khalaman[1,*], Nina S. Golubovskaya[2], Alexander Yu. Komendantov[1], Sergey S. Malavenda[2], Polina A. Manoylina[3], Tatiana A. Mikhaylova[4], Svetlana V. Raznovskaya[5]

[1]Zoological Institute RAS, Saint Petersburg 199034, Russia
[2]Murmansk State Technical University, Murmansk 183010, Russia
[3]St. Petersburg State University, Saint Petersburg 199034, Russia
[4]Komarov Botanical Institute RAS, Saint Petersburg 197376, Russia
[5]Petrozavodsk State University, Petrozavodsk 185910, Russia

ABSTRACT: An ecosystem engineer's influence on associated organisms includes 2 components: physical and biological. The physical component is the spatial environment created by the ecosystem engineer, while the biological component is the physiological activity of the engineering species. However, little is known about the ratio between these components. We evaluated this ratio for *Mytilus edulis* L. by means of a field experiment in which communities of organisms that developed on bare ceramic plates (controls, C) were compared with those that formed on plates carrying patches of live mussels (L) or artificial patches made of mussel dummies (D). The experiment was performed using 2 different age–size groups of mussels and dummies (small–young and large–old). Live mussels had only a weak positive effect on species richness of the associated organisms, but the structure of the communities that formed on tests plates (L, D and C) differed significantly. The similarity of the communities of associated organisms between C and L was 1.5–3 times less than between C and D. Mussel size–age factor had no significant effect on community structure other than on the algal assemblage. The results of this experiment suggest that the influence of mussels on associated organisms cannot be reduced to only the effect of increasing complexity of the spatial environment. The influence of the biological component is significant and can exceed that of the physical component. Thus, in ecosystem engineering, non-living spatial structures cannot serve as an identical substitute for a population of living organisms.

KEY WORDS: Ecosystem engineer · Positive impacts · Negative impacts · White Sea · Fouling community

1. INTRODUCTION

Sedentary and sessile organisms that can modify their environment and provide a habitat for other animals and plants are now commonly called ecosystem engineers (Jones et al. 1994, 2010, Crain & Bertness 2006). Although this terminology is relatively recent (Jones et al. 1994), ecosystem engineering itself has actually been studied for about a century. The term 'edificator' (Latin: aedificator — builder) was introduced to plant ecology as early as the first half of the 20th century to refer to plant species that transform and shape their environment and provide niches for associated organisms (Braun-Blanquet 1928, Sukachev 1928). This term was initially used in terrestrial plant ecology but was later extended to

*Corresponding author: vkhalaman@gmail.com

Московский государственный университет имени М.В. Ломоносова

Международный молодежный научный форум «Ломоносов-2020»

СЕРТИФИКАТ

настоящим подтверждается, что

Манойлина Полина Андреевна

приняла участие

в XXVII Международной конференции студентов, аспирантов и молодых учёных «Ломоносов»

с докладом «Ассоциированная фауна мидиевого сообщества обрастания в Белом море»

секция «Биология»

Ответственный секретарь Международной конференции студентов, аспирантов и молодых учёных «Ломоносов», кандидат экономических наук

И.А. Алешковский

2020 год

6500757622674441273