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Research Article

Food sources of the non-indigenous bivalve *Ruditapes philippinarum* (Adams and Reeve, 1850) and trophic niche overlap with native speciesEster Dias^{1,*}, Paula Chainho², Cristina Barrocas-Dias^{3,4} and Helena Adão⁵¹CIMAR/CIIMAR –Interdisciplinary Centre of Marine and Environmental Research, University of Porto, Terminal de Cruzeiros do Porto de Leixões, Av. General Norton de Matos, 4450-208 Matosinhos, Portugal²MARE, Faculdade de Ciências da Universidade de Lisboa, Campo Grande, 1749-016 Lisboa, Portugal³HERCULES Laboratory, University of Évora, Largo Marquês de Marialva, 8, 7000-809 Évora, Portugal⁴Chemistry Department, School of Sciences and Technology, Rua Romão Ramalho 59, Évora, Portugal⁵MARE- University of Évora, School of Sciences and Technology, Apartado 94, 7005-554 Évora, PortugalAuthor e-mails: esterdias@ciimar.up.pt (ED), pmchainho@fc.ul.pt (PC), cmbd@uevora.pt (CBD), hadao@uevora.pt (HA)

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Citation: Dias E, Chainho P, Barrocas-Dias C, Adão H (2019) Food sources of the non-indigenous bivalve *Ruditapes philippinarum* (Adams and Reeve, 1850) and trophic niche overlap with native species. *Aquatic Invasions* 14 (in press)

Received: 8 February 2019**Accepted:** 17 July 2019**Published:** 26 September 2019**Handling editor:** Jaclyn Hill**Thematic editor:** Stelios Katsanevakis**Copyright:** © Dias et al.

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Abstract

The Manila clam, *Ruditapes philippinarum* (Adams and Reeve, 1850), was introduced in many estuaries along the Atlantic and Mediterranean coasts for fisheries and aquaculture, being one of the top five most commercially valuable bivalve species worldwide. In Portugal, the colonization of the Tagus estuary by this species coincided with a significant decrease in abundance of the native *R. decussatus* (Linnaeus, 1758). This study aimed at identifying the main food sources supporting populations of the non-native bivalve in the Tagus estuary, using carbon and nitrogen stable isotopes, and evaluate the potential for food competition with the native bivalves *R. decussatus* and *Cerastoderma glaucum* (Bruguière, 1789). Results showed that these species relied on the same food sources, and that the trophic niche of *R. philippinarum* overlapped with the trophic niche of *R. decussatus* by 40% and with *C. glaucum* by 23%. The most likely food sources included particulate organic matter (POM), microphytobenthos (MPB), and sediment organic matter (SOM). The Bayesian stable isotope mixing model indicated that POM was the food source with the highest proportional contribution (up to 92%), followed by MPB (up to 32%), and SOM (up to 23%). Although the majority of the food sources identified were filtered from the water column, reliance on SOM and MPB suggests they may also feed on resuspended organic matter. Because these bivalve species feed on the same sources, there is some potential for food competition in this ecosystem. However, further studies are needed to analyze the long-term consequences of these trophic interactions to verify if the co-existence between the native and the invasive species will generate competition for food resources when those are limited in quantity and/or quality.

Key words: Manila clam, non-indigenous species, *Ruditapes decussatus*, *Cerastoderma glaucum*, stable isotopes, Tagus estuary

Introduction

Estuaries are among the most altered ecosystems by non-indigenous species (NIS; Williams and Grosholz 2008). Once NIS are established in a new environment, they can become invasive by changing local biological community interactions, causing reductions in the abundance of native