*Food sources of macrobenthos in an estuarine seagrass habitat (*Zostera noltii*) as revealed by dual stable isotope signatures*

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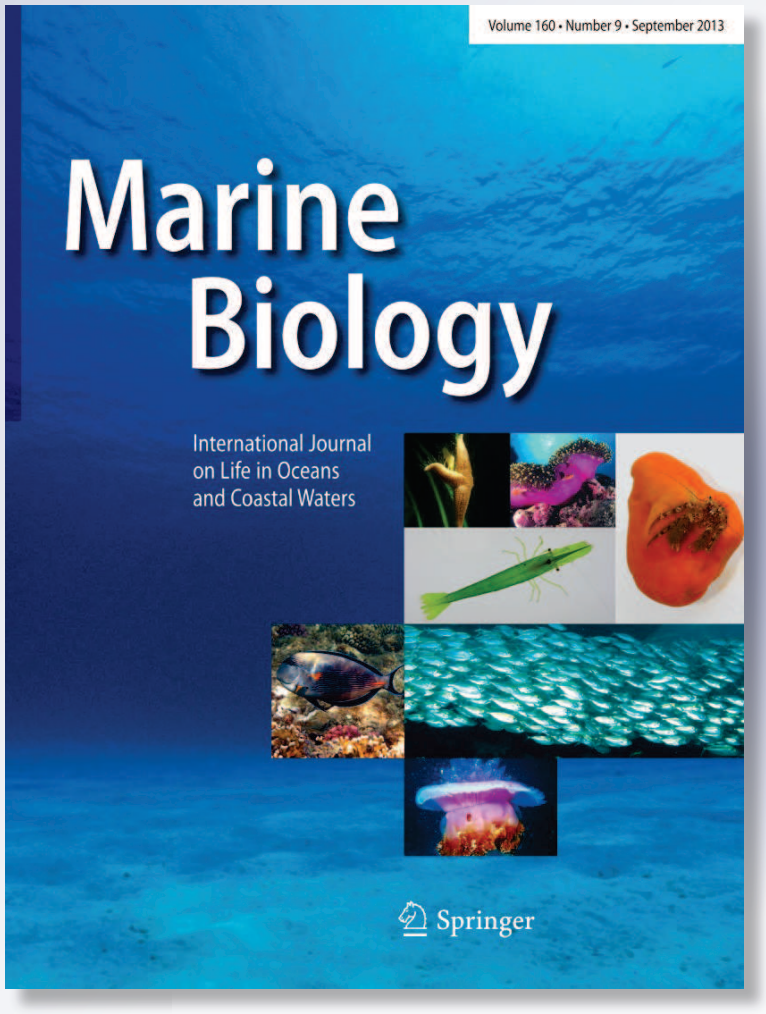
Marine Biology
International Journal on Life in Oceans and Coastal Waters

ISSN 0025-3162
Volume 160
Number 9

Mar Biol (2013) 160:2517-2523
DOI 10.1007/s00227-013-2238-0



Springer

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DOI 10.1007/s00227-013-2238-0

SHORT NOTE

Food sources of macrobenthos in an estuarine seagrass habitat (*Zostera noltii*) as revealed by dual stable isotope signatures

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Received: 14 November 2012 / Accepted: 3 April 2013 / Published online: 12 April 2013

Abstract Stable carbon and nitrogen isotope analysis was used to examine the resources and position of macrobenthos in an estuarine seagrass food web in two sampling moments, during summer and winter. The contribution of each food source to the carbon requirements of consumers was estimated by a mixing model. The used carbon sources were largely seagrass associated, although seagrass tissues were utilized by only few species, and equally contributed to microphytobenthos and suspended particulate organic matter. Based on isotopic data, Lucinidae bivalves have an alternative trophic pathway via symbiosis with chemoautotrophic bacteria. Resource utilization inside and adjacent to seagrass beds did not differ significantly, implying that seagrass-associated inputs extend well beyond the borders of the vegetation patches.

Communicated by F. Bulleri.

Electronic supplementary material The online version of this article (doi:10.1007/s00227-013-2238-0) contains supplementary material, which is available to authorized users.

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Introduction

Food webs in estuarine ecosystems are characterized by the presence of diverse resources and high macrobenthic diversity (Deegan and Garritt 1997). Macrofauna rely on various carbon sources implying different competitive interactions (Herman et al. 2000) and often exhibit opportunistic feeding behaviour related to changes in habitat and food availability (Deegan and Garritt 1997; Stocks and Grassle 2001).

Seagrass beds contribute to estuarine ecosystem functioning by supporting high biodiversity and more complex food webs than bare sediments (Boström and Mattila 1999). They provide a variety of microhabitats and food, including seagrass leaves and roots, detritus and other associated carbon sources; that is, epiphytes, suspended particulate organic matter (SPOM) trapped in the canopy, and epibenthic and other microalgae in the sediments (Moncreiff and Sullivan 2001).

Although several studies have focused on food utilization by macrobenthos in seagrass beds (Lepoint et al. 2000; Kharlamenko et al. 2001; Moncreiff and Sullivan 2001; Baeta et al. 2009; Carlier et al. 2009; Lebreton et al. 2011; Ouisse et al. 2012), information about the relative importance of resources is still inconclusive (but see Sarà 2006, 2007). This study aims to document food web structure and elucidate the contribution of potential carbon sources to macrofauna diets in an estuarine seagrass habitat, using stable carbon and nitrogen isotopes. We address the following research questions: (1) Do seagrass-associated sources contribute substantially to the diet of macrobenthos? If so, we would expect differences in resource utilization in the seagrass bed vs adjacent unvegetated sediments. (2) Is there temporal variation in resource utilization by macrofauna?