



Should we redefine meiofaunal organisms? The impact of mesh size on collection of meiofauna with special regard to nematodes

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Received: 14 June 2020 / Accepted: 25 August 2020 / Published online: 7 September 2020
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Abstract Meiofaunal organisms are the predominant metazoans in benthic systems and important members of the benthic food web. They are defined by mesh size and specifically by their retention on a sieve with a 44- μm mesh size. In this study, we examined the accuracy of this standard collection method by counting the number of meiobenthic individuals, life stages and nematode species in a sample. A filter cascade consisting of five different mesh sizes (41 μm , 30 μm , 20 μm , 10 μm and 1 μm) was used to fractionate a natural freshwater meiobenthic collection, and the individuals in each fraction were then counted. In line with the current definition of meiofauna, all tardigrades, microcrustaceans, chironomids and oligochaetes were retained by the largest mesh size, whereas 9% of the rotifers were first retained on the 30- μm meshes. For nematodes, 23% were not retained on the 41- μm meshes and individuals were collected even from the 1- μm fraction. With declining mesh size, the yield of retained nematodes increased,

the age structure shifted to juveniles, evenness declined, and the species composition changed. As all of these findings were significant, this study therefore shows that the current definition of meiofauna is not sufficient to encompass the entire spectrum of meiofauna present in a sample and may result in misleading assessments of the diversity and composition of these organisms. We therefore propose that, especially for nematodes, a definition based on a smaller mesh size (at least 20 μm) is more appropriate.

Keywords Benthos · Nematodes · Diversity · Species composition · Age structure · Mesh size

Introduction

The term “meiobenthos” or “meiofauna” is well established in aquatic biology and was first used by Mare (1942) to describe the smallest metazoans that colonize sediments and other substrates of aquatic habitats (e.g., microcrustaceans, rotifers and nematodes). According to Higgins and Thiel (1988), meiobenthic organisms are those that pass through a net with a mesh size of 1000 μm and which are held back by nets of 42- μm mesh size. Giere (2009) later defined limit values for meiofauna of 500 μm and 44 μm . Through a literature search on the databases Google Scholar (last search: 17th February 2020), we

Handling Editor: Téléphore Sime-Ngando.

Electronic supplementary material The online version of this article (<https://doi.org/10.1007/s10452-020-09798-2>) contains supplementary material, which is available to authorized users.

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