



Monographing micromolluscs: A case study on Scissurellidae s.l. (Vetigastropoda)

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Abstract

The last taxonomic monographs of micromolluscs (size less than 5 mm) of worldwide scope date back to the turn of the 19th/20th century, prior to the invention of the scanning electron microscope (SEM). In the present study, experiences from the preparation of a monograph on worldwide Scissurellidae s.l., a gastropod taxon comprising minute members plus an overview of this taxon, are provided. The literature is mercifully brief with some 650 references tracked, equal to approximately 4.6 references per species. Relying on secondary resources has proven to be problematic, and all primary taxonomic sources have to be consulted. The internet has made some searches easier, but some invalid names have surfaced. Generic concepts have often not been evaluated phylogenetically, and family-level micromollusc taxa may well be para- or even polyphyletic, which needs to be evaluated early on. Although underdetermined data matrices from shell morphology are problematic, they do provide some information on overall patterns of character evolution. The usual practice of only examining a single specimen by SEM is fraught with problems as it does not permit the identification of intraspecific and ontogenetic variability. Old type material should be examined now that environmental and variable pressure SEMs are available. As micromolluscs are most susceptible to adverse environmental and storage conditions, upgrade of storage of micromolluscan types should be given highest priority. At least 89 species (conservative estimate) remain to be described. The Atlantic is less diverse in both species as well as genera. Tropical and temperate waters hold approximately the same number of species, while the polar oceans have a much lower diversity. The geographic coverage of available material is primarily driven by contemporary sampling initiatives, and no sampling bias due to the longer history of collecting in Europe can be detected. Sampling in general and available material for Scissurellidae declines with depth; only ten lots are known from greater than 3,000 m. Scissurellidae are proportionally less frequent in shallow waters, and are overrepresented on the upper slope (300–1,000 m). Labor-intensive procedures are mainly sorting of micromollusc samples, and digital processing (cut-out) of SEM images.

Keywords: Global biodiversity inventories, alpha beta taxonomy, latitudinal depth gradient, sampling, historical bias

Introduction

Part of generating inventories of molluscan biodiversity is the production of worldwide monographs of groups of species as a counterpart to geographic accounts. Both approaches have their advantages and disadvantages. The practical utility of geographic monographs may be considered superior to narrow taxonomic works, while taxonomic monographs due to their global scope have the greater potential for taxonomic accuracy. Recent examples of geographic treatments include Okutani (2000),