



Digital imaging of micro bivalves

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Abstract

Advancements in digital camera technology, microscope optics and image capture software have allowed researchers to create more detailed and higher quality images than ever before. Digital imaging using light microscopy at high magnifications does, however, have its limitations. Features that may be diagnostic for species identification can often be difficult to illustrate using standard imaging techniques alone, and other methods, such as Scanning Electron Microscopy (SEM) and traditional line illustration, may be better suited to the task. The best results are often achieved by using a combination of these methods to create visual taxonomic guides to bivalve species. Drawing from the experiences gained whilst undertaking digital imaging projects, this paper covers current working practices in place at Amgueddfa Cymru - National Museum Wales, providing details of the equipment and techniques in use. Specimen preparation, lighting methods, digital image post-processing and image file management are discussed. These topics will detail the methods used for capturing aspects of bivalve morphology of both the shell and the anatomy of specimens 5 mm in size or less in order to produce publication quality images for taxonomic research.

Key words: Bivalves, molluscs, photography, microscopy

Introduction

The Department of Biodiversity & Systematic Biology (BioSyB) at Amgueddfa Cymru-National Museum Wales (NMW) has, over recent years, embarked upon a number of projects aimed at producing taxonomic tools to aid researchers in the identification of bivalves. Digital imaging has been key to many of these projects. Over three thousand images have been captured in four years, with many of these being images of bivalve specimens of 5 mm in size or less.

The digital imaging of micro bivalves featured prominently in the Atlantic Frontier Environmental Network (AFEN) funded project to produce identification guides to deep-sea bivalves from the North East Atlantic Margin (Killeen & Turner in press). The bivalve fauna from this region includes species from Protobranchia and Thyasiridae. Many species in these groups are very small in size, even at the adult stage. There is a lack of good quality images of these bivalves in the current literature. The aim of the project was to produce full colour images to help researchers identify species from these difficult groups.

There are many approaches to the imaging of biological specimens in terms of equipment, procedures and techniques, and very rarely will there be a single method that will suit the needs of all practitioners. The intent of this paper is to provide an insight into the techniques and working practices undertaken at the NMW for the digital photomicroscopy and photomacrography of bivalve specimens for taxonomic research.