

Title:

Building an Open 3D Digital Reference Collection of Schistosomiasis Vector Snails to support research, malacological training and field surveillance

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Schistosomiasis, caused by parasitic blood flukes from the genus *Schistosoma* and transmitted through freshwater snails, remains one of the most significant neglected tropical diseases worldwide. Accurate identification of *Schistosoma*-transmitting snails underpins surveillance, mapping, and targeted control strategies. However, many endemic countries face a shortage of trained malacologists, and field identification is frequently conducted by personnel with limited or no taxonomic training. Strengthening morphological knowledge and access to reliable reference material is therefore essential for improving snail surveillance, risk mapping and supporting schistosomiasis control programmes.

The Natural History Museum houses one of the world's most comprehensive gastropod collections, including numerous African species that serve as intermediate hosts for human infecting *Schistosoma* species. With the aim of creating an online reference collection of three-dimensional shell models, a selection of these medically important snail species was digitised, focusing specifically on those involved in human schistosomiasis transmission. Shells were photographed from each side and subsequently scanned using micro-computed tomography to generate high-resolution 3D mesh models. The models were then optimised in 3D modelling software for visualisation and for use in 3D printing. The resulting collection of snail-shell models, alongside with their photographs, will be freely accessible on *Sketchfab* - an open-access 3D repository. We also produced educational 3D animations of shells morphology demonstrating one of the ways in which our digital models can be used for teaching. Furthermore, we present a method for 3D-printing the models to create physical replicas of the snail shells in different sizes.

Our digital catalogue, drawing on expertise from specialists across multiple disciplines, represents the first 3D resource of schistosomiasis vector snails and constitutes an initial step toward building a comprehensive future snail species database. By creating an available, curated 3D reference set of schistosomiasis vector snails, this project aims to support malacological training, dissemination of knowledge, and enables more accurate snail surveillance in schistosomiasis-endemic countries reinforcing the central role of malacology in global schistosomiasis control and elimination efforts.

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