

**Title :** Geometric morphometric analysis of shell shape variation in *Melanoides tuberculata*  
(Gastropoda: Thiariidae)

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## ABSTRACT

*Melanoides tuberculata* is a freshwater snail commonly known as the Red-Rim Melania. The snails have been reported as a first intermediate host of various parasitic trematodes. They are most widely distributed in Thailand across various regions and show high variation of shell morphological characters. So, the snail taxonomy needs to be clarified. This study aims to study the variation in morphological characteristics by using geometric morphometric analysis and to clarify the taxonomic boundaries of *M. tuberculata* throughout Thailand. A total of 180 snail samples were collected, and 3 morphotypes of the snails were detected. Geometric morphometric analysis and canonical variate analysis (CVA) revealed significant differences between 3 morphotypes as different species ( $P < 0.05$ ). Shell shape venation geometry can be used to distinguish between these cryptic species mainly based on shape divergence. This study suggests that geometric morphometrics represent a convenient, low-cost method to complement morphological identification. However, the molecular phylogenetic analysis is needed for confirmation in the future study.

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