1. Supplementary methods 1

Replication error in morphological data

To test the robustness of landmark data and shell length measurements and calculate the error of landmark data arising from parallax or encrusting algae (obscuring landmark location), a random selection of shells (~10% of specimens) was measured and photographed in triplicate, in three different sessions, and landmarks on each of the three replicate images of a shell were recorded in triplicate, again in three different sessions. The three-way interaction between these three factors (individual shells, three photos per shell, three replicate sets of landmarks per photo) was tested in a Procrustes ANOVA. Mean of squares of the different terms in the ANOVA were used to calculate error by using the following equation (Adams *et al.*, 2015):

$$1 - \frac{\frac{MS_{shell} - MS_x}{n}}{MS_x + \frac{MS_{shell} - MS_x}{n}} \qquad (1)$$

In equation 1, MS_{shell} is the mean of squares of the factor shell in the ANOVA model, MS_x is the mean of squares of either the three-way interaction between the factors shell, photo and digitizing replicate (to calculate the digitizing error, i.e. the repeatability of landmarks) or the interaction between the factors shell and photo, to calculate the total error (also including the digitizing error). The number of replicates (in both these cases three) is represented by n. Errors were calculated separately for different species.

Reference

Adams DC, Collyer ML, Sherrat E. 2015. Geomorph: Software for geometric morphometric analyses. R package version 2.1.5. Available at: https://cran.r-project.org/web/packages/geomorph/index.html.