Pleistocene events and present environmental factors have shaped the phylogeography of the intertidal limpet *Cellana toreuma* (Reeve, 1855) (Gastropoda: Nacellidae) in Southeast Asia and China

Jie Wang[1,2], **Monthon Ganmanee**[3], **Aileen Tan Shau-Hwai**[4], **Aazani Mujahid**[5] and **Yun-Wei Dong**[1,2]

+ Author Affiliations

Correspondence: Y.W. Dong; e-mail: dongyw@xmu.edu.cn

Received July 17, 2015.
Accepted December 14, 2015.

Abstract

High levels of biodiversity and phylogeographic structure in marine species in Southeast Asia are strongly linked to Quaternary sea-level fluctuations and complex oceanographic conditions. *Cellana toreuma* is a common limpet on intertidal rocky shores and is widely distributed in the Western Pacific. Analyses of partial mitochondrial COI gene sequences from Southeast Asia, combined with previously published sequences from East Asia and Indonesia, revealed the existence of five well-supported clades with high genetic divergences (between 1.4 and 7.6%), namely the East Asia clade, the eastern Southeast Asia clade, the western Southeast Asia clade, the Pelabuan Ratu (Java) clade and the Ogasawara clade. The geographical distribution of the five clades is likely related to the history of glaciations and rapid postglacial population expansions. Analyses of pairwise Φ_{ST} and hierarchical analysis of molecular variance shows significant population structure among collections in East and Southeast Asia. These results suggest that historical events have had strong effects on the phylogeographic structure of *C. toreuma*. In addition, present environmental factors, such as unsuitable habitats and ocean currents, have also affected the genetic footprints of past environments.