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Shell morphology and skeletal properties in edible clam *Chamelea gallina* during the Holocene: contrasting the fossil and modern records to forecast biotic responses to global change

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Understanding how marine taxa will respond to climate change is one of the main challenges for management of coastal ecosystem services and fishing industry. Ecological studies on factors controlling shell proprieties and morphology of commercially important mollusk species are necessarily restricted to studies along a latitudinal gradient or small-scale laboratory experiments. Few studies, however, have investigated how shell growth and microstructure is affected by climate change in the recent fossil record, which offers a quantitative archive of ecological responses to past climate transitions (e.g., Holocene climate optimum). Among economically relevant shellfish, bivalve *Chamelea gallina* seems particularly sensitive to environmental changes, showing macroscale variation in shell morphology in response to environmental parameters (solar radiation and temperature). This preliminary study investigates skeletal properties and growth of *C. gallina* specimens from the Holocene nearshore deposits of the Po coastal plain (northern Italy). Here, shell skeletal parameters (micro-density and apparent porosity) and growth parameters (bulk density, linear extension and net calcification rates) were investigated in relation to shell size and age. We also compared morphology and skeletal properties of the fossil assemblages with those of living, harvested populations of *C. gallina* sampled from the comparable environmental setting in the modern North Adriatic Sea. In both the sub-fossil and present-day populations, juveniles are more porous than adult specimens, suggesting that *C. gallina* promote rapid shell accretion at expense of a higher risk of predation in order to reach earlier the size of sexual maturity (present day ca. 10-16mm) by enabling faster linear extension rates. The inferred biotic response of *C. gallina* over the Holocene offers a baseline for understanding the short- to mid-term impact of anthropogenic warming on this important shellfish species. This in turn, may allow implementation of more effective management of fishing industry and ecosystem services.