

Analyzing shell size variability in the opportunistic bivalve *Corbula gibba*: comparing Recent and fossil data

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Corbula gibba is a first-order opportunistic bivalve species presently inhabiting the Eastern Atlantic and Mediterranean. This species is abundant in fossil benthic assemblages in Middle Miocene sediments of the Central Paratethys (Vienna and Danube Basins). Its indicator value for interpretation of past environmental conditions remains poorly explored and requires studies combining paleoecological, taphonomic, sclerochronological, and allometric approaches.

First, meta-analysis of published abundance and body size patterns in living assemblages collected in the Adriatic Sea revealed that in spite of the westward increase in primary productivity in the northern Adriatic Sea, size structure of living assemblages of *C. gibba* during the 20th century does not differ between the northeastern (mesotrophic) and northwestern (eutrophic) coasts Adriatic Sea, with size-frequency distributions showing minimal differences in maximum shell size. Second, samples from cores from the northern Adriatic that span the past centuries to few millennia show that past populations of *C. gibba* inhabiting northeastern Adriatic had significantly smaller sizes than today, suggesting that the lack of size differences in the 20th century is a relatively young phenomenon triggered by recent eutrophication events. However, population densities are still significantly higher on the western side of the Adriatic Sea and in the Gulf of Trieste.

Third, a broad-scale macroecological comparison of size-frequency distributions of molluscan assemblages with dominant *C. gibba* from the eastern Mediterranean (Israel) shows significantly smaller shells, relative to larger shells from the Adriatic Sea. This increase in shell size correlates positively with an increase in chlorophyll concentrations. We observed a size gradient of similar magnitude in Middle Miocene assemblages with *C. gibba* between the Vienna and Danube basins. Fossil *C. gibba* shells size from the northeastern margin of the Danube Basin (without major river input, locality Trstín) are similar to those from the Eastern Mediterranean, whereas shells from the Vienna Basin (occurring in sediments with major river-borne sediment supply, locality Rohožník) have similar size distributions as shells from the northern Adriatic.