



Molluscan community responses to the Holocene sedimentary evolution of the Po Delta, northern Italy

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The sedimentary history of the Po River Delta during the Holocene highstand records a transition from wave-dominated, weakly prograding shoreline (~ 7.0 - 2.0 cal ky BP) to rapidly upbuilding, strongly progradational river-dominated delta lobes of the Roman to modern age (< 2 cal ky BP). We evaluate responses of nearshore molluscan communities to this major shift in sedimentary dynamics using a series of cores drilled throughout the ~ 30 -m-thick Holocene succession of the present-day Po coastal plain. Changes in diversity and composition of fossil assemblages from delta front environments were analyzed within a regional chronostratigraphic framework based on millennial-scale parasequences traceable across the study area. Rarefied sample-level species richness decreases through time as the assemblages become increasingly strongly dominated by the opportunistic corbulid bivalve *Lentidium mediterraneum*. This pattern is especially pronounced in samples representing lower shoreface and delta front transition facies associations, while mouth bar and upper shoreface/foreshore assemblages remain species poor throughout the investigated succession. Drastic drops in both local diversity and between-sample species turnover combined with increase in average fossil abundance (i.e. the density of identifiable fossils per core interval) characterize the samples from the youngest parasequence. Deposition of this sedimentary unit followed the historical Po River avulsion near the Ficarolo village in 1152 AD, which shifted the river towards its present-day position, and corresponds to the time of intensified anthropogenic modification of the drainage network. While the reduction in local species richness can be partly explained by decreasing time averaging in the river-dominated deltaic succession, lower turnover and higher fossil abundance in the last parasequence is primarily driven by the ubiquity of the *L. mediterraneum* characterized by an explosive population dynamics. The observed changes in the fossil assemblages thus likely resulted from a combination of taphonomic effects of higher sedimentation rates and ecological responses of benthic communities to increased instability of deltaic habitats.