

***Pinna nobilis* within a *Posidonia oceanica* meadow: evidences of how hydrodynamics define this association in the Gulf of Oristano (W Sardinia, Italy)**

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The fan mussel *Pinna nobilis* is the largest bivalve of the Mediterranean Sea, declared protected since 1992. It is a sessile suspension feeder endemic of this basin which lives mainly on soft sediments colonized by seagrass meadows. This study considers a population living within a *Posidonia oceanica* bed in the Gulf of Oristano (W Sardinia, Italy), a site included within a Marine Protected Area and in two Sites of Community Importance. Based on field surveys conducted in 2007, 2009 and 2014 differences in density, size, and shell burial level of *P. nobilis* were investigated in relation to meadow's distribution and characteristics. Moreover, the spatial differences in density and orientation of *P. nobilis* were related to hydrological features. *P. nobilis* showed a mean density of 4.06 ± 1.13 ind./100 m² and a significant increase in population size was observed between 2009 and 2014. A high-resolution multibeam survey revealed that the *P. oceanica* bed was characterized by a striped structure. Toward the inner sheltered sector of Gulf, the meadow became hill-shaped. A comparison between meadow structure and *P. nobilis* distribution showed that specimens are mainly located at the edge of the channels within the striped meadow, whereas the edge effect resulted less noticeable within the hill-shaped meadow. The compactness of the seabed influences the shell stability: the burial level decreased with the increasing of fine sediments. Bottom current direction and speed are the main factors influencing shell orientation, whereas wave action is negligible. Where bottom current speed exceeded 0.07 m/s specimens resulted in line with the prevalent current direction with the ventral side exposed to incoming flow. These features suggest that feeding strategy is an important factor in determining shell orientation, possibly in addition to drag. Food availability could be the driving force in determining the patchiness distribution of *P. nobilis* population with higher values in those sites close to the mouth of the lagoons, in sedimentation area or in the meadow channels where the water flow is conveyed. These findings contribute to increase the knowledge on the *P. nobilis*-*P. oceanica* association and provide useful information for improving conservation measures.