

Biol. Mar. Medit. (2006), 13 (2): 134-135

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AN ALTERNATIVE SUSPENDED CULTURE METHOD
FOR THE MEDITERRANEAN CARPET CLAM,
TAPES DECUSSATUS (L.),
IN THE CALICH LAGOON (NORTH WESTERN SARDINIA)

UN METODO ALTERNATIVO DI ALLEVAMENTO IN SOSPENSIONE
DELLA VONGOLA VERACE MEDITERRANEA,
TAPES DECUSSATUS (L.),
NELLO STAGNO DI CALICH (SARDEGNA NORD OCCIDENTALE)

Abstract - *Tapes decussatus* seed was grown in two distinct groups of six suspended modules each placed at two different sites of the Calich lagoon from January to July 2004. Each module was composed of three stacked plastic baskets filled with coarse sand to prevent shell deformities. Statistical analyses showed significant differences in carpet clam survival at the two sites, while no differences in growth were detected.

Key-words: mollusc culture, *Tapes decussatus*, coastal lagoons, Mediterranean Sea, Sardinia.

Introduction - Clam aquaculture has developed conspicuously in Italy during last decades. In particular, following its introduction into northern Adriatic lagoons, the Pacific carpet clam *Tapes philippinarum* (Adams & Reeve, 1850) has been intensively exploited due to its rapid growth and propagation (Paesanti & Pellizzato, 2000). In Sardinia the semi-extensive culture of this species has been banned by the Regional Government in order to protect the native Mediterranean carpet clam *T. decussatus* (Linné, 1758). Since previous trials carried out in the Calich lagoon (Alghero, NW Sardinia) showed excellent results by culturing this latter species using traditional farming methods (Chessa *et al.*, 1998, 2005), the aim of this study was to evaluate its growth using an alternative suspended culture technique.

Materials and methods - Commercial seed of *Tapes decussatus* (mean total length=20±1.7 mm) was grown in suspended modules in the Calich lagoon from January to July 2004. Each module was composed of 3 small stacked plastic baskets and 2 distinct groups of 6 modules each were positioned at 2 different sites: near the mouth (hereafter station 1) and in the internal portion of the lagoon (hereafter station 2), respectively. All the baskets (diameter=41.5 cm; height=8 cm) were filled with coarse sand to prevent shell deformities, and 60 *T. decussatus* specimens were placed in each of them. In order to ensure good water circulation inside the baskets, fouling organisms were removed from them every month. Overall mortality and total length of a 180 specimen carpet clam sample was recorded monthly at each site. An equal mollusc sample were assessed bimonthly for shell height and width. All morphometric measurements were always recorded by the same experimenter to improve accuracy. Furthermore, water temperature, salinity, dissolved oxygen, and pH values were monitored monthly by means of a multi-parametric probe at both sites. One-way ANOVA was used to test for differences in both carpet clam mean survival and final shell length at the 2 growing stations. Data were tested for homoscedasticity using Cochran's C test prior to analysis (Underwood, 1997).

Results - *Tapes decussatus* growth rate showed a similar trend at both the stations and no significant differences between them were detected. Indeed, final mean length values of the molluscs were almost identical (33.2 ± 2.1 mm at station 1 vs. 32.8 ± 2.2 mm at station 2). Moreover, due to the presence of coarse sand in the baskets, all the surviving specimens showed a harmonic growth (i.e. without deformities of the shell) at both the stations, as shown by their final mean shell height (23.6 ± 1.5 mm at station 1 vs. 23.5 ± 1.4 mm at station 2) and width (16.2 ± 1.1 mm at station 1 vs. 16.5 ± 1.2 mm at station 2) values. On the other hand, ANOVA detected significant differences ($F=6.01$; $p<0.02$) in mean *T. decussatus* survival values recorded at the 2 growing stations. In fact, a Student-Newman-Keuls post-hoc comparison test revealed a higher mean survival rate in the external station (68.3%) than in the internal one (53.3%). Water temperature, salinity, dissolved oxygen, and pH monthly values recorded were almost identical at both the stations. Consequently, the dissimilarity observed in carpet clam survival seemed not to be attributable to differences in the hydrological parameters monitored at the 2 growing sites.

Conclusions - Suspended culture is a widespread farming method used for many bivalve species such as mussels, oysters and scallops. Conversely, it is quite unusual for clams belonging to the genus *Tapes*. In Italy, this technique was successfully tested for both *T. philippinarum* and *T. decussatus* by Boscolo *et al.* (2003) and by Pastore *et al.* (1996) and, limited to the pre-growing phase, by Orel *et al.* (1997) and Chessa *et al.* (2005). Since intense harvesting of bivalves cultured by traditional methods can have a serious effect on the environment (Sorokin *et al.*, 1999), our results emphasized the effectiveness of suspended culture for the Mediterranean carpet clam in the Calich lagoon. Furthermore, the alternative technique we used (i.e. coarse sand in baskets) produced good results in terms of mollusc survival, size increases and shell shape.

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