

Changes in the biodiversity of mussel assemblages induced by two methods of cultivation

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ABSTRACT

Mussel cultivation involves collecting mussel spat or transplanting mussels that typically harbor complex assemblages of associated species, into more favorable growing sites. The biodiversity associated with cultivated mussel assemblages thus depends partly on the source of the mussels and on the new habitat created by the method of cultivation. The aim of the current study was to make a quantitative comparison of the macrofaunal communities associated with natural intertidal seed beds and with cultivated mussels grown either on the seabed or on ropes, particularly in relation to the structure of the mussel populations. Core samples (79 cm²) were collected from rope-grown and subtidal bottom-cultured populations and from natural intertidal mussel beds using a nested ANOVA design. The size distribution, biomass and density of the mussel populations and the macrofauna associated with each type of population were quantified. The biomass of macrofauna associated with mussels was significantly greater within rope-grown mussel assemblages than on mussel beds. There were significantly fewer individuals among bottom-cultured mussels than either rope-grown or naturally occurring intertidal mussels. Positive correlations between mussel biomass and associated faunal biomass existed at certain sites but not others. There was a shift from oligochaete to polychaete dominated worm communities caused by mussel cultivation. Sessile polychaetes were most abundant among rope-grown mussels whereas highly motile polychaetes were most abundant at the bottom-culture sites. Fewer amphipod crustaceans were found under both types of cultivation. To maintain or enhance the abundance and biomass of mussel-associated fauna relative to the intertidal beds, suspended culture is preferable to on-bottom cultivation. Positive mussel and associated-macrofaunal biomass correlations are species dependent; cultivation sites could thus be selected to minimize detrimental impacts of mussel farming or even increase the biomass of mussel-associated macrofauna.

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