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CM 296: Coastal Fish Communities – a Comparison of Fishing Methods

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Seagrass meadows do not only provide important ecosystem services across the globe, but also essential functions for marine organisms including coastal fish. Currently, seagrass meadows experience high levels of anthropogenically and environmentally induced threats such as rising temperatures, human constructions and high nutrient loads. Therefore, monitoring the state and faunal communities associated with these vulnerable habitats has become an important task and is included as a requirement in the Marine Strategy Framework Directive.

To establish sound monitoring programs for faunal communities, such as coastal fish, information on the applicability of sampling methods in habitats is essential. Different active and passive methods might only capture specific fragments of local fish communities, introducing a certain bias into sampling results. In this study, we aim to address this issue by comparing the efficiency of fishing methods in seagrass meadows along the western German Baltic Sea coast. To do so, taxonomic and trait biodiversity were compared between active (beach seine, YOY-trawl) and passive gear (multimesh gillnet, eelfyke, minnow trap), and assessed whether differences between methods vary with season.

Results indicate pronounced discrepancies in the catch efficiency between fishing methods. The gillnet generally performed best in representing fish biodiversity among passive gear, while the minnow trap exhibited the lowest performance. From winter until summer, gillnets and active methods predominantly displayed similar catch per unit efforts (CPUE) and species richness, while Shannon diversity was higher in gillnets. This pattern was reversed in summer and autumn when CPUE was clearly higher in the beach seine and YOY-trawl compared to the gillnet, whereas species richness and Shannon diversity either did not differ between these methods or were higher in the active methods.

These patterns are likely directly linked to differences in taxonomic and trait composition between fishing methods. Active methods were more efficient in catching pipefish, sticklebacks and gobies throughout the year explaining the higher diversity captured with the active methods during summer and autumn, as these species commonly are more abundant in coastal habitats during this time of year. On the contrary, species with a flat body shape as plaice and flounder displayed highest CPUEs in gillnets.

The outcomes of this study will help scientists choose appropriate sampling methods in seagrass meadows depending on the study objective, i.e. with respect to sampling season and targeted species, and will additionally support the development of solid monitoring programs.

Keywords: coastal fish communities, fishing methods, seagrass meadows, biodiversity

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