



Recolonization dynamics in areas disturbed by bottom fishing gears

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Abstract

Results of two investigations on the effects of disturbance on benthic communities in lagoon and coastal areas, caused by bottom fishing-gears ('hydraulic dredge' for clams and 'rapido', a kind of beam-trawl for soles and scallops employed in the Northern Adriatic sea), are given. Such gears, although characterised by different features and targets, have similar effects on the sea bottom: both produce deep furrows (7–13 cm for the 'rapido', up to 20 cm for the 'hydraulic dredge'), thus affecting the texture of the bottom. In 1992 ('hydraulic dredge') and in 1995 ('rapido') two different research projects were carried out; samples of benthos were collected immediately after the passage of the gears and at fortnightly-intervals, in treated and control areas. This allowed study of the modifications of the macrobenthic communities and investigation of the short and medium-term (dredge: 60 days, 'rapido': 15 days) progression of the recolonization processes in the disturbed areas. These dynamics have been analysed by giving emphasis to the species and to their time-space fluctuations. It has been found that characteristically 'non-opportunistic' species can assume an opportunistic behaviour during the initial phase of the recolonization processes of the disturbed areas.

Introduction

Results of studies on the structure of marine ecosystems, the relationships among their components and the temporal evolution of such relationships have been of increasing importance. In addition to natural disturbance, human activities have the potential to greatly modify aquatic ecosystems. Particularly, the interaction between the benthos and the abiotic component of the ecosystem has been the subject of numerous studies, both in terms of structural relationships (Sutherland, 1974; Commito, 1982; Ambrose, 1984a; Ambrose 1984b; Valderhaug & Gray, 1984) and recovery following events of anthropic disturbance (Dean & Haskin, 1964; Leppäkoski, 1975; Rosenberg, 1976; Pearson & Rosenberg, 1978; Hily, 1983; Bonsdorff et al., 1984). Chemical stresses as a consequence of pollution and dredging activities are just two examples of anthropic disturbance able to cause a drastic reduction

of a benthic population, giving origin to permanent or temporary changes in the environmental abiotic features (Poiner & Kennedy, 1984; Bonvicini Pagliai et al., 1985).

Among different anthropic activities, the trawling fishery appears not only to have a direct impact on its target species, but also on benthic communities as a whole, and on the physical environment in which they live.

The effects of bottom-fishing gears on sea-bottom morphology and its communities have been assessed in many studies mainly carried out in the North Sea (Bridger, 1970; Bridger, 1972; Pickett, 1973; Reise, 1982; de Groot, 1984; ICES, 1988; Rees & Eleftheriou, 1989; BEON, 1990; Hutchings, 1990; Bergman & Hup, 1992; Jones, 1992; Hall, 1994; Kaiser & Spencer, 1996). These studies provided evidence of remarkably heavy stress on epi- and endofauna and physical disturbance on the seabed.