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Fate of primary production in *Posidonia oceanica* meadows of the Mediterranean

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Abstract

Primary production of *Posidonia oceanica* meadows was estimated at two sites in the Mediterranean basin (Marseilles, France and Ischia, Italy), in the 10 to 20 metre depth range. At the five stations studied, foliar production (blade + sheath) ranged from 67.7 to 146.6 g C m^{-2} yr^{-1} and rhizome production from 8.2 to 18.0 g C m^{-2} yr^{-1}. Based on litter input (rhythm of fall of leaves), stocks (biomass) and kinetics of litter decomposition, the rate of export of this necromass was estimated. The rate of export was strongly influenced by depth and hydrodynamic forces which ranged from 51 to 68% at Marseilles (stations exposed to strong currents) and from 37 to 49% at Ischia. Exclosures at Marseilles were used to assess the proportion of the foliar production consumed by macro-herbivores in this area. The values recorded ranged from 24.8 to 35.3 C m^{-2} yr^{-1}, of which 44% is absorbed. On the basis of all these results, the fate of stocks and the flux of elements resulting from primary production were determined. For the Marseilles stations, carbon followed four major pathways: 10% was consumed by herbivores, 23% was decomposed in situ as the result of detritivore action, 35% was exported in the form of litter and 32% was stored in the matte (sheaths and rhizomes). For Ischia, the values were 3%, 34%, 27% and 36%, respectively. Extrapolation for the whole Mediterranean gave an estimated total production of *P. oceanica* meadows of 3.5 million tons of carbon, of which 2.4 million tons are lost to the community through export or storage in the mat. © 1997 Elsevier Science B.V.

Keywords: Seagrass; Leaf production; Consumption; Exportation; Decomposition; Litter; Carbon flux

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