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Autore	Jones E. B. Gareth (Evan Benjamin Gareth), <1937->
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Marine fungi play a major role in marine and mangrove ecosystems. Understanding how higher fungi with their spectrum of cellulolytic and ligninolytic enzymes degrade wood tissue, while labyrinthuloids and thraustochytrids further contribute to the dissolved organic matter entering the open ocean is essential to marine ecology. This work provides an overview of marine fungi including morphology and ultrastructure, phylogeny, biogeography and biodiversity. Increasingly, biotechnology is also turning to these organisms to develop new bioactive compounds and to address problems such as decomposition of materials in the ocean and bioremediation of oil spills. These potential applications of marine fungi are also treated. In the light of massive marine oil spills in the past years, the importance of understanding marine fungi and their role in the food chain cannot be underestimated.
