

Microdistribution of macroinvertebrates in a temporary pond of Central Italy: Taxonomic and functional analyses



"Spatial distribution of physical and chemical variables and macroinvertebrate composition, structure and functional aspects were investigated in five microhabitats available (Ranunculus acquatilis+Ranunculus sardous, Spirogyra sp., Juncus effusus, and unvegetated littoral sediments and central sediments) in a temporary pond near Rome during spring 2004. The central sediments were found to differ greatly from the other substrates. They were characterized by higher nutrient contents (total P, total N), organic matter and organic C, and silt and clay in the sediments, and lower dissolved oxygen content and lower pH in the water. Species richness and densities of total macrofauna showed the lowest values in central sediments and the highest ones in submerged macrophytes (Ranunculus spp.) and emergent vegetation (Juncus effusus). Oligochaeta Tubificidae, some Nematoda Dorylaimus spp., and Chironomidae Tanyptodinae (Procladius sp. and Psectrotanyptus varius) and Chironominae (Chironomus plumosus group) characterized the central sediments, whereas Ephemeroptera and most of the Odonata and Coleoptera species were commonly found in submerged macrophyte beds. Some species of Coleoptera and Hemiptera (Hygrobia hermanni, Helochaetes lividus, Berosus signaticollis and Gerris maculatus) were mainly found in the algal substratum, and some Nematoda species (Tobrilus spp. and Aporcelaimellus obtusicaudatus), Oligochaeta Enchytraeidae, young larvae of Sympetrum and Diptera Ceratopogonidae in littoral sediments. Juncus effusus appeared to be mainly colonized by Chironomidae Orthocladiinae (Psectrocladius sordidellus group and Corynoneura scutellata) and Tanyptarsini (Paratanyptarsus sp.). Central sediments also favoured high

abundances of collector-gatherers, burrowers and drought resistant forms with passive dispersal, whereas Ranunculus spp. hosted mainly scrapers, shredders, swimmers+divers and active dispersal forms without any resistant stages to desiccation. Juncus plants were mostly colonized by collector-filterers and by organisms capable of both active dispersal and surviving desiccation. Littoral sediments and algae showed similar functional organization and intermediate features between central sediments and submerged macrophyte beds. All these results demonstrate that microhabitat characteristics play a crucial role in selecting macroinvertebrate taxa according to their environmental requirement, feeding mechanism, movement and resistance to drought. Moreover, our study confirms the role of submerged and emergent vegetation in maintaining high biodiversity and suggests that all microhabitats should be considered to provide both an exhaustive collection of species for pond management and conservation and basic insights into the functioning of pond communities."

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Obtenir le document : "Sapienza" Université de Rome

Mots clés : MACROFAUNE BENTHIQUE, INVERTEBRES, ITALIE, DISTRIBUTION

Thème (issu du Text Mining) : MILIEU NATUREL

Date : 2010

Type de ressource : Article scientifique

Format : text/xml

Identifiant Documentaire : PRLM5981

Langue : Anglais

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