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Colonization of a new man-made river (Marchfeldcanal, Lower Austria) by benthic copepods

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Abstract

The role of copepods in the colonization and emigration processes of benthos and drift of an irrigation canal were studied. During the 3 first years of existence of the canal, fifteen species of copepods were recorded (1 diaptomid, 11 cyclopoids, 3 harpacticoids). Copepod succession in the canal was initially represented by lentic species, then by predatory species like *Macrocyclops albidus* that developed with the proliferation of filamentous algae and epibionts during the first two years. Primary consumers appeared from the beginning of the flowing conditions but started to dominate only from the third year. Smaller species associated with the bed sediments like the harpacticoid species *Nitocra hibernica*, were late colonizers. The latter as well as *Paracyclops fimbriatus* and *Eucyclops serrulatus* were the dominant copepod species in the canal. Total copepod density in the benthos ranged from 15,800 to 68,000 ind./m^2, with a mean of 7.6% of the total zoobenthos. Copepods constituted up to 25% of the total faunal drift density, ranging from 50 to 140 ind./m^3. Their highest abundance was observed around midnight. A three-fold increase of the discharge temporarily affected the drift density, but did not change the diel rhythm of the drift. Cyclopoid copepods namely *P. fimbriatus* (54.77%), copepodid cyclopoids (20.76%) and *E. serrulatus* (16.11%) formed the main part of the drift samples. The harpacticoid *Nitocra hibernica* was a minor participant in the drift processes.

Keywords: Copepoda; benthic copepods; drift; Austria; colonization; man-made rivers

1. Introduction

Most studies on microcrustaceans deal with plankton of lakes and, to a lesser extent, lacustrine benthos (Williams, 1982; Sarvala, 1986, 1990; Paterson, 1993). Recently, some research has been done on the benthic microcrustaceans of lotic systems, for example, on densities and species composition (Robertson, 1990; Rundle and Ormerod, 1991), production (O'Dorherty, 1985; Gladden and Smock, 1990; Robertson, 1996) and distribution in relation to river hydraulics (Richardson, 1992; Robertson et al., 1995; Palmer et al., 1995). Little is known about the role of copepods in stream drift (Shiozawa, 1991; Palmer et al., 1992).

Copepods are considered to be an important part of benthic food webs of streams as predators upon other microcrustaceans (Sarvala, 1986) and as consumers of protozoans, microalgae, fungi, detritus and bacteria (Fryer, 1957a,b). They also serve as an important prey for young fish (Sibert et al., 1977; Treasurer, 1990; Rundle and Hildrew, 1992) and invertebrates (Hildrew et al., 1985; Lancaster and Robertson, 1995).

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