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# Diet and secondary production of some species of *Hydropsyche* larvae (Trichoptera: Hydropsychidae) in the tailwater affected by dam removal and the emptying of an impoundment

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## Abstract

The diet of 4th and 5th instar larvae of filter-feeding trichopteran species [*Hydropsyche contubernalis* McLachlan, *H. modesta* Navás and *H. pellucidula* (Curtis)] that are dominant in the benthos in riffle habitats was analysed. Caddisflies were collected in a river section downstream of a dam. Samples were collected in 2 periods: S1—during the functioning of the dam reservoir, and S2—just after it was emptied (reservoir recovery). Gut contents were examined from the anterior part of the alimentary canal. Formless content, diatoms and other algae were considered as detritus. The diet of 4th instars mostly consisted of plant and animal detritus, with a small contribution of early stages of Chironomidae larvae. In contrast, 5th instars consumed larger chironomids in the subfamilies Orthocladiinae and Tanytarsini. When the reservoir was emptied, an increase in the contribution of invertebrates to the diet was observed – chironomid larvae, trichopterans and ostracods dominated. In spring they were Chironomidae (*Cricotopus* sp.), while in winter and summer Simuliidae. The most diversified diet was recorded in *H. contubernalis* and *H. modesta* in the summer of S2. Trichopteran secondary production in the investigated river section was similar in both study periods: 38.8 in S1 and 35.3 g dry mass $m^{-2}$ $year^{-1}$ in S2. In both study periods, the highest values of production were recorded in the stony riffle habitat, where *H. contubernalis* comprizeded 23.4% (S1) and 18.8% (S2) of total annual trichopteran production originating from all the investigated habitats.

**Key words:** dam reservoir, dam removal, caddisflies, *Hydropsyche*, diet, secondary production

## Introduction

To prevent floods and stabilize water levels numerous rivers have been turned into canals and impounded (Dyniesius & Nilson 1994). In the last century about 40 000 reservoirs with dams exceeding 15 m in height (Oud & Muir 1997) and an uncounted number of smaller ones have been constructed (Poff & Hart 2002). It is presumed that the average lifetime of reservoirs is from 60-120 years (Dendy & Champion 1978), depending on the morphometry of the reservoir and characteristics of the river catchment. Both of these factors determine the rate of sedimentation of transported organic matter (Morris & Fan 1998). The removal of dams is increasingly becoming the solution to problems connected with the filling of reservoirs. Although the impact of impounding on river biological communities has been relatively well investigated, the removal of dams and emptying of reservoirs have been studied less (Shuman 1995, Hart *et al.* 2002, Pollard & Reed 2004).

In Drzewieckie Lake, which impounds the Drzewiczka River, dry dredging, with a temporary removal of the dam to empty the reservoir, was used. This was a specific type of temporary restoration of the river below the dam (Żmudziński *et al.* 2002), enabling us to follow changes in the communities of the Drzewiczka that occurred after the releasing of the river from impoundment-

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