Introduction

Nitrogen (N) is a dominant pollutant in freshwater and

macrophytes provide a large biologically active surface area for epiphytic communities on leaves consisting of auto- and heterotrophic microorganisms and the structure of macrophytes creates substantial surface area for water-biota contact. Finally, we hypothesised that N enters the primary consumer food web at a higher rate in macrophyte habitats than in non-macrophyte habitats, because macrophyte beds provide habitat for invertebrates and thus increase the biomass of primary consumers.

Methods

Study site and experimental design

We conducted the ^{15}N release study in a 300-m reach in the River Lilleaa situated in an agriculturally dominated catchment in eastern Jutland of Denmark (10 03¢46.96¢¢E, 56 15¢00.83¢¢

few metres upstream on each subsequent sampling date to avoid re-sampling disturbed areas. Samples of fish and

Turnover rates of ^{15}N were within the same range for all autotrophic compartments although macrophyte turnover

Uptake rates of ^{15}N by primary consumers in Lilleaa were similar in macrophyte and non-macrophyte habitats (Fig. 1). In macrophyte habiilaratenon-mhabi-

Discussion

Macrophyte habitat versus non-macrophyte habitats

Macrophyte habitat showed four times higher NH_4^+ uptake rates in the River Lilleaa than non-macrophyte habitats. This represents a lower level for uptake rate in

vascular

although Madsen & Cedergreen (2002) conclude that vascular stream plants can satisfy their demand for nutrients by leaf uptake alone, our study indicates that even in nutrient-rich stream water macrophytes could be using sediment nutrients. However, we did not sample

nutrient concentration and the role of macrophytes in sedimentation (Sand-Jensen & Mebus, 1996) results in tenfold higher FBON pools in Lilleaa.

Longer-term nitrogen retention

Our results strongly indicate that macrophytes play an important role in the longer-term retention of N and thus a decrease in net downstream transport during the growth season compared to streams without macrophytes