Budgets of nitrogen fluxes in riparian grey alder forests

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With 2 figures and 2 tables in the text

Abstract: Transects were established on two hillslopes and two study nitrogen budgets in two complex riparian buffer zones receiving different nitrogen loading. In the heavily loaded site the average total-N content decreased from 23 mg l⁻¹ to 3.1 mg l⁻¹ in a 40-years-old riparian grey alder forest (80 % removal). At the site with low loading the average removal of total-N was 48 %. In both transects the budget of N fluxes was established. In the older forest it was estimated as high as 321.1 kg ha⁻¹ yr⁻¹, being 285.3 kg ha⁻¹ yr⁻¹ in the younger one. Considering all inputs and outputs, the N removal efficiency in grey alder stands slows down with increase of age. In the same time, immobilization in soil is increasing. This suggests that grey alder buffer communities should be managed by regeneration cutting and tending to keep their nitrogen removal rate high.

1. Introduction

Buffer zones have many functions that improve water quality, protect air and soil, increase biological and landscape diversity (Mander et al. 1997b). One of the main functions of buffer zones and riparian wetlands is to purify water of contaminants and has been studied in many regions (Peterjohn & Correll, 1984; Lowrance et al. 1984; Pinay & Decamps 1988; Uusi-Käppä & Ylä-Ranta 1992; Haycock & Pinay 1993; Gilliam 1994; Vought et al. 1994). However, our knowledge concerning the processes affecting water quality partly due to the large variety of riparian ecosystems which specific role in buffering is unclear. A comprehensive analysis of nutrient fluxes within the riparian ecosystems allows us to better explain the processes and make decisions for the riparian ecosystem management.

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