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## The comparison of soil denitrification potentials in two kinds of planted forests

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**Statement of the Problem:** Riparian vegetated buffer strips (RVBS) are widely constructed in the world to reduce the nutrient flux in surface runoff into surface water bodies to curb the development of eutrophication. However, which kinds of vegetation composition may reduce the nutrient flux in surface runoff more effectively is still an open problem. The purpose of this study is to determine whether plant species significantly influences its floor soil denitrification potentials for a planted forest.

**Methodology & Theoretical Orientation:** Two planted forests with different compositions in similar soil conditions in Zhushan Bay, in the buffer zone of Taihu Lake were chosen as the vegetation buffer strips for the comparison of their soil denitrification potentials. One is a composite forest composed of poplar trees, shrubs and herbs, named the poplar and shrub forest (PSF), and the other is composed of poplar and herbaceous plants, named the poplar forest (PF). Their floor surface runoff, the soil water and groundwater below their floor were monitored for one-year, and their soil denitrification potentials were compared. Laboratory DOC (dissolved organic carbon) leaching experiments of plant leaf and root were conducted which occurs in the study area.

**Findings:** The research results show that: There is a maximum value for the measured denitrification potentials around the depth of 40 cm in the vertical soil profiles for both planted forests, coincided with lower values for DO concentration and Eh at the same depth, proving the existence of a coupled nitrification-denitrification layer; in the vertical soil profiles for both planted forests, all the maximum values for the soil denitrification potentials and the numbers of denitrification bacteria in these two forests occur around the depth of 40 cm, demonstrating the existence of an active denitrification layer (composed of biogeochemical hot-spots) around the depth of 40 cm, which is closely related to the root system of grass vegetation for both forests; at the same depth, the soil denitrification potentials for PSF are twice of those for PF, however, there is no significant difference for the actual denitrification rates for the soils in both forests, which are limited by the concentration of nitrate in soil water and plant species have important influence on soil denitrification potentials.

**Conclusion & Significance:** Vegetation composition is an important influence factor for RVBS systems to remove nitrate in surface runoff and groundwater.

### Biography

Xuyi Cai has his expertise in Groundwater Chemistry and Atmospheric Chemistry. His research is involved in aerosol thermodynamics, secondary organic aerosol formation from biogenic and anthropogenic volatile organic compounds, groundwater pollution in north China, and geochemical modelling. He has published his papers in several journals.

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