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## EFFECTS OF PLANT DIVERSITY ON PLANT BIOMASS AND EFFLUENT NITROGEN REMOVAL IN A CONSTRUCTED WETLAND

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### Abstract

The short-term effects of plant diversity (number of plant species and species compositions) on aboveground biomass, substrate inorganic nitrogen (N) concentrations, and substrate solution “effluent” N concentrations were studied in a subsurface vertical-flow constructed wetland (CW). Results showed that (1) the number of plant species increased aboveground biomass ( $P < 0.05$ ) but had no effect on theoveryielding index  $D_{Max}$ ; (2) the species compositions and presence of the very productive species (e.g., *C. alternifolius*, *A. donax*) had a positive effect on plant biomass, while negative effects on substrate and substrate solution N concentrations; (3) substrate nitrate and ammonium concentrations negatively responded to the plant diversity ( $P < 0.05$ ); (4) the plant diversity decreased substrate solution nitrate and ammonium concentrations ( $P < 0.05$ ), suggesting that plant diversity increased effluent N removal. The results confirmed that plant biomass and N removal were enhanced by plant diversity in a short time span, and plant diversity could be managed to improve the N removal in a CW at the beginning stage (the second year after cultivation) for wastewater treatment.

*Key words:* ammonium, high nitrogen supply, nitrate, plant diversity, substrate solution

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