



Title: Iron Uptake and Translocation by Facultative and Obligate Wetland Plants

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Abstract: The effect of initial concentrations of iron in wastewater on its overall removal efficiency and accumulation in wool grass, soft rush, broad leaved cattail and soft stem bulrush plants was investigated under laboratory conditions. The total uptake and translocation of Fe in the roots, stems, leaves and flowers of each plant species were determined and the fractions of Fe removed by plant uptake and precipitation were calculated. The removal of Fe from the wastewater was influenced by the plant type, time and initial Fe concentration. The overall Fe removal efficiencies from the wastewater were 89, 74, 97 and 97%, 73, 71, 83 and 89% and 92, 44, 85 and 65% for soft stem bulrush, wool grass, soft rush and cattail in the compartments receiving tolerance (101.12 mg L^{-1}), wetland influent (7.72 mg L^{-1}) and control (1.12 mg L^{-1}) concentrations, respectively. The results showed that the concentration of Fe in the soils in the control compartments of soft stem bulrush, wool grass, soft rush and cattail decreased indicating the removal of Fe from the soil. The concentration of Fe in the soils in the wetland influent compartments of soft stem bulrush and cattail decreased and in the soils of wool grass and soft rush increased indicating the removal of Fe from the soil by the first two plants and the addition of Fe to the soil by precipitation in the other two compartments. The concentration of Fe in the soils in the tolerance compartments of soft stem bulrush, wool grass, soft rush and cattail increased indicating the precipitation of Fe from the wastewater. On a mass basis, broad-leaved cattail accumulated the greatest amount of Fe followed by soft stem bulrush, soft rush and wool grass. The root tissues accumulated significantly greater concentrations of Fe than the shoots indicating high plant availability of Fe but limited mobility once inside the plant.