

ASSESSMENT OF SALT TOLERANCE THRESHOLD FOR WETLAND PLANTS

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Salinization is a great threat to wetlands and freshwater ecosystems. Increased salinity can disturb aquatic vegetation and alter their growth and morphology. To understand the fate of aquatic fauna under future salinity levels, several wetland plant species with different morphologies (submersed, amphibious, floating-leaved, emergent and woody/tree) were exposed to increased salinity conditions. The objective was to model their growth in response to a salinity gradient and identify the salt tolerance threshold for each species. Species were grown under freshwater [0.2 parts per thousand (ppt)] conditions until mature, then transferred to treatment tanks with different salinity concentrations (0.2, 2.0, 4.0, 10.0, 15.0 and 20.0 ppt). After 6 to 9 weeks of growth in treatment tanks, plants were visually evaluated on a 1 to 10 scale (1 = dead; 10 = green, healthy and robust), then above- and below-ground biomass was collected to calculate shoot and root growth rates. We assessed the lower and upper limits of salinity tolerated by each species and implemented nonlinear regression techniques to project sublethal salinity concentrations that would reduce plant biomass and visual quality by 50% (LC50). Overall, increased salinity caused declines in plant health and growth. Visual quality of both tree species (pond apple and Brazilian pepper) declined at a lower salinity concentration than did shoot and root growth, so visual quality was the most sensitive parameter for these species. Shoot biomass was most the sensitive parameter for 9 of the 12 non-tree species evaluated (Illinois pondweed, hydrilla, lemon bacopa, alligatorweed, hygrophila, yellow waterlily, crested floatingheart, pickerelweed and broadleaf sagittaria), whereas root growth was the most sensitive parameter for torpedograss, spatterdock and southern naiad. Salt tolerance was highest in pond apple, Brazilian pepper, alligatorweed and torpedograss, and salt stress was highest in spatterdock and lemon bacopa.

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