Nitrogen Limitation of Mangroves Encroaching into Marshes Depends on Hydrological Positioning

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Coastal wetland plants such as mangroves and salt marsh grasses absorb nitrogen and abate estuary eutrophication. Increased nitrogen runoff to estuaries around the world has shifted the nitrogen limitation regimes of these plants, potentially threatening this nutrient sequestration. Tidal creeks and coastal waterways differentially deliver nitrogen to creek-adjacent plants and those in the interior wetland. However, we know little about how hydrological positioning on the landscape influences wetland plant nitrogen limitation and uptake. To fill this knowledge gap, we performed fertilization and ^{15}N labelling experiments at two sites in northeast Florida, USA and examined plant and soil responses. Six replicates of co-existing mangroves and marshes were fertilized with urea in the interior and creekside environments and compared with six replicates that were not fertilized (2 sites x 2 hydrological environments x 2 plant types x 2 treatments x 5 replicates). We found that interior mangroves (*Avicennia germinans*) and the marsh succulent *Batis maritima* grew more in response to nitrogen fertilization than plants on the creekside. Root productivity was higher for A. *germinans* and *S. alterniflora* in the interior, also indicating greater nitrogen limitation in this hydrological position. Nitrogen retention, as indicated by ^{15}N label, was higher in soils than plants at all locations and higher in soil in the creekside environment as compared to the interior portion of the wetland. Though mangroves and marshes on the creekside exhibited lower nitrogen limitation, it's possible that the silty soils along the creek may better bind nitrogen. Our findings will help managers in this region better value the nitrogen storage capacity of their coastal wetlands and will help ecologists and managers elsewhere to parameterize coastal wetland nitrogen budgets.