SL206 Nitrogen budget of the seagrass *Thalassia testudinum* in the western Gulf of Mexico

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The nitrogen (N) budget of the seagrass *Thalassia testudinum* was examined with respect to inorganic-N acquisition and the effects of sediment NH4+ enrichment on two distinct populations in south Texas. The two populations exhibit different biomass allocation patterns at Corpus Christi Bay (CCB) and lower Laguna Madre (LLM): plants at CCB have a higher above-ground biomass while plants at LLM have a higher below-ground biomass. Ambient sediment pore water NH4+ concentrations at CCB (ca. 100 uM) were significantly higher than at LLM (ca. 30 uM). Therefore, it was hypothesized that 1) differences in biomass allocation are a result of the differential sediment N availability, 2) sediment NH4+ enrichment will affect growth, leaf morphology and tissue nutritional content of *T. testudinum* to a greater degree at low sediment N conditions, and 3) the relative contributions by leaf and root tissues to total N acquisition will differ between the two study sites. To examine the effects of sediment NH4+ enrichment, the seagrass bed sediments were fertilized with commercial N fertilizer, and changes in production, biomass, leaf morphology, tissue nutritional content and carbon (C) reserves were monitored. Additionally, N uptake by leaves and roots of *T. testudinum* from the two sites were measured seasonally. After fertilization, leaf production rates and shoot height at LLM increased to reach levels equivalent to CCB. However, sediment NH4+ enrichment had little effect on production and leaf size of T. testudinum at CCB. These results suggest that sediment N availability at LLM limits seagrass production. Rhizome non-structural carbohydrates (NSC) decreased in response to sediment NH4+ enrichment during the early periods of the experiment which suggests that C was reallocated from rhizome to leaf tissues to support the stimulated leaf growth. Root NH4+ uptake accounted for about 52 % of total N acquisition, while leaf NH4+ uptake contributed about 38 % and leaf NO3- uptake accounted for the remaining 10 % at both sites. The high biomass, chlorophyll, and C content in leaf tissues at CCB and the high biomass, C and NSC content in rhizome tissues at LLM demonstrated that plants responded to high sediment N conditions by enhancing leaf function, and to low N conditions by enhancing function of below-ground tissues.