

2008 VINCENT P. SLATT FELLOWSHIP REPORT

PROJECT: “Evaluating the Role of Evolutionary Change in Wetland Carbon Budgets”

SCHOLAR: Christopher Esber, Junior, Biological Sciences

ADVISOR: Dr. Jason McLachlan

REPORT: The impact of anthropogenic CO₂ production on climate and terrestrial primary production depends on the complex pools and fluxes of the global carbon budget. Plant primary production, growth and biomass allocation, processes at the root of the carbon cycle, are subject to evolution. Recent studies show that changing environments (e.g., rising CO₂) might alter the way plants fix carbon and subsequently allocate it to above ground and below ground tissues. Yet, these studies do not examine the evolutionary potential of these traits in response to changing environments – a process which could alter our estimates of future production. We investigated the changing abilities of ecologically important C₃ coastal sedge, *Schoenoplectus americanus*, to store carbon over 100 years of rising CO₂ levels, sea levels, and competition with the C₄ grass, *Spartina patens*.

- We found significant differences between modern populations of *S. americanus* for stem count, height and biomass.
- CO₂, salinity, and population had significant effects on aspects of *S. americanus* growth (stem number, stem height or biomass). - Differences in growth between populations could alter ecosystem processes (such as marsh soil accretion and decomposition).
- Models that predict these ecosystem processes may need to take disparities in growth into account in order to make more accurate forecasts.

Chris Esber (senior, now graduated) presented at the Notre Dame College of Science JAM and to be presented at the 94th annual Ecological Society of America Meeting in August.