

PRIMARY PRODUCTION AND SUBSTRATE SELECTIVE PROPERTIES OF SELECTED MAINE SALT MARSH PLANTS

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The coastal zones of our nation are ecologically (biological) and economically (industrial) productive regions. With intensification of coastal zone usage it is necessary to become more cognizant of any perturbations and their potential effects. This study focuses on several important primary producers of the salt marsh, the relations of the substrate to their production, and comparisons of the Maine salt marsh plants with those of Delaware and Georgia.

The methods of plant primary production measurements and substrate selective properties are enumerated in detail elsewhere (The Production of Minor Plant Species and Their Substrate Selective Properties. Contract Report-DRAFT. Office of Dredged Material Research; U.S. Army Engineer Waterways Experiment Station, Corps of Engineers, Vicksburg, Mississippi, Contract No. DACW 39-73-C-0110, 57 pp., 1974). Plant species considered included *Carex paleacea* Wahlenb, *Juncus gerardi* Loisel, *Spartina alterniflora* Loisel, *Spartina patens* (alt.) Muhl.

Field collections of aerial plant portions, underground biomass, and substrate samples were accomplished at eight-week intervals from early June through late September. The geographic collection sites included Northeast Creek Marsh (near Salsbury Cove, Maine) and Hog Bay Marsh (near East Franklin, Maine), both in Hancock County, Maine.

Samples were analyzed for wet weight per unit area, dry weight per unit area, number of stems per unit area, quantity of underground biomass per unit area, carbon caloric value, and mineral (N, P, K, Ca, Mg, Mn, Fe, B, Cu, Zn, Al, Mo, Sr, Ba, S). In addition plant material was sorted into living, dead, and dead parts. Production computations included rate of growth, rate of production of dead material, and rate of disappearance of dead material to the estuary. Tidal elevation of the marsh plants was also determined using the National Ocean Survey Primary Tide Station (in Bar Harbor), and U.S. Geological Survey Vertical Datum control points. Soil profiles from stands of each plant were prepared in conjunction with scientists from the University of Maine and the Soil Conservation Service, U.S. Department of Agriculture. Samples of each horizon were returned to Georgia to be dried and analyzed for available nutrients, physical properties, and carbon.

The preliminary results of primary productivity measurement reveal that *Spartina alterniflora* has nearly the same biomass in Maine marshes as in Georgia marshes. The mean tidal elevation of *Spartina alterniflora* is 2.7 meters above mean low water. Aerial portions of *Juncus gerardi* are similar in standing crop to *Juncus gerardi* marshes of Delaware but lower in standing crop than *Juncus roemerianus* marshes in Georgia. Tidal elevation of the *Juncus gerardi* ranges from 3.1 to 3.7 meters above mean low water. Results of caloric and mineral content of the plant material are not yet available nor are soil analyses complete. Comparisons of underground biomass profiles from Maine, Delaware, and Georgia indicate a decrease with decreasing latitude. This may be due to differential growth rates, faster decay rates of the dead matter at the higher temperatures in the South or greater silt and clay deposition in the more southerly marshes.