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Plant functionality across an environmental gradient

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Objective:

This study evaluated community and individual plant functional responses across an environmental gradient to provide insight into what is influencing the functionality and distribution of plants on barrier islands.

With projected increases in sea level rise and storm disturbance it is important to understand how plant communities are organized across barrier islands and how they function.

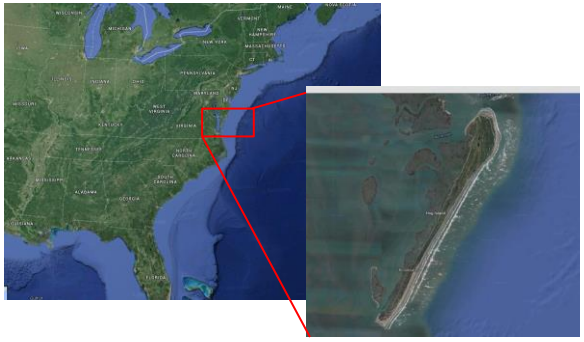

Figure 1: Virginia Coastal Reserve off the Eastern Shore of Virginia. Hog Island was the study site.

Methods:

Eight transects were established on the Southern tip of Hog Island. Plots were located every 20 meters and sampled.

- **Soil** was analyzed for pH, nitrogen, carbon content, and percent organic matter.
- **Plants**: Species composition, percent canopy cover and specific leaf area were quantified

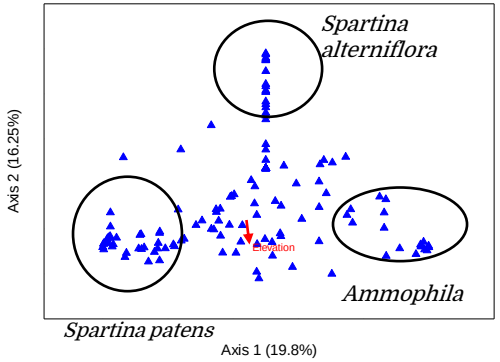

Figure 2: Bray-Curtis ordination of species cover. Elevation was important in structuring the dominant community types (i.e. dune building and marsh plants).

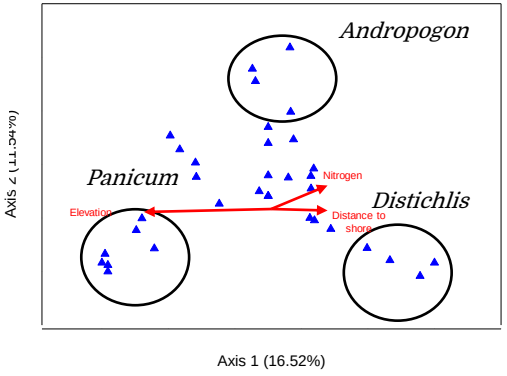

Figure 3. Bray-Curtis ordination without dominant species. Elevation, distance to shoreline and nitrogen were related to community separation. This reflects biotic processes that occur in the interior portion of the island.

Table 1. Mean percent cover and species composition across transects.

Scientific Name	Mean Percent Cover
Ammophila breviligulata	22.54%
Andropogon sp.	9.25%
Baccharis halimifolia	6.36%
Borrichia frutescens	7.51%
Cakile edentula	12.14%
Cirsium horridulum	0.58%
Conyza canadensis	19.08%
Clitoria sp.	0.58%
Distichlis spicata	14.45%
Festuca rubra	7.51%
Fimbristylis spadicea	7.51%
Gnapthalium obtusifolium	4.05%
Iva frutescens	6.94%
Lepidium virginicum	4.05%
Limonium sp.	4.62%
Monarda punctata	0.58%
Oenthera idecora	1.16%
Panicum amarum	27.17%
Physalis viscosa	0.58%
Rumex sp.	4.05%
Salicornia sp.	7.51%
Solidago sempervirens	19.08%
Salsola kali	10.98%
Salvia coccinea	5.20%
Scutellaria sp.	1.16%
Sonchus asper	1.16%
Spartina patens	43.93%
Spartina alterniflora	7.51%

Quadrat showing *A. breviligulata* and sampling techniques.

Transects established ran from primary dune into marsh.

Conclusions:

Position in the landscape (i.e. elevation and distance to shoreline) is an important driver in structuring dominant species such as *Ammophila breviligulata*, *Spartina patens*, and *Spartina alterniflora.* Elevation and distance to shoreline also show strong effects on species composition and distribution across the island.

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