Assessing arbuscular mycorrhizal colonization and rhizosphere carbon stocks across a chronosequence of salt marshes in the Bay of Fundy, Nova Scotia

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Fig. 1. Salt marsh sampling sites in the Bay of Fundy, Nova Scotia.

- Salt marshes are blue carbon ecosystems that accumulate and store high amounts of carbon below ground
- Carbon (C) can be accumulated from suspended sediment (allochthonous) and within the salt marsh through fixed carbon dioxide (CO_2) via photosynthesis by marsh vegetation (autochthonous)
- This carbon is beneficial for arbuscular mycorrhizal fungi (AMF)
- AMF receive fixed carbon from their host plant, and in return, provide the plant with mineral nutrients and an increased surface area, which leads to greater below ground carbon storage

Objectives:

1. Evaluate if rhizosphere carbon (C) varies across a chronosequence of restored salt marshes in comparison with reference marshes within dominant *Sporobolus* (formerly *Spartina*) species (*S. alterniflorus, S. pumilus* and *S. michauxianus*)
2. Address if there are correlations between rhizosphere carbon, nitrogen, phosphorus, salinity and arbuscular mycorrhizal fungi (AMF)
3. Determine how AMF are contributing to carbon storage

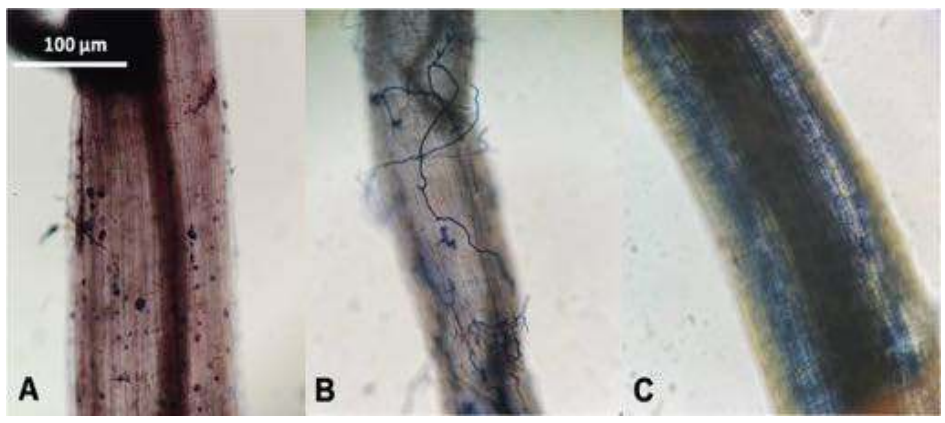

Fig. 2. Ink-vinegar stained (A) *Sporobolus alterniflorus*, (B) *Sporobolus pumilus*, and (C) *Sporobolus michauxianus* roots from Cogmagun Reference viewed at 200x magnification, highlighting arbuscular mycorrhizal fungi stained blue.

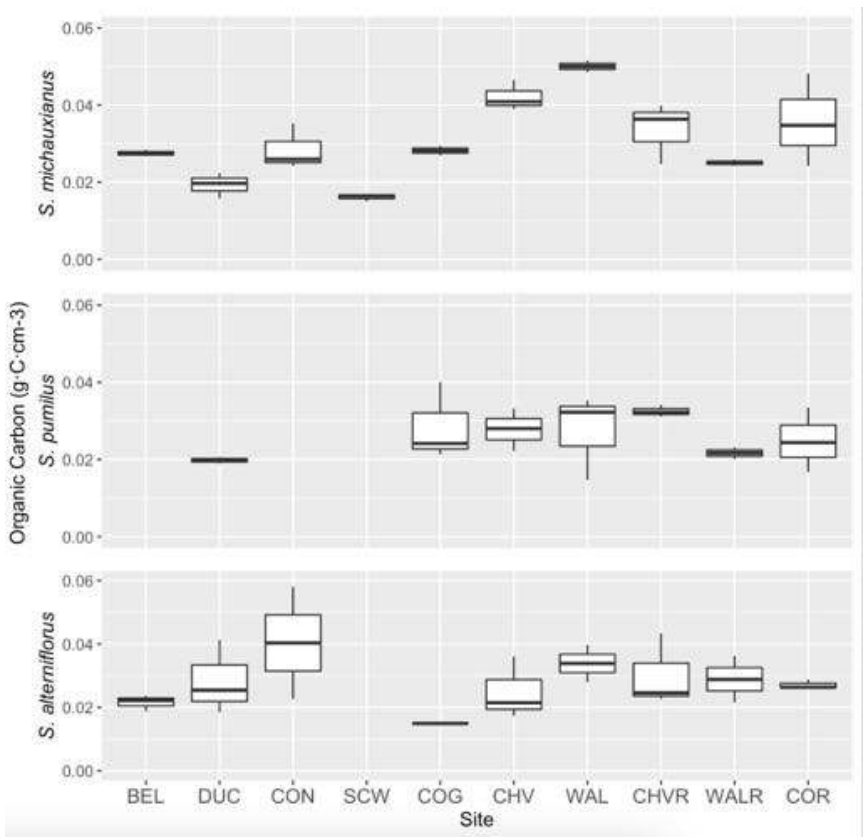

Fig. 3. Organic carbon ($g \cdot C \cdot cm^{-3}$) in three vegetations zones at a chronosequence of salt marsh site (BEL = Belcher Restoration, DUC = Belcher DUC Restoration, CON = Converse Restoration, SCW = St. Croix West Restoration, COG = Cogmagun Restoration, CHV = Cheverie Restoration, WAL = Walton Restoration, CHVR = Cheverie Reference, WALR = Walton Reference, and COR = Cogmagun Reference). Error bars represent 95% confidence intervals.

Results:

1. AMF and C densities were highly variable among vegetation zones and sites
2. High AMF colonization rates (94%) and OC densities (>0.045 $g \cdot C \cdot cm^{-3}$) in *Sporobolus michauxianus* roots at older restoration and reference sites
3. Both AMF colonization and C densities were at their highest at the same aged sites for each respective vegetation type

This is an ongoing project, more results will be available in the near future!

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