Using **Plant Traits** to Predict **Denitrification** in **Wetland Ecosystems**

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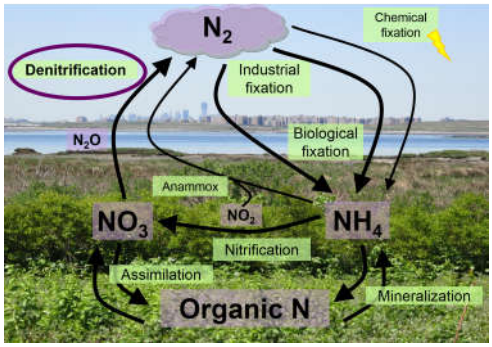
Denitrification is a nitrogen-removal **service** wetland ecosystems provide.

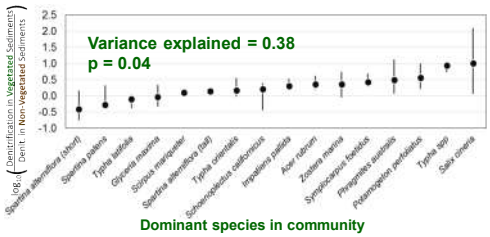


Do **plants** matter?

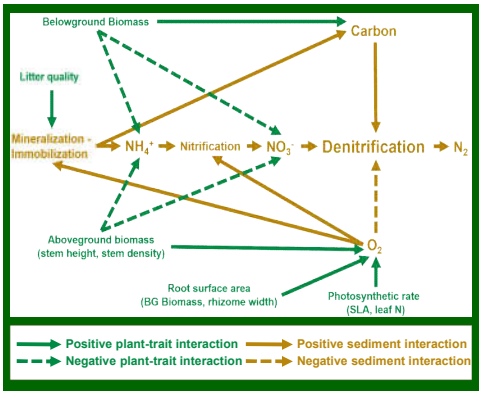
Meta-analysis of published studies

Presence of **vegetation** increased **denitrification** by **1.55x** (433 studies)

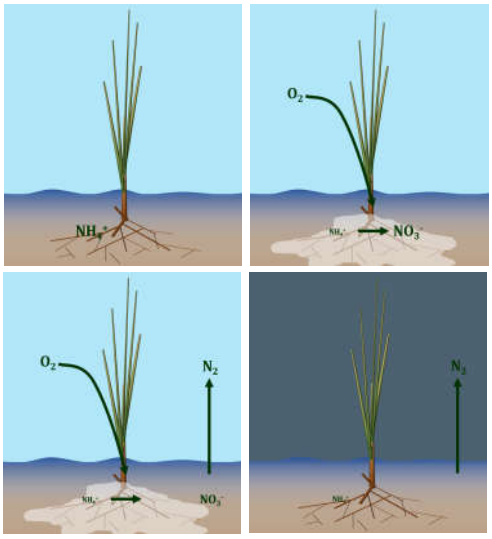
Effect of **vegetation** on **denitrification** varies significantly among plant communities! (97 studies)



Plant traits and **N cycling**: Hypothesized relationships

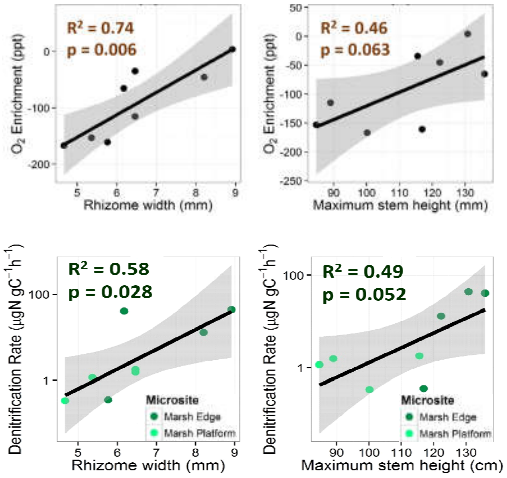


Sediment aeration is one potential mechanism.



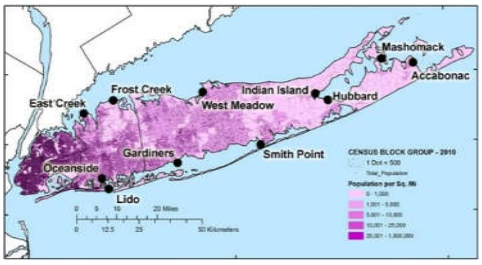
Plant traits that increase spatial or temporal variation in **sediment O_2** should increase coupled **nitrification-denitrification**.

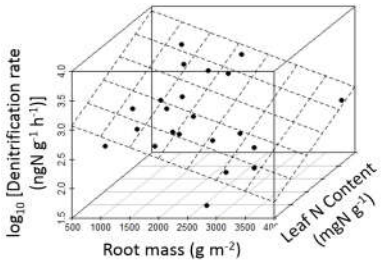
Plants alter **sediment oxygen** and **denitrification**.



In greenhouse mesocosm experiments, I found that **traits** of *Spartina alterniflora* that were correlated to **sediment oxygen** availability also explained variation in **denitrification** potential.

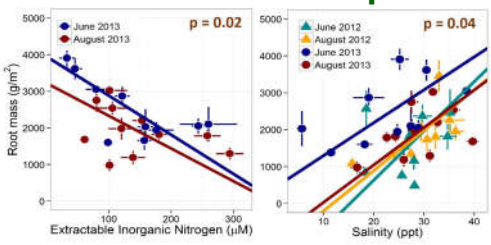
Can **plant traits** predict **denitrification** in the field?



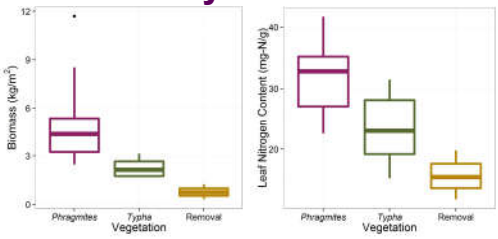


Among 11 marshes on Long Island, NY, USA varying in human impact, **root mass** and **leaf nitrogen** explained 52% of the variation in **denitrification** (p = 0.0009).

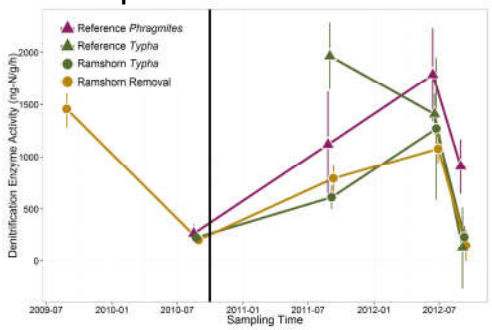
How may **sea-level rise**, **eutrophication**, and **invasive-species management** influence **wetland plants** and the **ecosystem services** wetlands provide?



Field data from Long Island salt marshes suggest that **eutrophication** and **sea-level rise** may have opposing effects on **root mass** and thus **marsh stability**.



Following **removal** of *Phragmites australis*, **low-biomass** plants with **lower N** content recolonized freshwater tidal marshes of the Hudson River, NY, USA.



Denitrification decreased 50% relative to reference *Phragmites* marshes.

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