A new vegetation chamber to investigate the role of macrophytes in the CH$_4$ and N$_2$O gas fluxes from the Tres Rios constructed wetland in Phoenix, AZ.

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**Introduction**

- Macrophytes can increase nutrient retention in wetlands constructed to reduce nutrient pollution and for this reason, Typha spp., are frequently planted in constructed wetlands (CWS).
- However, macrophytes can also play a role as a significant pathway, even sometimes the dominant pathway, of methane (CH$_4$) and nitrous oxide (N$_2$O) emissions from wetland ecosystems.
- We aimed to investigate the GHG fluxes emitted from Typha spp. in the Tres Rios CWS to increase our knowledge of the role macrophytic vegetation plays in constructed ecosystems in arid regions.

**Vegetation Chamber Results**

**Methane (CH$_4$)**

- Means of all CH$_4$ fluxes are not different between, transect, subsites, time, and plant height. However, summer CH$_4$ fluxes are sig. greater at low Typha spp. (p<0.05, Fig. 4a) and show a sig. interaction effect with subsite and transect factors (p<0.01).

**Nitrous Oxide (N$_2$O)**

- Means of all N$_2$O fluxes show gas uptake; are not different between transect, subsite, and daytime. Fall N$_2$O fluxes are sig. greater at higher parts of Typha spp. (p<0.01, Fig. 4d) and show a sig. interaction effect with subsite (p<0.01).

**Preliminary Analysis Summary**

- Significant fluxes show higher CH$_4$ fluxes in July (p>0.05, Fig. 4c) and outlet (p=0.049, Fig. 4e); and for N$_2$O, higher in shoreline subsite (p<0.01, Fig. 4d) and in the afternoon (p<0.01, Fig. 4f).

**Conclusions**

- Our results emphasize the need to develop new and more feasible methods to better resolve the role of vegetation in the biogeochemical cycling of methane (CH$_4$) and nitrous oxide (N$_2$O) fluxes as an important component of closing the gap in the greenhouse gas fluxes from novel wetland ecosystems.
- Due to the increased development of CW worldwide, it is important not just to study their effectiveness in purifying water but also the design factors, vegetation, & environmental conditions that control GHG fluxes.

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