Plants favored in waterfowl management promote zooplankton production in Suisun Marsh.

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Introduction

- Drying of managed wetlands promotes the growth of annual forbs, which rapidly decompose when seasonally flooded
- Tidal waterways are dominated by deciduous emergent plants that resorb nutrients before dropping their leaves, thereby limiting nutrient availability for algae
- **Hypothesis:** Decomposition of annual forbs in managed wetlands increases nutrient mineralization and algal productivity, promoting zooplankton production.

Methods

- We incubated *Daphnia magna* in Suisun Marsh water pre-treated with either tules *(Schoenoplectus californicus)*, mature sea purslane *(Sesuvium portulacastrum)*, or control (no organic matter)
- We diluted a portion of each plant treatment to determine concentrations at which *D. magna* was growth limited. Salinity was kept constant throughout the experiment.
- After 96 hours we preserved the specimens and measured their final lengths with an ocular micrometer

Figure 1:Gravid female D. magna. Photo credit: Wikimedia Commons.

Figure 2:Plant treatments: Tule, left. Sea purslane, right.

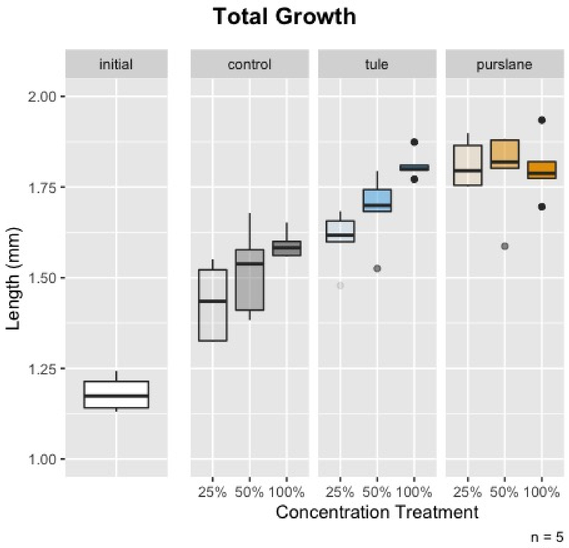

Figure 3: Mean initial and final lengths of D. magna incubated for 96 hours in water with different plant treatments (color hue) and dilutions (color value).

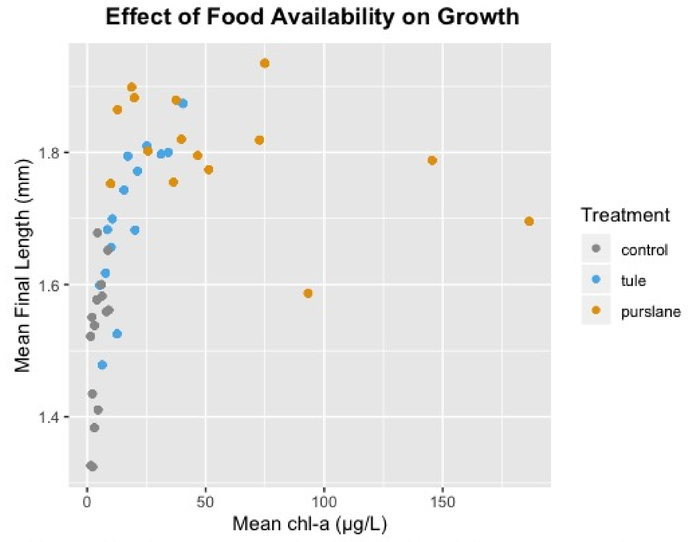

Figure 4: Mean final lengths per jar compared to the mean chlorophyll concentration in the water.

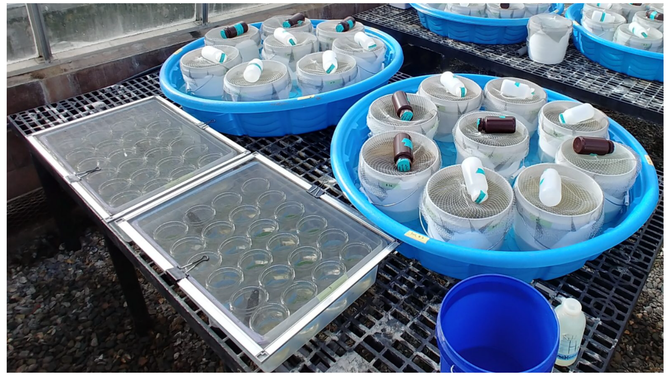

Figure 5: D. magna incubation jars, left. Mesocosms with plant material, right.

Results

- Annual forbs (sea purslane) supported the highest growth rates across all concentrations
- Growth rate in emergent vegetation (tule) was strongly dependent on treatment concentration
- High chlorophyll-a concentrations correlated with high growth rates, except at very high concentrations

Implications

Managed wetlands in Suisun Marsh are typically dominated by annual forbs such as sea purslane. Seasonally managed wetlands will support higher densities of zooplankton due to differences in plant communities and nutrient cycling. Continued management of annual forbs may provide essential subsidies to aquatic food webs in plankton-limited habitats of the San Francisco Estuary.

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