An Uncertain Future: Will Climate Change Help or Hinder the Invasive Reed Canary Grass?

What is Reed Canary Grass?

Reed canary grass (*Phalaris arundinacea)* has a broad range, existing in much of Europe, the northern United States and southern Canada. It is an **aggressive weed** in wetlands over much of its North American range, shading out native plants and forming dense stands.

Reed canary grass' success is due in part to:

- **Fertilizer-rich runoff** from urban or agricultural areas.
- Its ability to spread by **rhizomes**, or underground stems. The resources stored in rhizomes allow reed canary grass to sprout quickly in spring.

Questions:

Because plants take in **Carbon dioxide** (CO_2) to make sugars for growth, will CO_2, a greenhouse gas, cause reed canary grass to become more weedy?

Will the effects of climate change be different with or without **nitrogen-rich fertilizer** in the environments?

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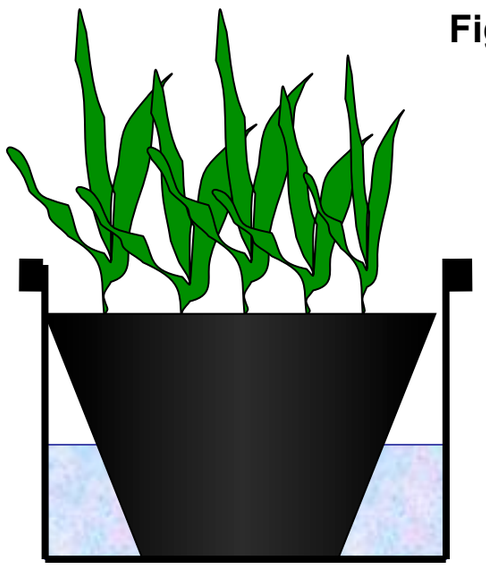
Figure 1



Methods:

- Grew stands of reed canary grass in pots simulating a wetland environment (fig 1).
- Fertilized half of the pots with nitrogen.
- Built and used growth chambers in which CO_2 was elevated (fig 2 & 3).

Figure 2

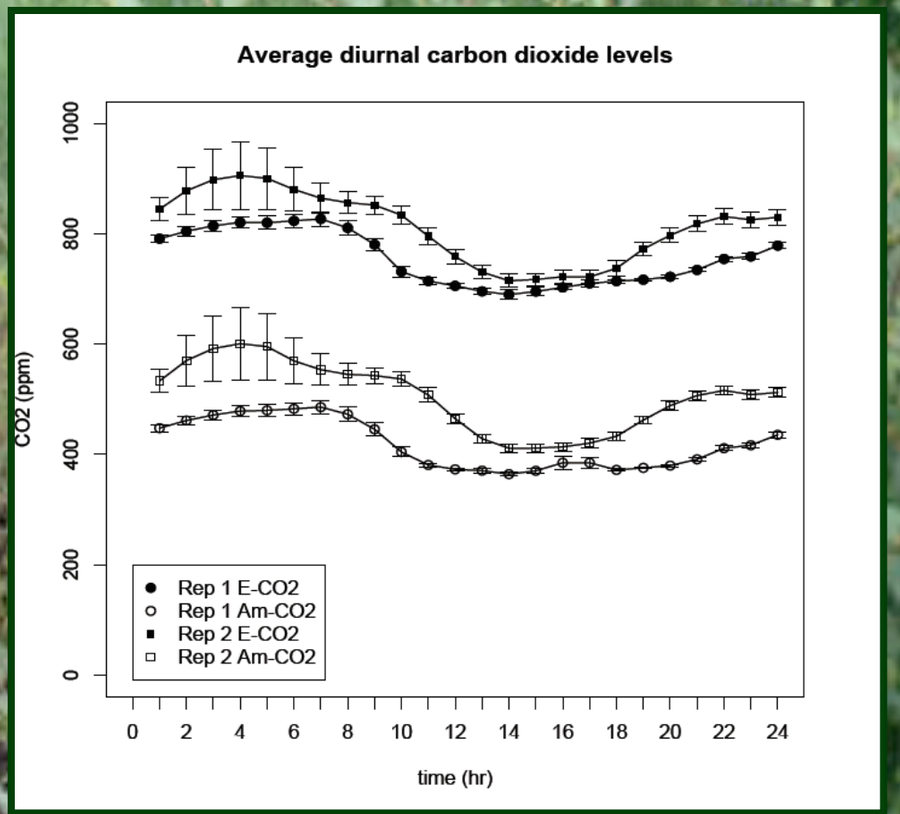


Figure 3. With the chambers, we were successfully able to raise CO_2 levels! The top lines represent CO_2 over the course of the day in high-CO_2 chambers, and the bottom lines represent CO_2 over the course of the day in low-CO_2 chambers. Just like outdoors, CO_2 dropped in the middle of the day because plants were taking it in!

Results:

Preliminary results show that elevated CO_2 may increase overall growth of reed canary grass, especially with high nitrogen. With nitrogen alone, growth increased about 80%; With CO_2 *and* nitrogen, growth increased about 300%! Because most of the new growth occurred in the leaves and stems, reed canary grass may be better able to shade out other plants.