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 (CO₂) to make sugars for growth, will CO₂, 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?

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 CO₂ was elevated (fig 2 & 3).

Results:
Preliminary results show that elevated CO₂ may increase overall growth of reed canary grass, especially with high nitrogen. With nitrogen alone, growth increased about 80%; With CO₂ 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.

Hannah Kinmonth-Schultz is a masters student under the advisement of Dr. Soo-Hyung Kim.

Figure 1

Figure 2

Figure 3. With the chambers, we were successfully able to raise CO₂ levels! The top lines represent CO₂ over the course of the day in high-CO₂ chambers, and the bottom lines represent CO₂ over the course of the day in low-CO₂ chambers. Just like outdoors, CO₂ dropped in the middle of the day because plants were taking it in!