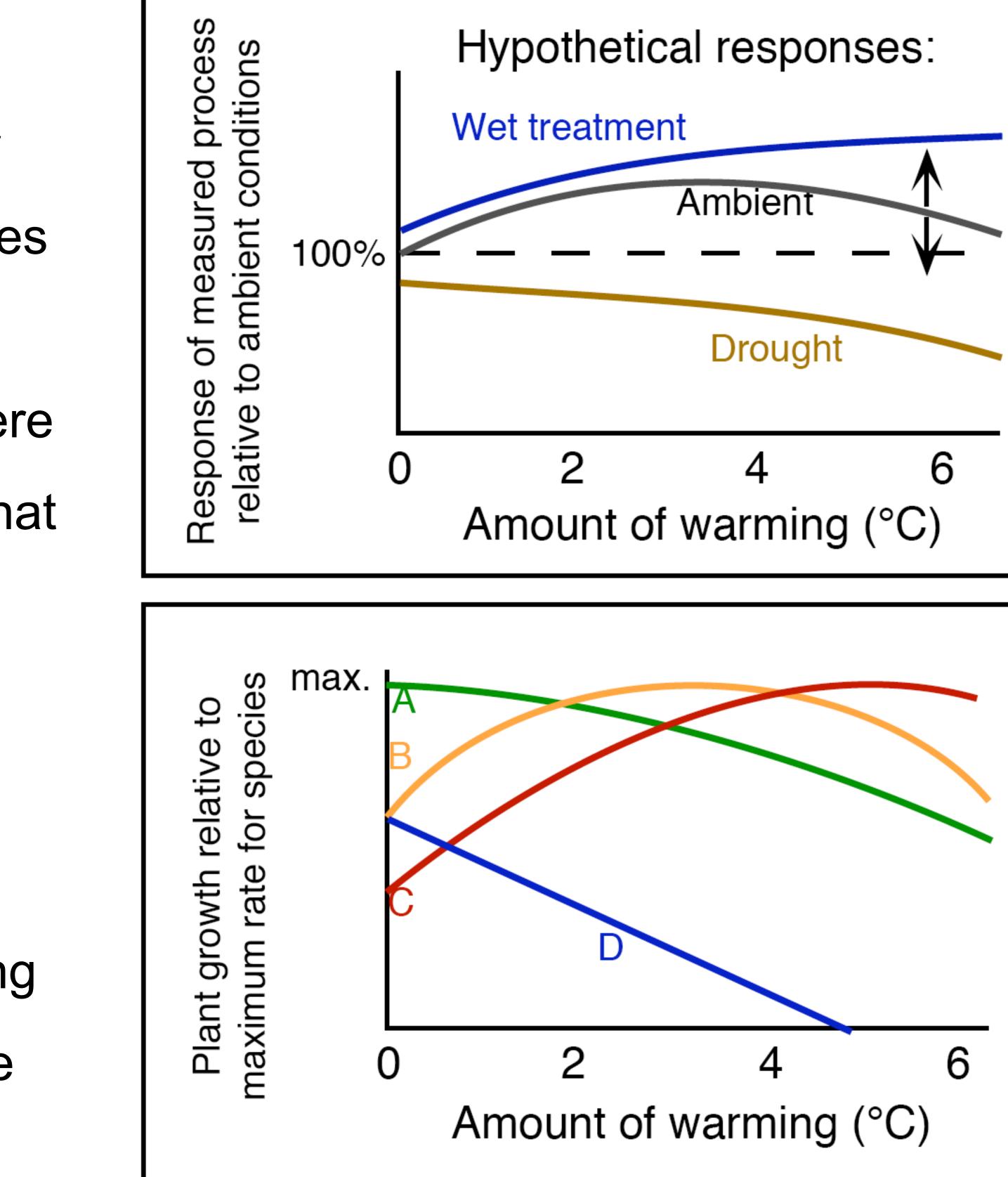
The Boston-Area Climate Experiment Characterizing ecosystem responses to climate change

The Boston-Area Climate Experiment (BACE) will help researchers understand how ecosystems respond to climate change. In the past, researchers have studied how ecosystems respond to a single amount of warming. In the BACE, plots of land will experience twelve different climates. For the first time, researchers will be able to ask whether processes and properties of communities and ecosystems respond linearly to changes in temperature, or whether there are important threshold temperatures that could be reached. Also, to what extent does an ecosystem's response to warming depend on precipitation patterns? Researchers will measure responses of several variables, including growth of wildflowers, grasses, and tree seedlings.

Experimental design: Twelve climates

Study areas: In an "old field," 36 square plots of land, 2 meters on a side, are being studied. **Three precipitation treatments**: no change, -50%, and +50% of actual precipitation

- Structures with clear, partial roofs and sprinklers alter precipitation
- Four temperature treatments (to start): no change, or +200, 600, or 1000 W m⁻² of warming
 - Above each plot, four ceramic infrared heaters provide the additional warmth



Two overarching hypotheses The figures below illustrate our hypotheses:

The BACE will examine how ecosystem processes such as plant growth respond to warming and precipitation. Responses are expected to vary from year to year (depicted by arrows on ambient precipitation treatment), depending on annual precipitation and ambient temperatures.

Plant species will respond to warming in different ways. Every species has an optimum temperature, and warming might bring the climate closer to or farther from that optimum. In this made-up example, species A is adapted to the local climate, species B and C have warmer climatic optima, and species D has a colder climatic optimum.



What is measured?

Plant growth per year Soil respiration (carbon dioxide leaving the soil) Responses of different plant species Cycling of nitrogen in the soil (and many more things...)

Public exhibit on climate change

An associated set of displays allows the public to "walk into the future" and view the predicted impacts of climate change.

Location and important dates

The BACE public display and experiment are **Iocated at 240 Beaver Street in Waltham.** Public display open: starting Earth Day 2007. Experiment turned on: late spring, 2007.

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