

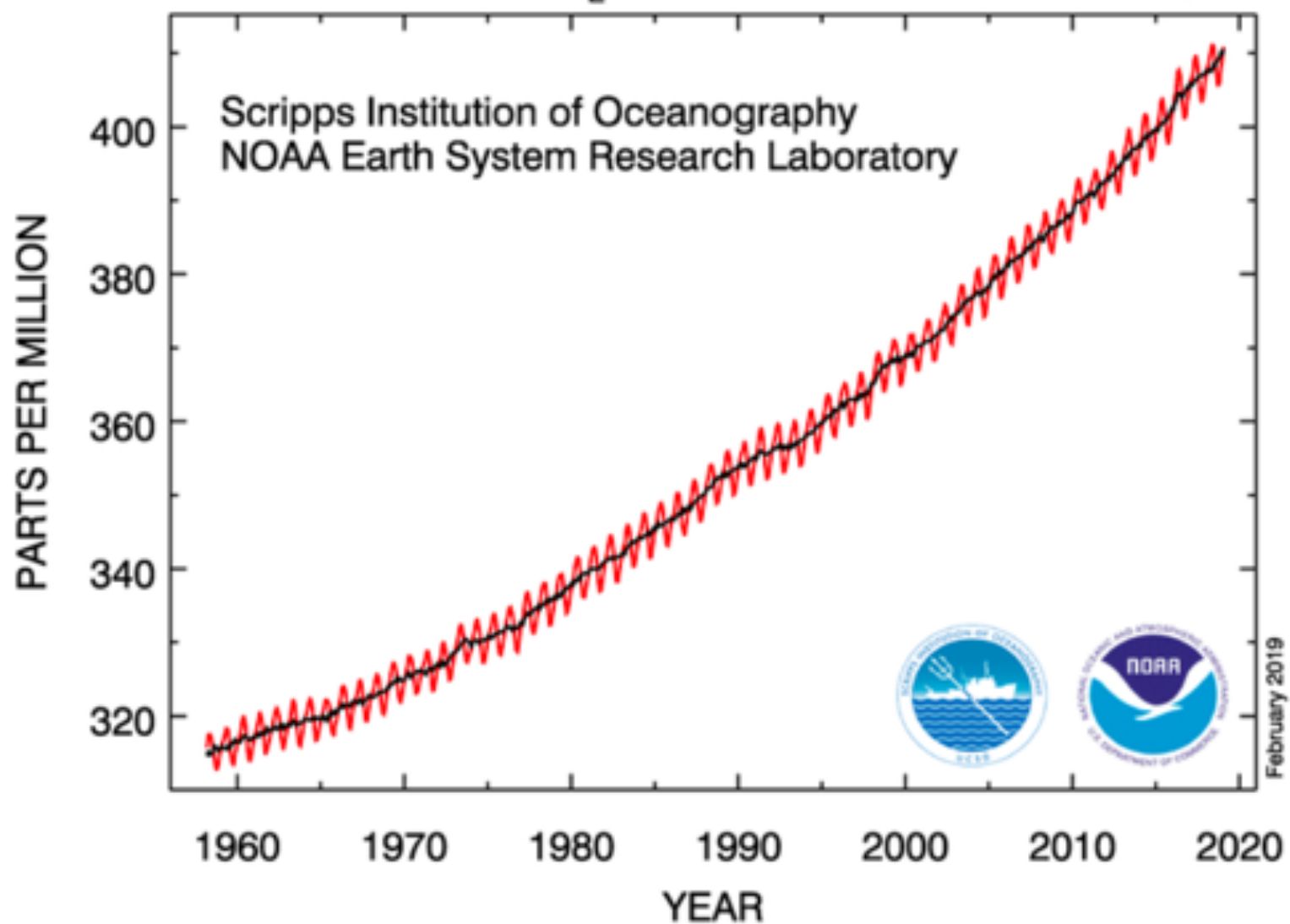
The curious case of plant responses to carbon dioxide

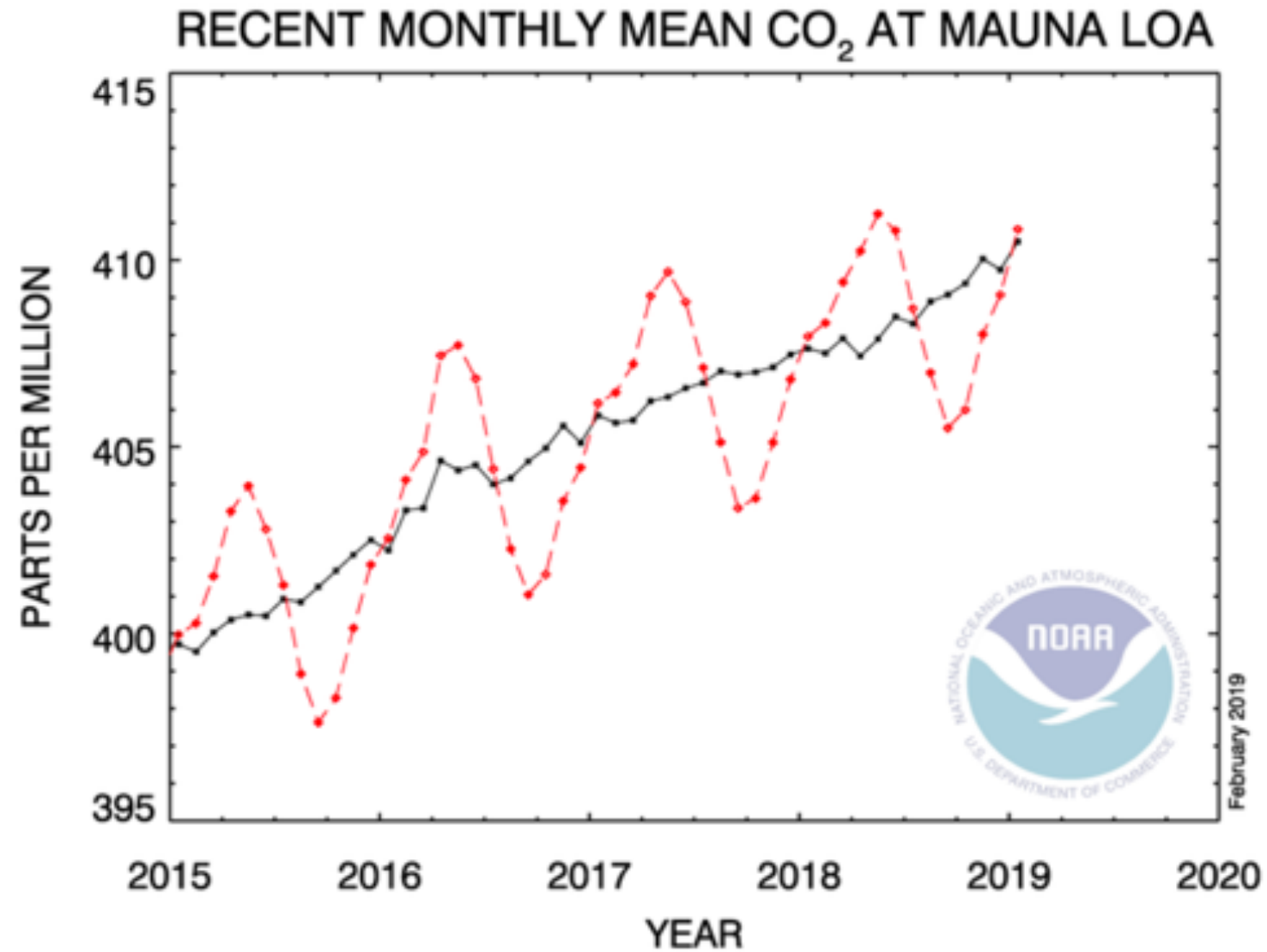
February 26, 2019



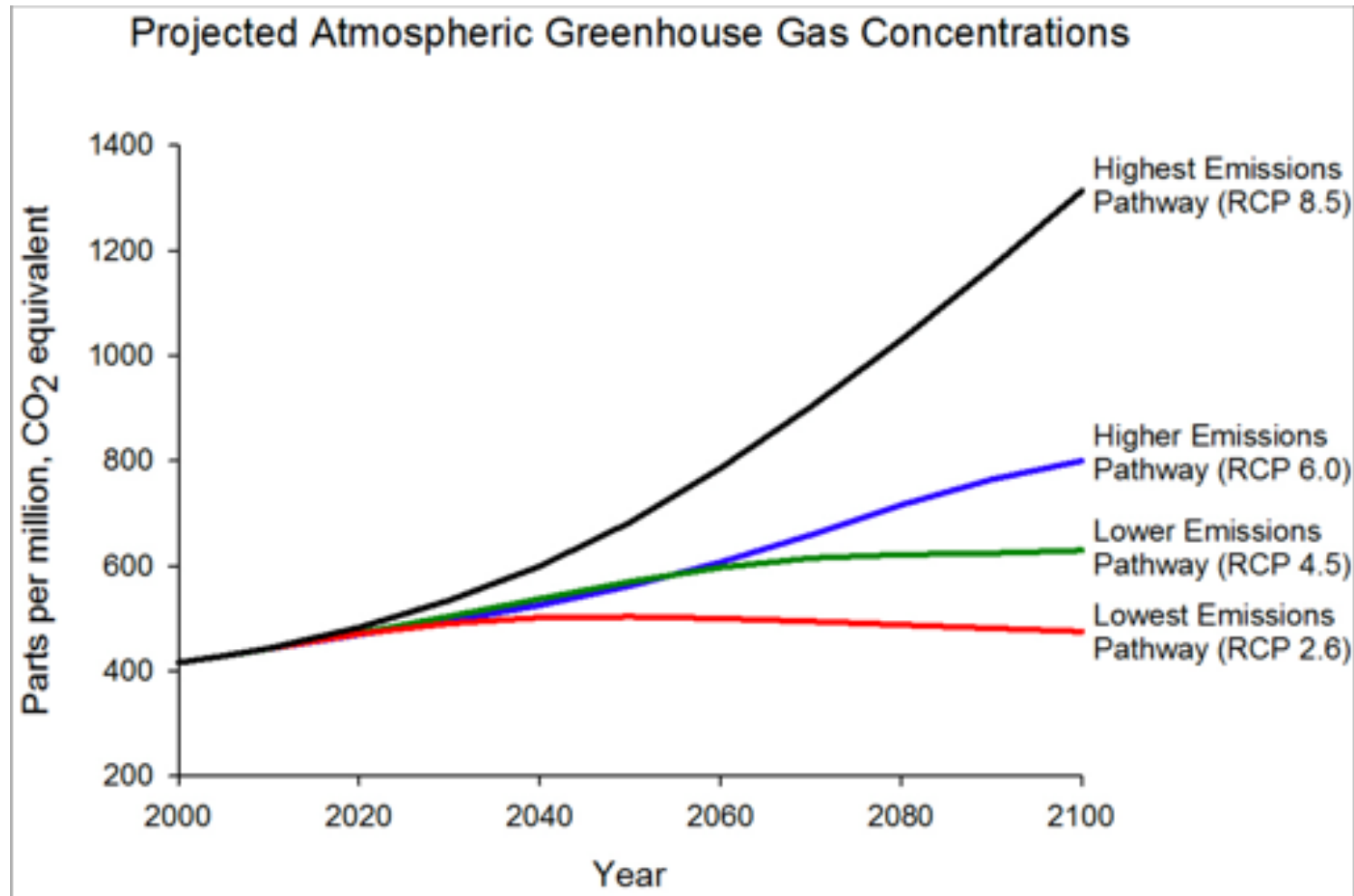
Why should we care about plant responses to CO₂?

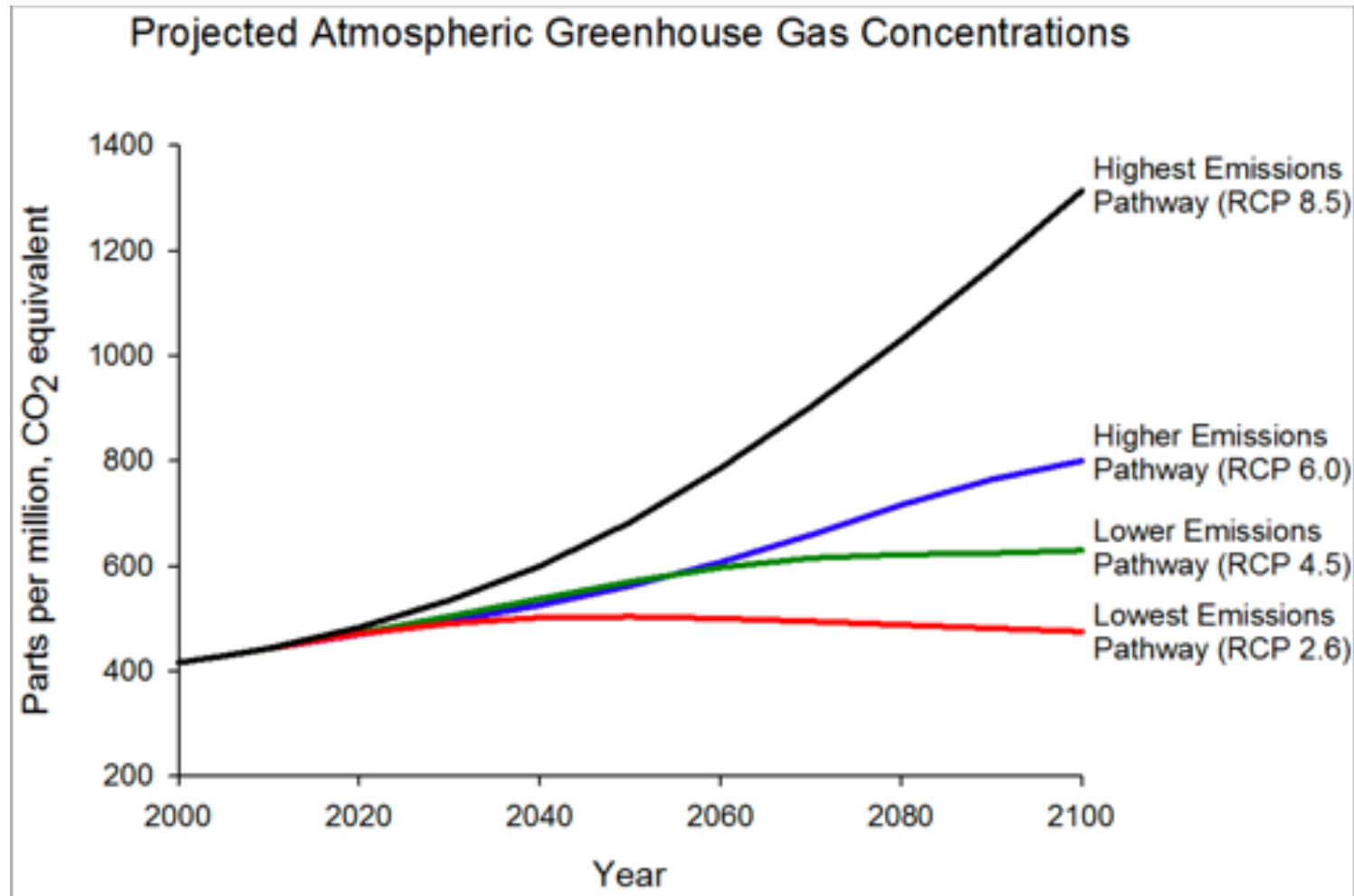
Atmospheric CO₂ at Mauna Loa Observatory





What causes the variations in the red line?

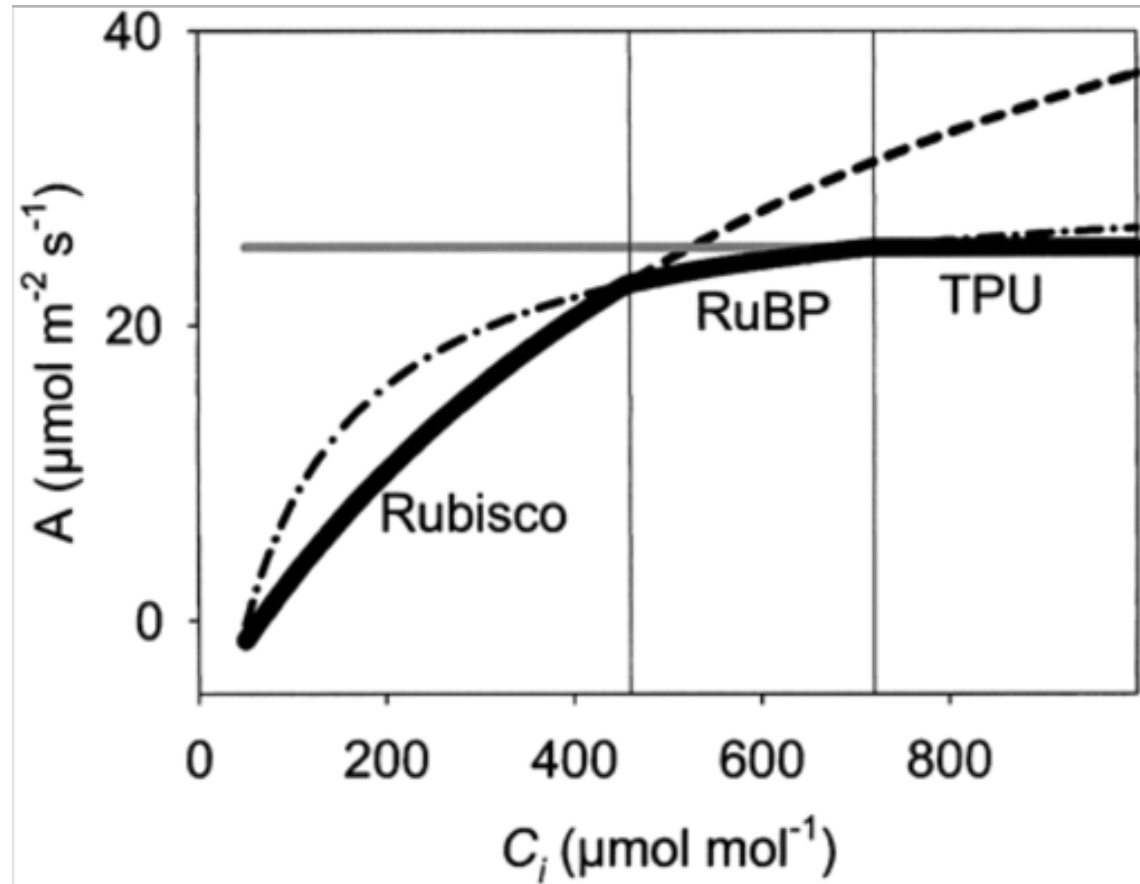




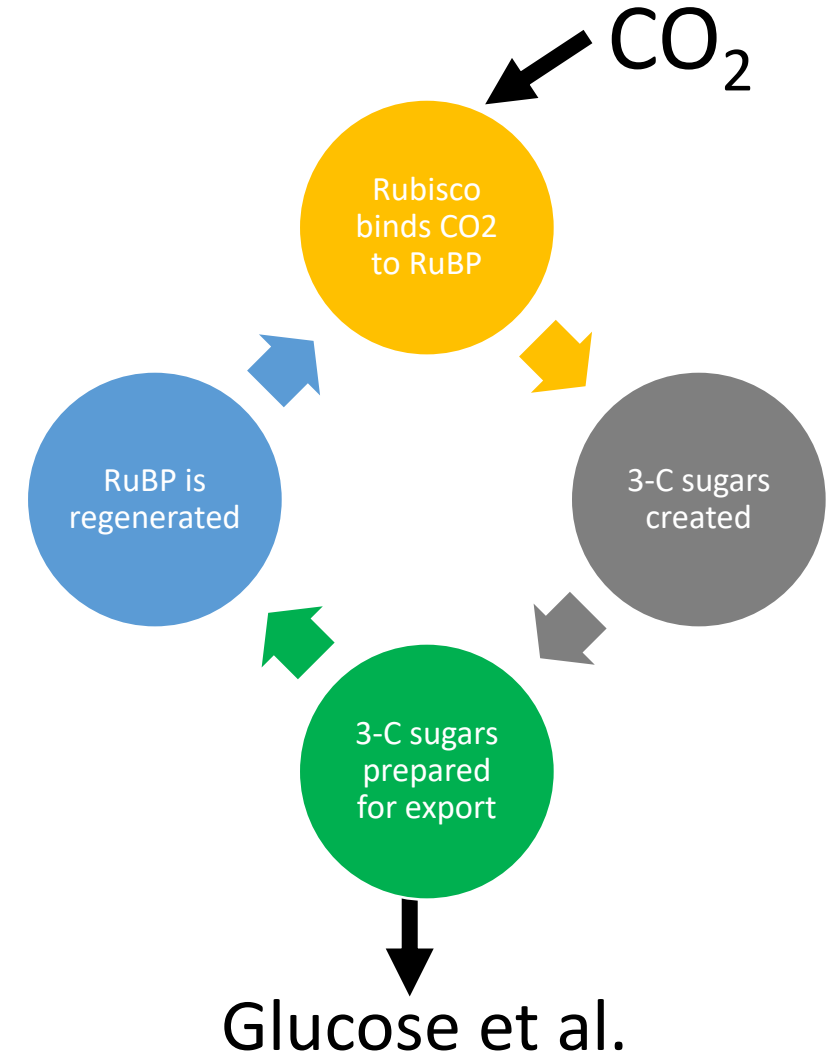
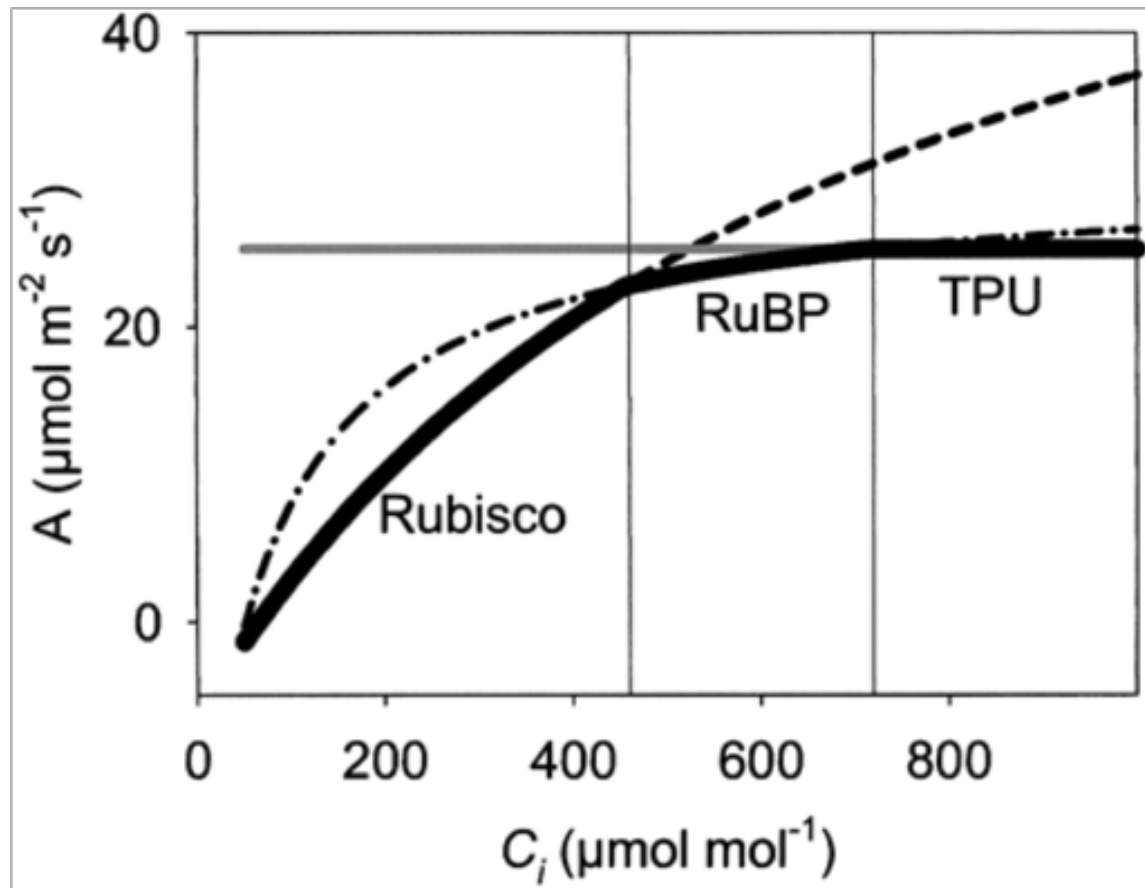
What do you expect the plant response to be?

Short-term plant response to
elevated CO₂: the A-Ci curve

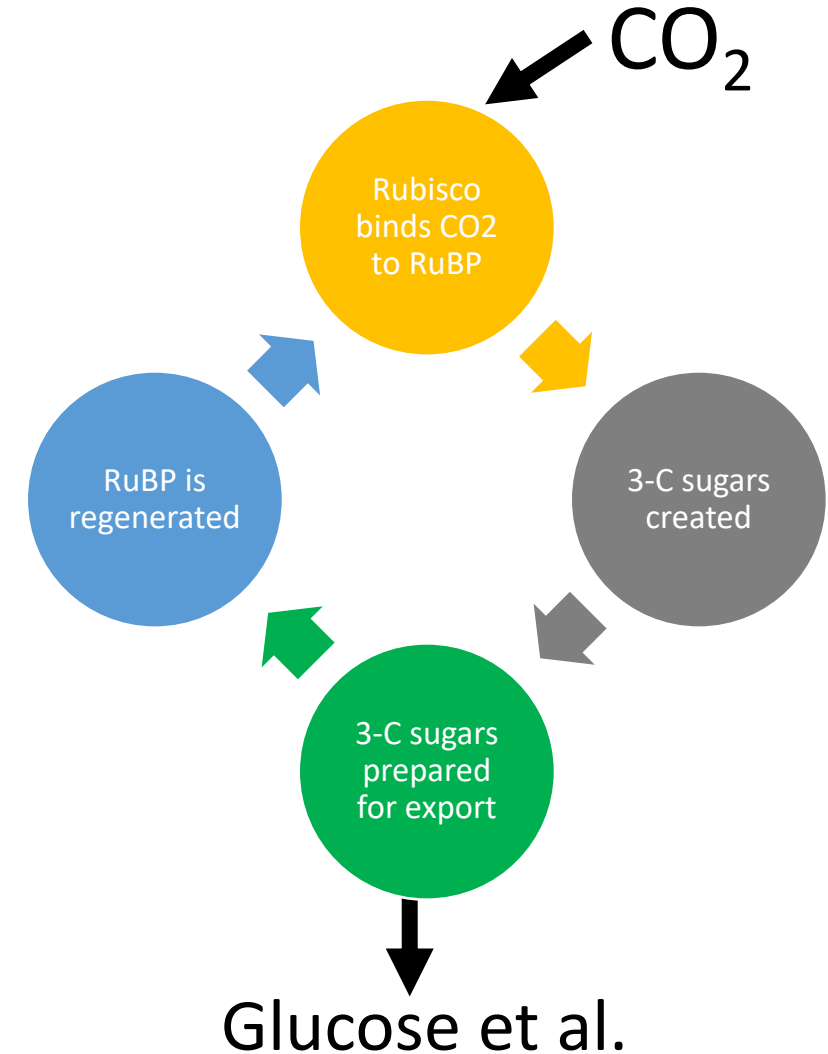
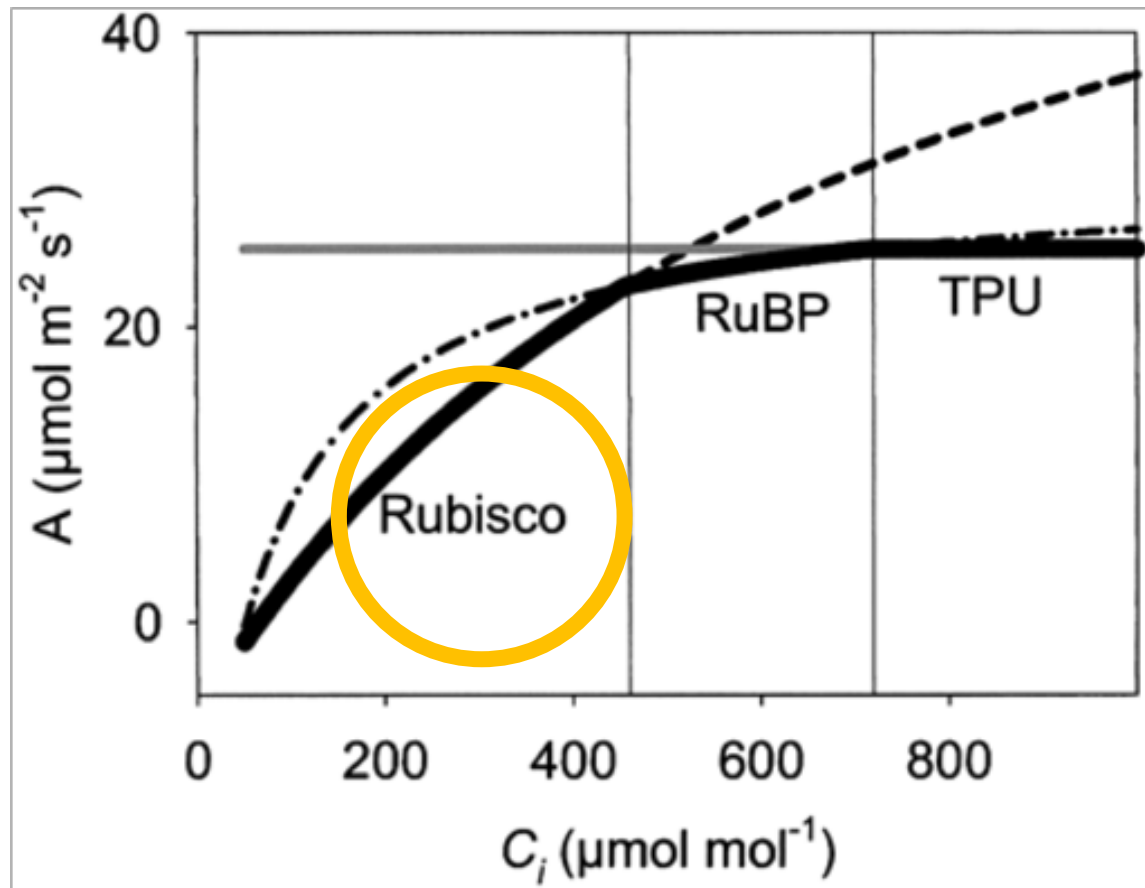
Short-term plant responses to CO₂: the A-Ci curve



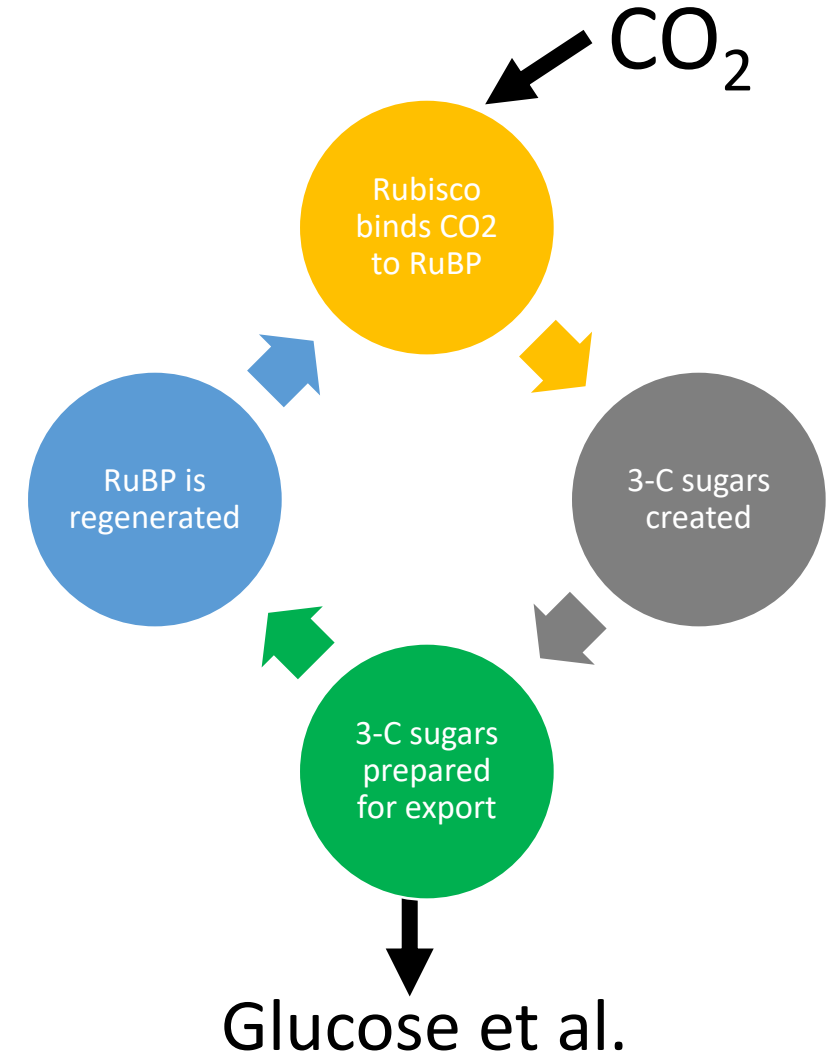
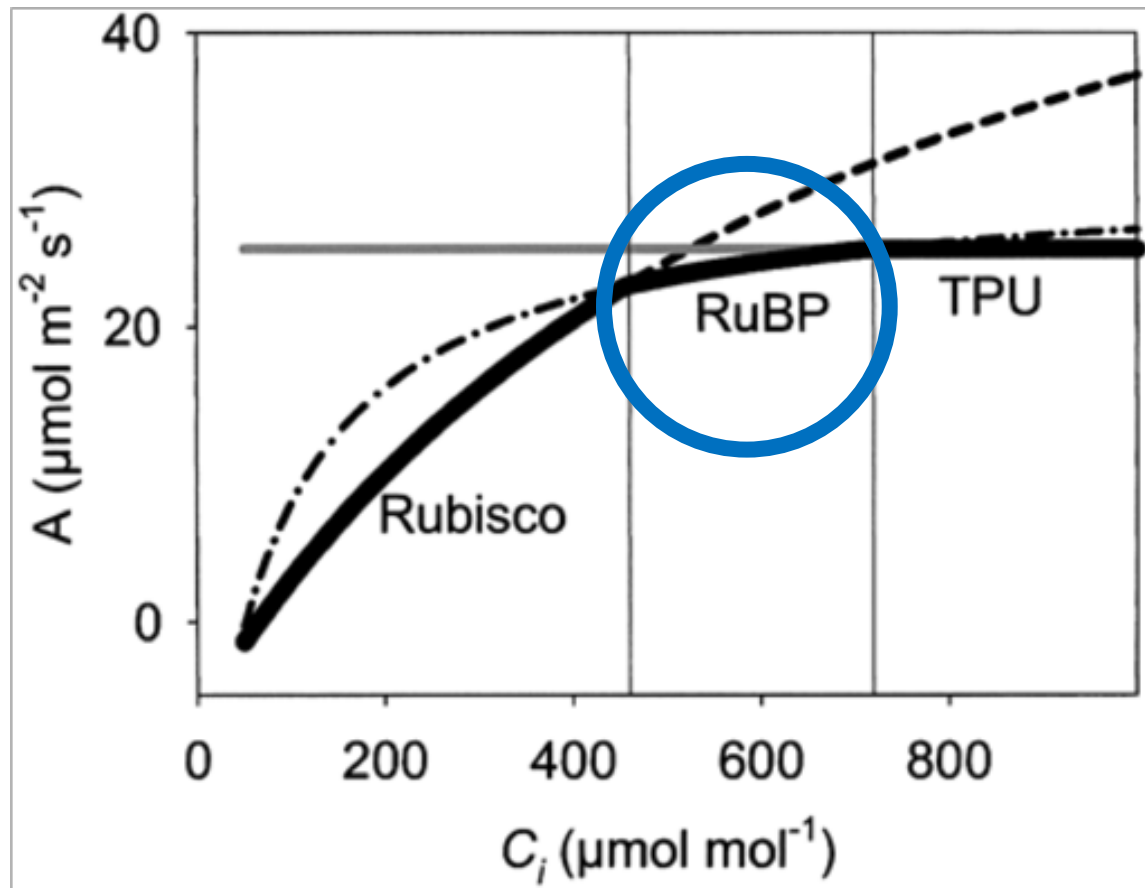
Short-term plant responses to CO₂: the A-Ci curve



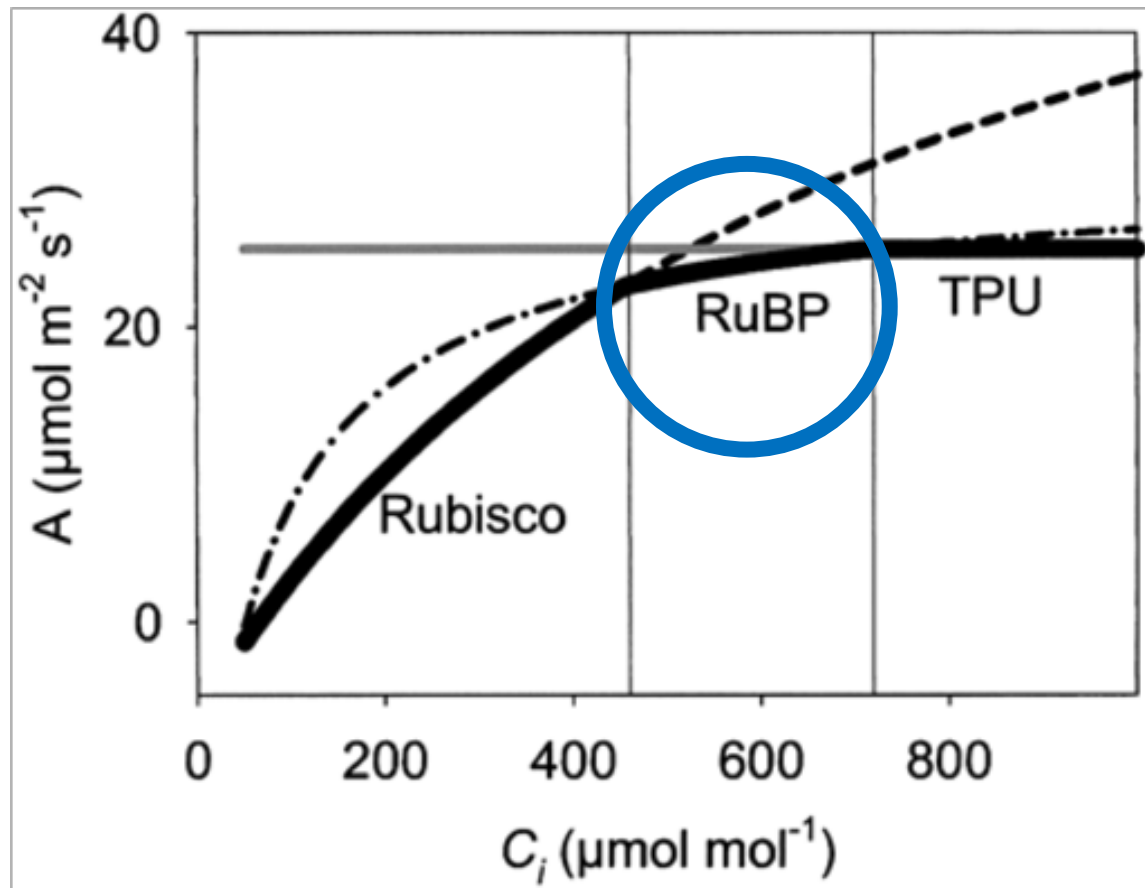
Short-term plant responses to CO₂: the A-Ci curve



Short-term plant responses to CO₂: the A-Ci curve

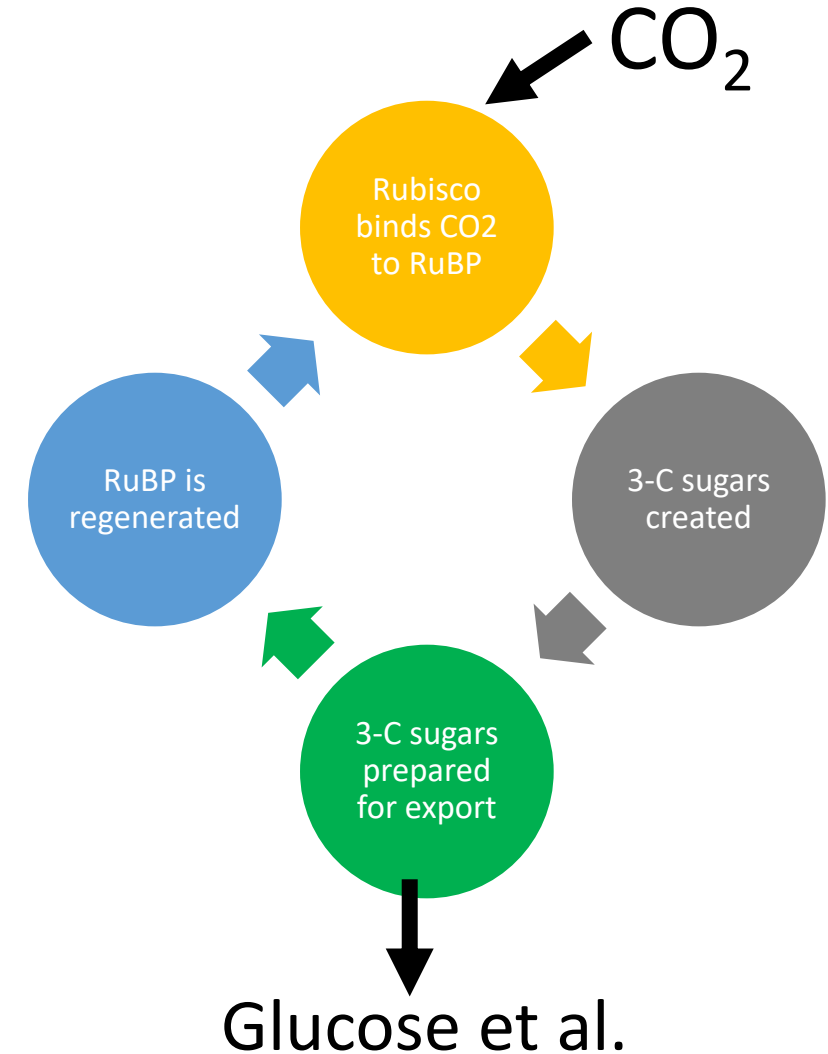
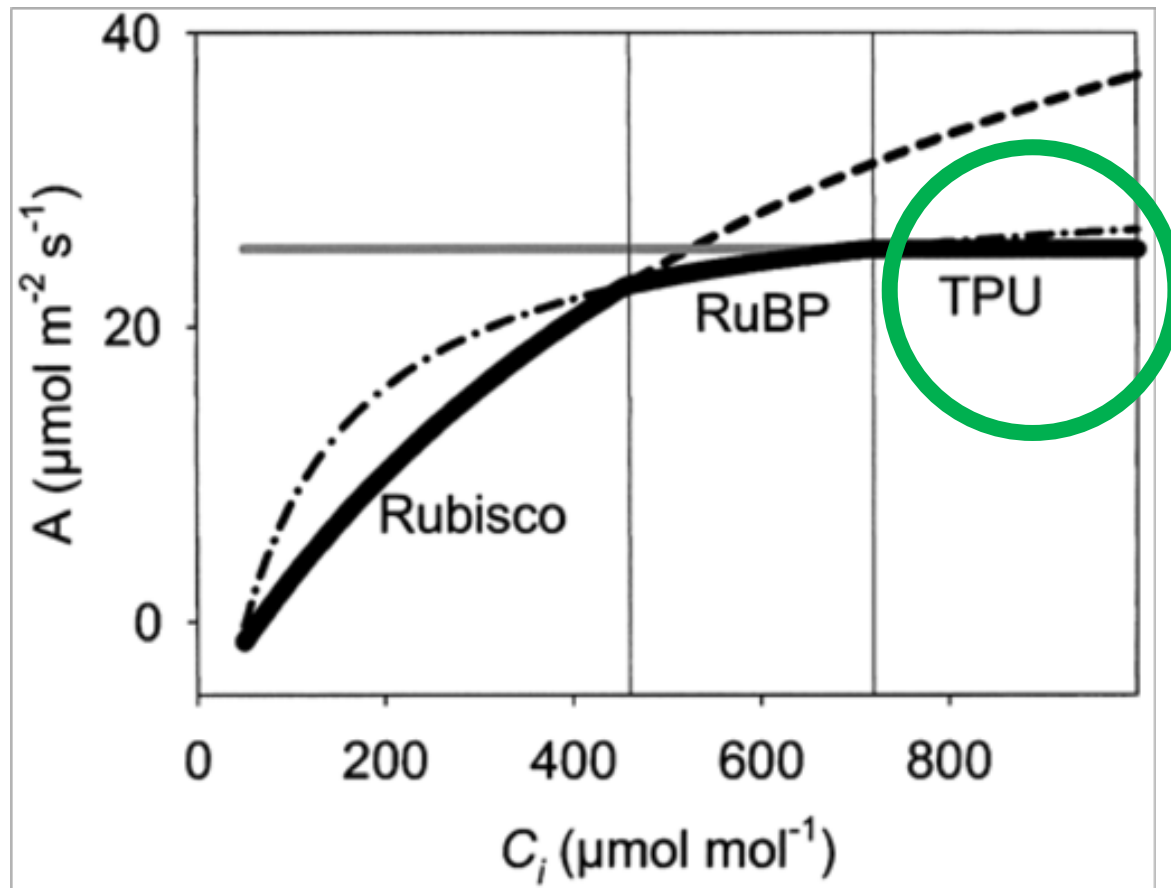


Short-term plant responses to CO₂: the A-Ci curve

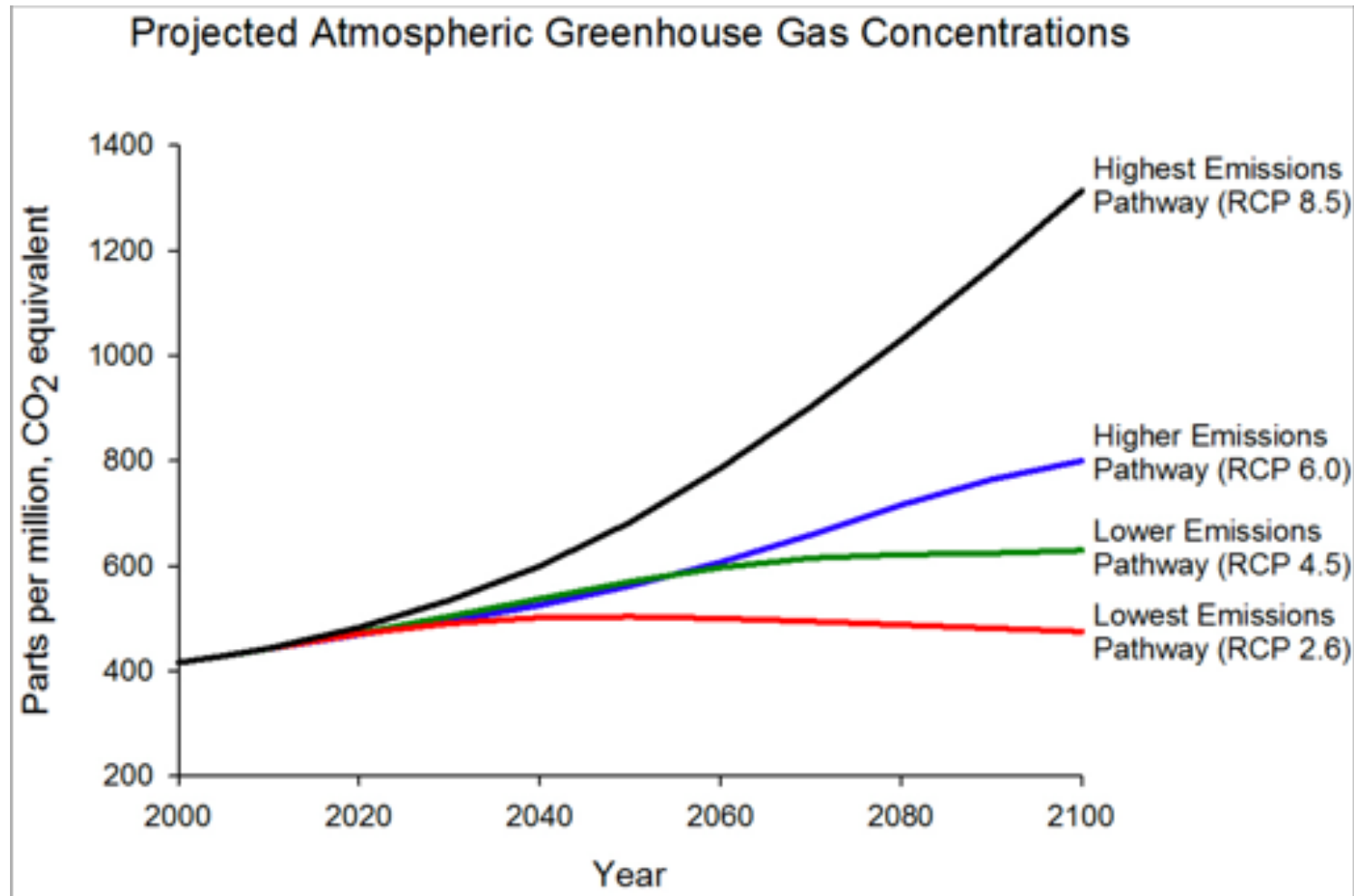


Hold on: What is strange about the RuBP regeneration response to CO₂?

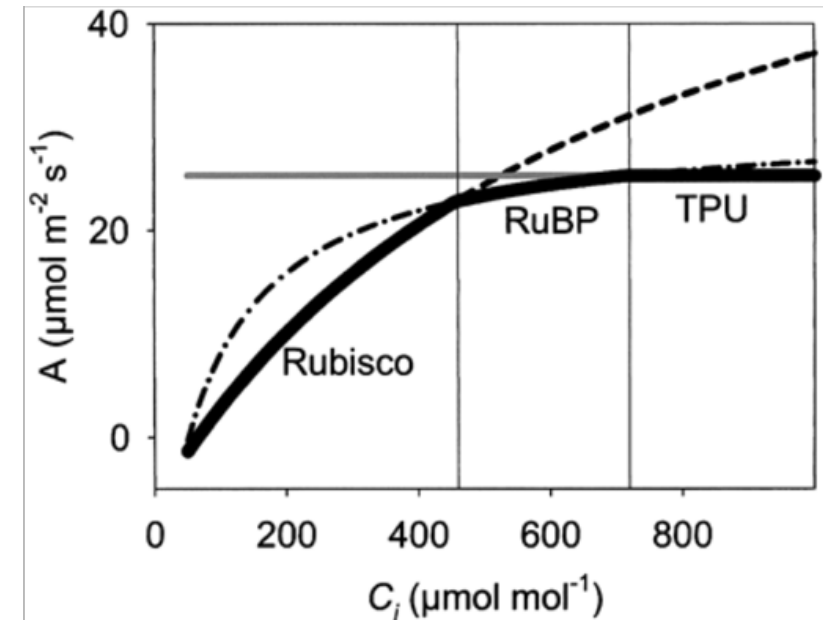
Short-term plant responses to CO₂: the A-Ci curve



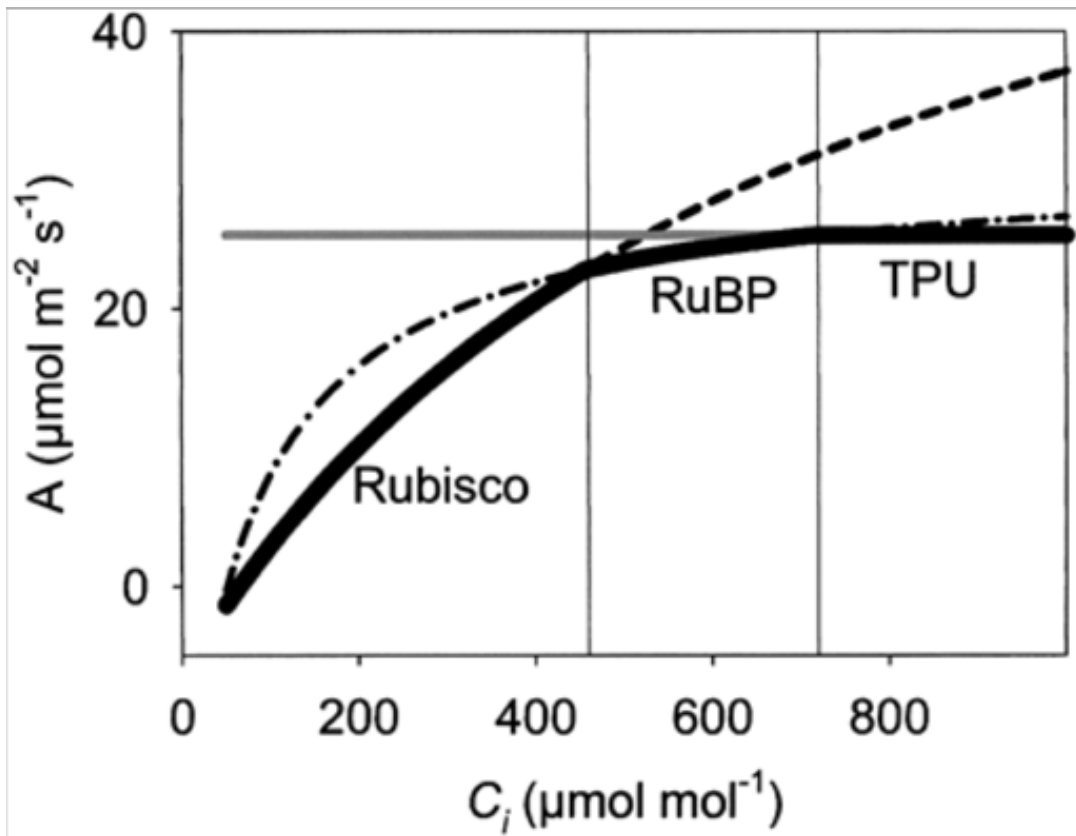
This response is relatively
consistent across species and
fairly easy to measure!



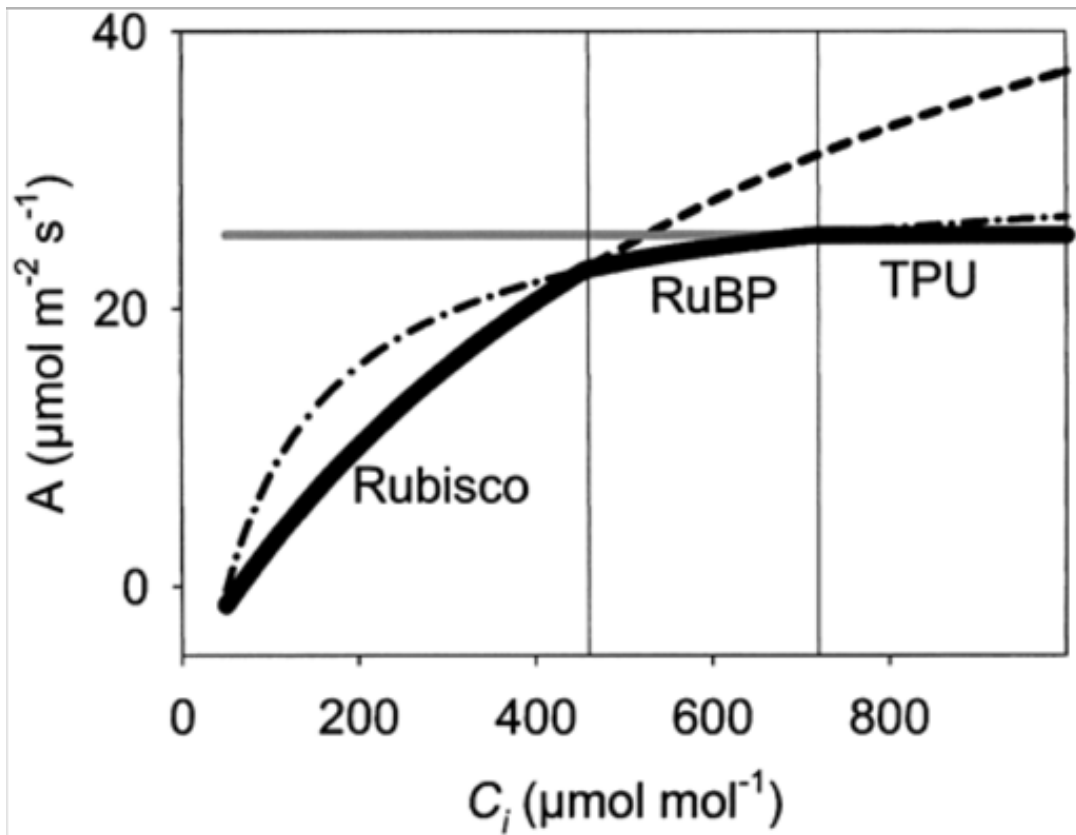
What do you expect the plant response to be?



How might the long-term response to elevated CO_2 differ?

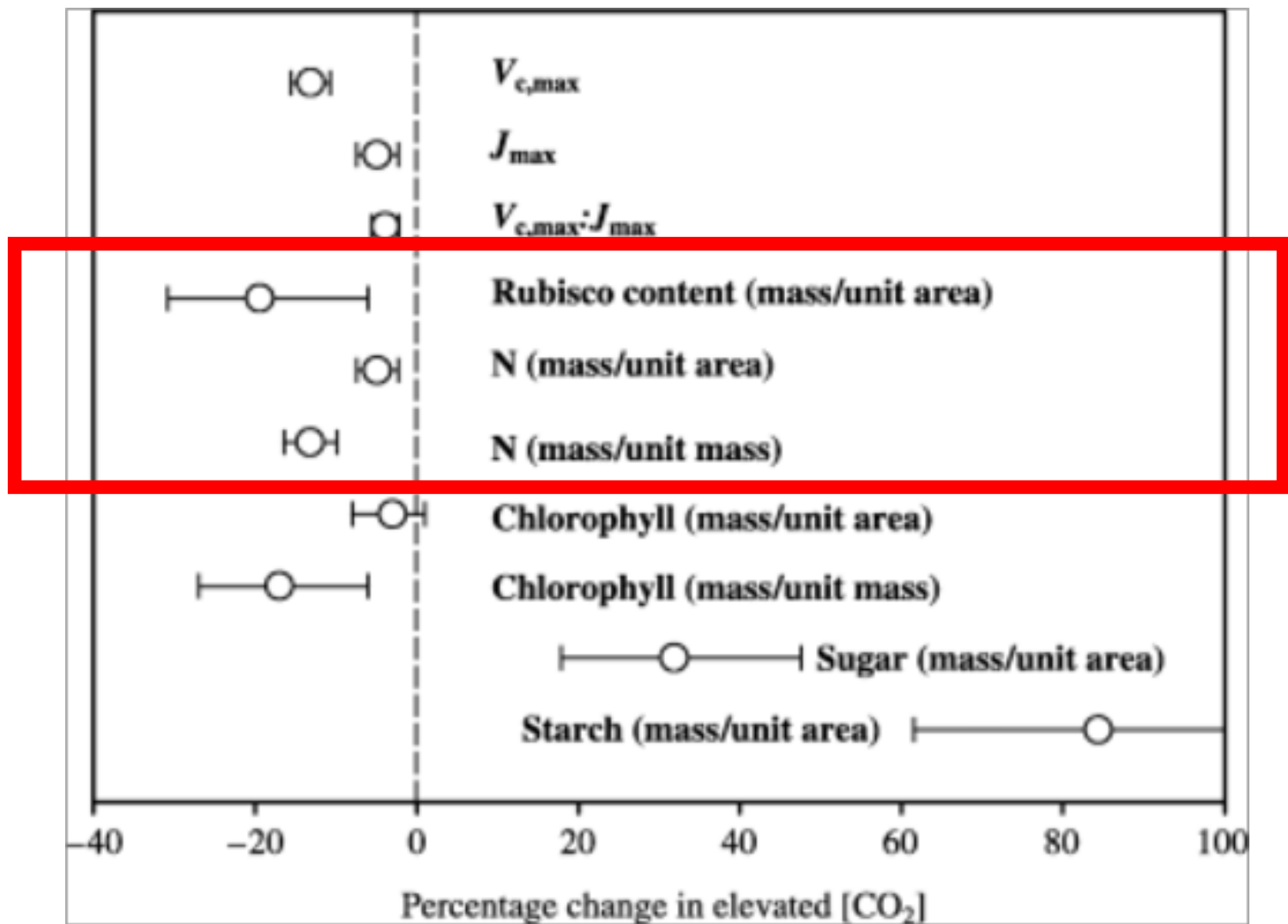


How might the long-term response to elevated CO₂ differ?



Things to consider:

- Each component represents a within leaf investment in
- Plants generally aim for efficiency
- RuBP regeneration is principally determined by light availability
- Rubisco is an expensive enzyme (lots of N)



What does this mean for the whole plant?

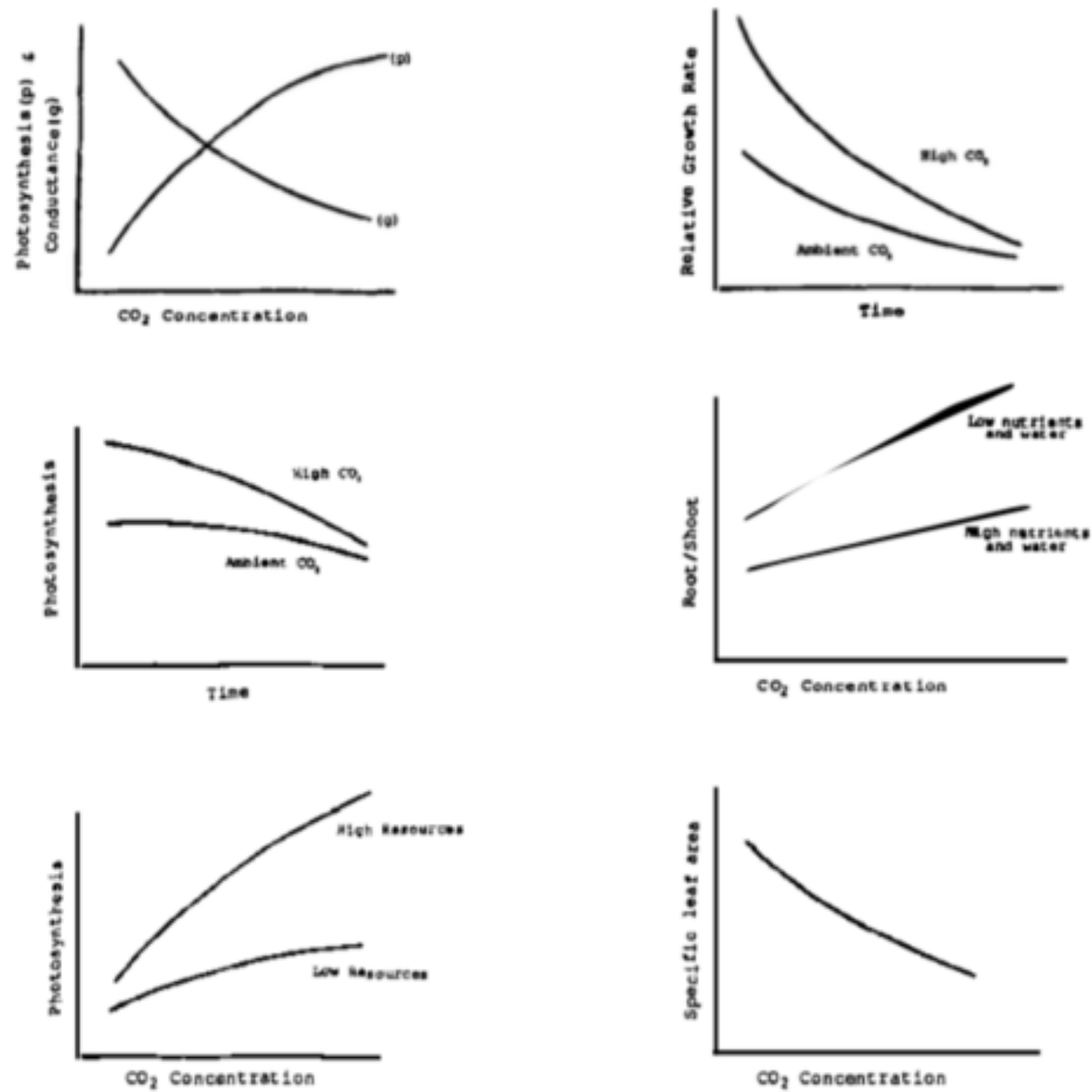


Figure 1 General trends of response of plants to CO₂ concentrations.

What does this mean for the whole ecosystem?