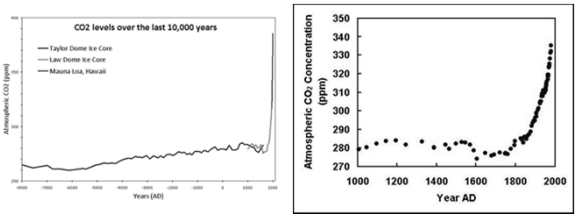
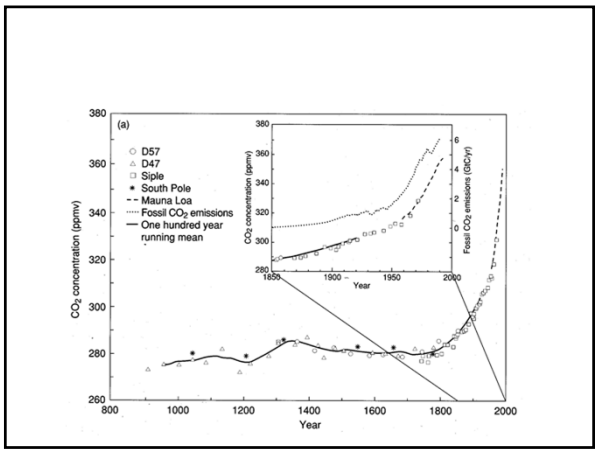
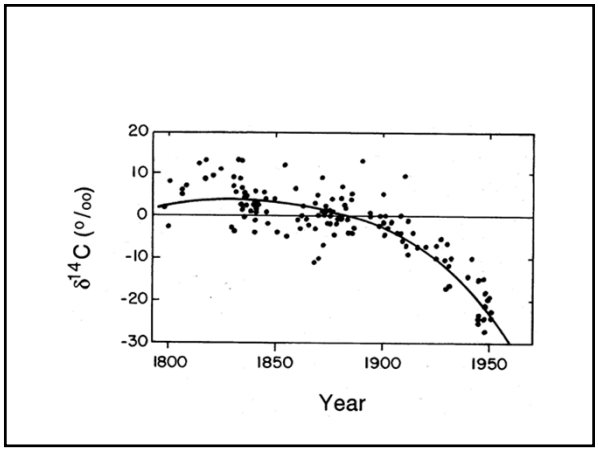
The End of Nature

Global Change is More Than Global Warming

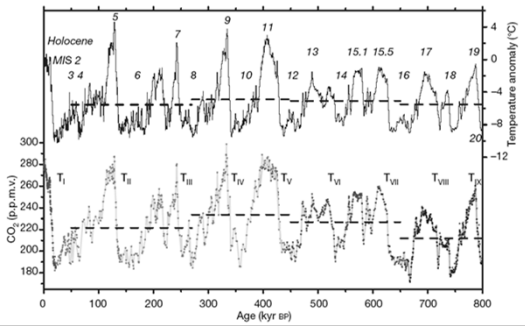




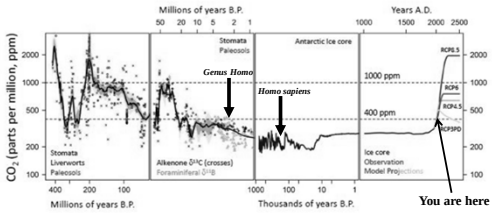


Are current levels of 398 ppmv of CO_2 abnormally high ?

True (A) or False (B)?



Current efforts to look even further back suggest …

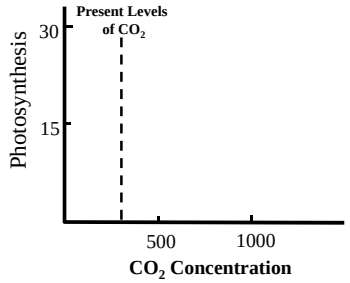


So What ?

Assigned Reading # 4
Bazzaz & Fajer 1992

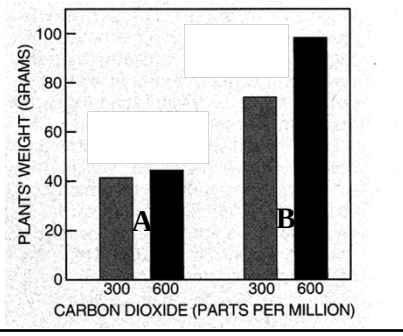
Chapter 6 pages 117-120

Under Optimal Conditions the Growth of Plants May Increase

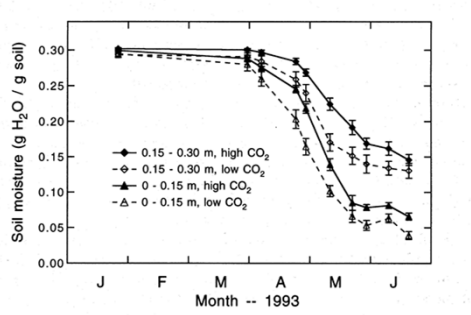


Conditions Are Not Always Optimal

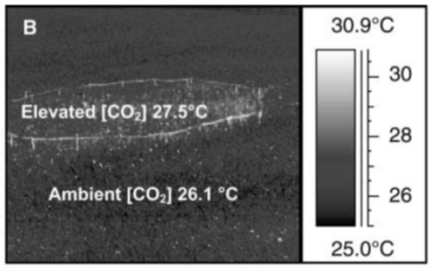
Which set of bars are plants growing under more optimal conditions?



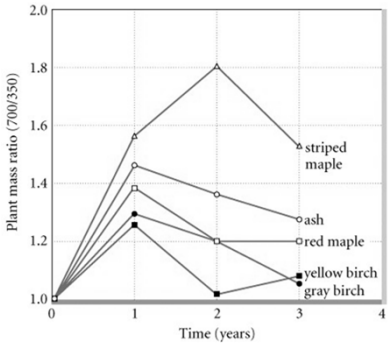
Plants May Loose Less Water



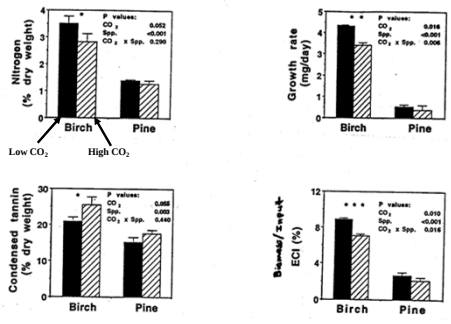
What is causing the difference shown here?



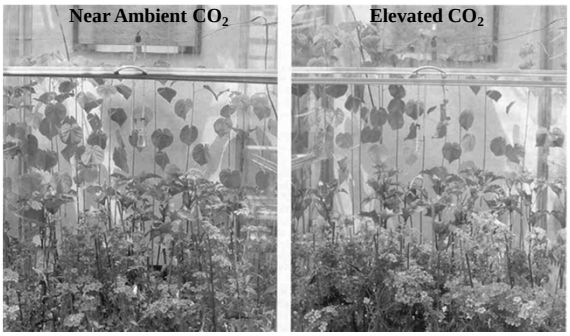
Effects May Change Over Time And Be Species Specific



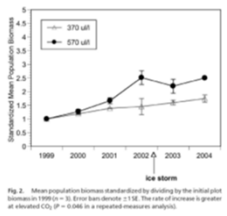
Changes in Tissue Composition Could Effect Herbivory

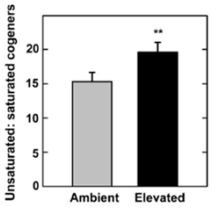


High CO_2 Can Speed Flowering & Senescence



Recent Discoveries





Mohan et al. 2006

The effects may be something to sneeze at!

Production of allergenic pollen by ragweed (*Ambrosia artemisiifolia* L.) is increased in CO_2-enriched atmospheres

Peter Wayne, PhD*; Susannah Foster, BS*; John Connolly, PhD*; Fakhri Bazzaz, PhD*; and Paul Epstein, MD†

Annals of Allergy, Asthma and Immunology 2002;8:279-282.

Background: The potential effects of global climate change on allergenic pollen production are still poorly understood.

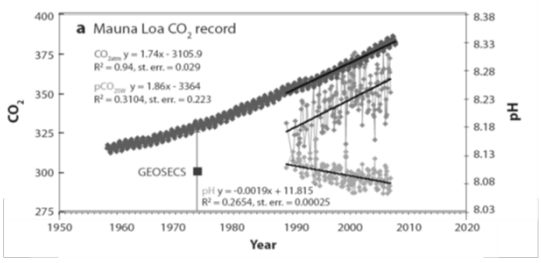
Objective: To study the direct impact of rising atmospheric CO_2 concentrations on ragweed (*Ambrosia artemisiifolia* L.) pollen production and growth.

Methods: In environmentally controlled greenhouses, stands of ragweed plants were grown from seed through flowering stages at both ambient and twice-ambient CO_2 levels (350 vs 700 μL·L^{-1}). Outcome measures included stand-level total pollen production and end-of-season measures of plant mass, height, and seed production.

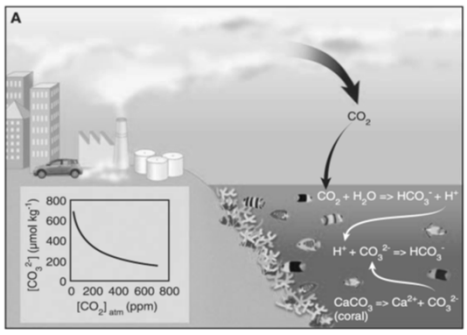
Results: A doubling of the atmospheric CO_2 concentration stimulated ragweed-pollen production by 61% ($P = 0.005$).

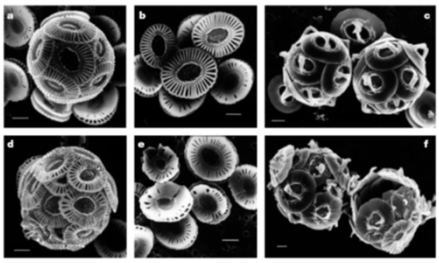
Conclusions: These results suggest that there may be significant increases in exposure to allergenic pollen under the present scenarios of global warming. Further studies may enable public health groups to more accurately evaluate the future risks of hay fever and respiratory diseases (eg, asthma) exacerbated by allergenic pollen, and to develop strategies to mitigate them.

Annals of Allergy, Asthma, & Immunology ©2002;88:279-282.



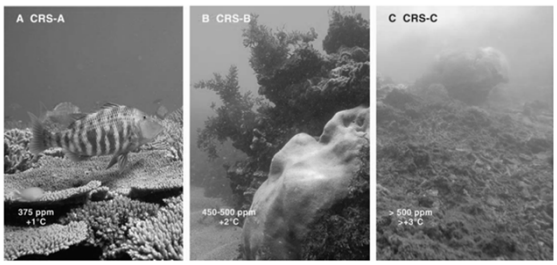
And reduce soluble carbonate because …





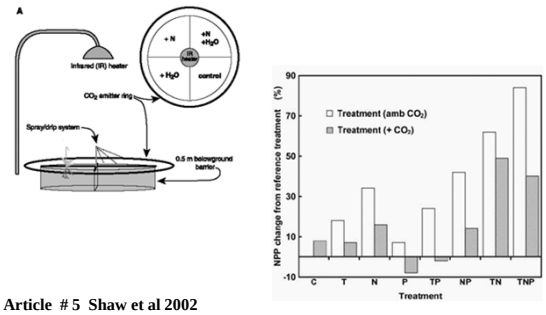
Riebesell et al. 2000

Present day examples of what may result from future climate conditions?



Hoegh-Guldberg et al . 2007

Interactive Effects Can Lead to Unexpected Changes



Article # 5 Shaw et al 2002