

# PRIMER ON CLIMATE CHANGE

by Tom Kuennen

## It's a Fact: Plants Flourish Under Higher Carbon Dioxide Levels

Here's something to think about next time you mow your lawn: Elevated levels of carbon dioxide enhance plant growth.

What once was a commonplace high school biology teaching has become a news item from coast to coast: From endangered rain forests in the Amazon Basin to the prairies of the Great Plains, elevated levels of carbon dioxide in the atmosphere will help plants grow more vigorously, resist disease better, and even better utilize water.

An avalanche of scientific literature buttresses what we know about how enhanced concentrations of carbon dioxide (CO<sub>2</sub>) boost plant yields. Enriched CO<sub>2</sub> levels in the air greatly enhance growth and water use efficiency in almost all the world's vegetation.

What's exciting is how these enhanced CO<sub>2</sub> levels -- the result of the combustion of fossil fuels for low-cost electricity and transportation -- will accelerate plant science and farm productivity, mitigate hunger, increase personal incomes and enhance the greening of America.

The facts are irrefutable:

- o In The Netherlands, researchers at the Glasshouse Climate & Technology Research Station for Floriculture & Glasshouse Vegetables grow vegetables such as cucumbers, tomatoes, eggplant, squash, lettuce and radishes at two to four times the atmospheric CO<sub>2</sub> level, that is, between 700 to 1,400 parts per million (ppm).

"The results of growing at elevated CO<sub>2</sub> levels are more rapid growth, earlier maturity, larger fruit size, greater weight, and a greater total yield of about 25 percent," said the station's chief, Gustaaf Anton van den Berg.

- o At the University of Florida, elevated CO<sub>2</sub> levels are stimulating rice growth and grain yield by factors of 30 to 40 percent. "We get increased carbon uptake through

photosynthesis," said Dr. Jeffrey Baker, of the UF Agronomy Department. "We also get a decline in total water use, and all this translates into an increase in grain yield."

o Higher CO2 levels have greatly increased the growth of cotton crops, reports Dr. Bruce Kimball, Water Conservation Laboratory, U.S. Department of Agriculture. "We found that in enriching the crop to about 550 parts per million -- which is 200 parts per million above our control plots -- that the growth is increased by about 40 percent more."

There's no doubt that carbon dioxide levels now are higher in our atmosphere now than in the recent past. Atmospheric levels of carbon dioxide appear have risen from 272 parts per million (ppm) from 1700 A.D., as postulated from ice cores, to 348 ppm in 1998.

This is proportional to the increase in world population, from 0.5 billion in 1770 to 5.1 billion in 1998. This rise in carbon dioxide is due partly to accelerated human activity, but also comes from natural sources. More recently, carbon dioxide levels have risen from 300 ppm to 360 ppm in this century.

Due probably to volcanic and oceanic releases, CO2 concentrations in distant prehistoric eras were vastly higher than today's levels. These include the great carboniferous periods -- some 250 million to 365 million years ago -- when lush forests absorbed the CO2 from the air, and fixed the carbon in their biomass, later to be recycled in our era as coal and petroleum.

Global warming advocates state that today's increase in carbon dioxide levels will lead to ecological disaster, including wild swings in weather patterns, desertification, spread of hot-climate infectious diseases, and greater risks of severe, damaging weather.

They maintain that higher concentrations of CO2 and other "greenhouse gases" will more efficiently trap solar heat in the atmosphere, and they attempt to prove their theory using climate change computer modeling.

But real-world conditions are complicating the climate change prognosticators and throwing computer forecasting models into error. For example, the degree of rise of CO2 concentrations in the atmosphere is slowing from earlier estimates, due in part because the CO2 is being locked up in the plant biomass through accelerated plant growth.

Also, other unpredictable or overlooked elements such as cloud cover, water vapor (comprising some 96 percent of all greenhouse gases), heat transport and sunspot cycles throw monkey wrenches into climate change predictions. To date, not a single computer model has predicted any current condition with any degree of accuracy, nor has there been any statistical evidence for a warming planet.

But we do know two things: That CO2 levels in the atmosphere are increasing, and that higher CO2 levels enhance plant growth. And that alone should be enough to make Mother Earth smile.

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