



In 2-year study

Arctic tundra may hold plant secrets

By Donald J. Frederick
National Geographic Society

Hundreds of pounds of arctic tundra in North Carolina may yield new information about the growth rate of many plants and future levels of carbon dioxide in the atmosphere.

Collected near Barrow, Alaska, the tundra was flown into Duke University's phytotron, a climate-controlled facility that has 40 "growth rooms" and six large greenhouses.

Thawed under carefully controlled conditions, the plants and peat comprising the tundra will be examined over two years at various soil and air temperatures and under light conditions duplicating the arctic summer.

Botanists Dwight Billings of Duke and Kim Peterson of Clemson University, project coordinators, hope the tests will ascertain whether the tundra absorbs or releases carbon dioxide when subjected to warmer temperatures or an increase of

carbon dioxide in the atmosphere.

MANY SCIENTISTS have predicted that increasing use of fossil fuels such as coal will sharply boost the amount of carbon dioxide in the atmosphere, causing warmer global temperatures. The more serious consequences envisioned include disruptions of agriculture caused by changes in growing cycles and prolonged droughts in the farming regions of the United States and Western Europe, as well as a long-range peril — rising sea levels that would flood coastal towns.

If warmer temperatures do occur, they are expected to be more pronounced in arctic tundra regions, where an estimated third of the world's carbon is stored in peat deposits.

For most of the year, the tundra — a vast region covering some 3 million square miles — is a frigid, hostile, seemingly lifeless realm, but in June it usually comes to life for a five- to six-week growing season in most places. So far, no one knows what

effect a prolonged warming trend would have on this expanse.

As Billings points out, "Some researchers, myself not included, think arctic plants will absorb carbon dioxide rather than release it during a longer growing season."

"We hope to settle the question, because a lot of carbon could be released through peat decomposition, worsening an already worrisome atmospheric carbon dioxide problem. And there are indications that temperatures in the arctic will rise 4 to 7 degrees Fahrenheit in the next 50 to 60 years, lengthening the growing season." The project is supported by the National Science Foundation.

OTHER INVESTIGATIONS at the phytotron are attempting to find the long-term effects of doubled carbon dioxide levels on ordinary plants. Preliminary experiments with high concentrations of the gas have shown that some crop plants such as wheat and rice do surprisingly well.

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