

# Rooting Around for Missing Carbon

Call it "The Case of the Vanishing Carbon." Researchers who study carbon dioxide — the most notorious of greenhouse gases — can't seem to find about a billion tons of the carbon pollution emitted each year by the burning of fossil fuels. But now a team of soil scientists has gotten to a root of the problem.

Myles J. Fisher and his colleagues at the International Center for Tropical Agriculture (CIAT) in Cali, Colombia, report that deep-rooted grasses in South American pastures may transport a substantial fraction of the missing carbon into the soil. Fisher's group announced their results in the Sept. 15 NATURE.

Plant biologist David O. Hall of the University of London comments that the CIAT project is the first to measure carbon storage in tropical soils. "In the past, most studies have emphasized carbon storage in above-ground biomass, in trees and such. But we've suggested that soils must be considered. We are trying to see where this carbon is because it's quite important as to what might happen in the future," Hall says.

Fisher and his coworkers studied two Colombian pastures planted with exotic species of African grass endowed with long roots. Since 1980, South American ranchers have planted roughly 35 million hectares with these varieties because they tap water and nutrients from the poor savanna soils more efficiently than native species. The researchers compared the carbon content of pasture soil to that of nearby "unimproved" savanna grasslands.

At one research site, a pasture with deep-rooted grass stored 13 percent more carbon than a neighboring savanna did. Sites planted with a combination of deep-rooted grasses and with nutrient-rich legumes contained even more carbon — up to 36 percent over the natural grasslands.

Judging from the amount of South American pastureland planted with African grasses, the CIAT team calculates that these regions sequester from 100 million to 507 million tons of carbon each year.

If true, that would locate a fair portion of the missing carbon, says atmospheric scientist Pieter P. Tans of the National Oceanic and Atmospheric Administration in Boulder, Colo. Estimates suggest that fossil fuel combustion and deforestation release roughly 6.5 billion to 7 billion tons of carbon each year, but only about 3 billion tons remain in the atmosphere.

Scientists believe the oceans sop up roughly 2 billion tons annually, which

leaves another 1 billion to 2 billion tons unaccounted for. This missing carbon must go into the forests, grasslands, and tundra spread around Earth. Tans and other scientists searching for the carbon sinks have tended to focus on tropical forests as a potential absorber, but the new report will prompt them to look at grasslands, he says.

While Fisher's study concerns savannas, he suggests that ranchers may also plant deep-rooted grasses and legumes in previously cleared sections of tropical rain forests. Although these plants can't offset the damage done by forest destruction, they will make pastures more sustainable, make the forage more nutritious, and help absorb some of the carbon released by deforestation.

— R. Monastersky



Neil Caudel/N.C. State Univ.

Deep-rooted grass in Brazil.

## Just say no to prostate cancer screening

Some health experts now argue that many men suffering from prostate cancer don't need treatment — they will die of something else before their slow-growing tumor becomes terminal (SN: 6/5/93, p.367).

However, a new study takes that hands-off approach a big step further, arguing against mass screenings for the disease. Men without symptoms are better off avoiding tests for prostate cancer, the second leading cause of cancer death among men, a team of researchers contends.

"In the aggregate, we predict that screening will result in net harm rather than net health improvement," report Murray D. Krahn of the University of Toronto and his colleagues in the Sept. 14 JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION.

However, the study has numerous limitations, Gerald W. Chodak of the Louis A. Weiss Memorial Hospital in Chicago warns in the same issue of the journal. Most important, the researchers base their entire analysis on a one-time screening, although physicians recommend that men get tested regularly.

Kahn says the new study suggests that repeated screenings would yield results similar to those from a one-time exam.

The new recommendation also rankles many cancer specialists, who now advise men to be tested regularly to catch the disease in its early stages. Early detection, they argue, increases the chances of survival.

Krahn and his colleagues calculated the risks and benefits of widespread screening for prostate cancer. They analyzed

data on, for example, reduced quality of life as a result of treatments, how much screening and treatment extend life, and the cost of testing.

Many individuals who test positive for the cancer and undergo treatment would never have experienced trouble from the disease, they argue. Yet a significant percentage of men who undergo surgery or radiation treatments — common therapies for prostate cancer — experience incontinence and impotence as a result. The risk of such side effects varies greatly, depending on a man's age, the location of his tumor, and the skill of his surgeon.

Moreover, treatment and screening extend a man's life only marginally. Getting one prostate-specific antigen (PSA) assay and a rectal examination increases life expectancy by a mere 0.6 to 1.7 days for men 50 to 70 years old, the authors report.

The PSA assay, frequently used by physicians to test for cancer, measures the concentration in the blood of a protein made in the prostate (SN: 8/8/92, p.94).

Radiation treatment produces fewer side effects than surgery and results in slightly greater life expectancy, they report. Nevertheless, overall, more people suffer from screening than benefit from it, Krahn argues.

The final decision about testing rests with the individual, Krahn acknowledges. "You have to sort out how cancer phobic you are" or how much you dislike medical treatment, he says. "I'd just as soon stay away from doctors....I'm a very treatment phobic person." — T. Adler