environment

ECOSYSTEM ANALYSIS

Tree cutting and nutrient loss

Six small watersheds in a New Hampshire forest are the site of a study being made in an effort to predict the effects of forestry practices on the ecology.

In one of the six areas, all the trees were cut and removed. The predictable result was that water runoff increased 40 percent. More significant, the loss of nitrates and other nutrient salts was highly accelerated by the cutting. Nitrate runoff, for instance, increased 50 times to as high as 90 parts per million. (This is 46 ppm higher than the Public Health Service limit for drinking water.) It would take nature 100 years to replace the nitrogen lost from the watershed in three years, says Dr. Gene E. Likens of Cornell University. He and Dr. F. Herbert Bormann of Yale University are doing the study in cooperation with the U.S. Forest Service. It is funded by the National Science Foundation.

Various logging techniques are now being used in the five remaining watersheds to determine effects on runoff and nutrients.

FOOD POISONING

Moldy sweet potato toxin isolated

It has been known for some time that moldy sweet potatoes are toxic to livestock. New research indicates this toxicity may be a menace to humans, especially in certain African countries where sweet potatoes are a staple.

The National Institute of Allergy and Infectious Diseases reports that three researchers at Vanderbilt University fed extract residues of moldy sweet potatoes to mice. The mice died in 8 to 24 hours of lung edema and cellular changes in liver, spleen and kidneys. The researchers then analyzed the extract residues and found that two compounds, ipomeamarone and ipomeamaronol, produced liver toxicity. A fungus, *Fusarium javanicum,* was likely the source of the toxins, report the researchers. They were unable to isolate the lung edema toxin.

The scientists, Drs. Benjamin J. Wilson, Dominic T. C. Yang and Michael R. Boyd, noted that baking or boiling the sweet potatoes did not remove the toxins. Further research is needed to determine whether the toxins are routinely produced in moldy sweet potatoes, note the scientists.

NUTRITION

Vitamin C use depends on diet

A new rage is to use massive doses of vitamin C as a prophylactic against colds, a regimen strongly advocated by Nobel laureate Linus Pauling (SN: 12/26/70, p. 477).

Work in India under a U.S. Agricultural Research Service grant indicates that the way the human body uses vitamin C depends to a great degree on other aspects of diet.

Directed by Dr. S. C. Niyogy of Calcutta University, the guinea pig experiment showed that the animals metabolized vitamin C less efficiently when milk casein, a protein, constituted 60 percent of the total diet of the animals. He concluded that perhaps greater amounts of vitamin C should be taken to compensate for a high-protein diet.

Likewise, excessive amounts of certain trace minerals, including zinc, chromium, copper and tungsten, slowed activity of the vitamin C-metabolizing enzymes. Smaller amounts of these minerals, however, improved vitamin C metabolism.

AIR POLLUTION

Tree uptake greater from leaves

Work by two researchers at Boston University indicates that trees may absorb much greater quantities of pollutants directly from the air than from the soil.

Dr. Irving J. Russell and Shieh-Lieh Fang report that uptake by trees of two radioactive elements, strontium 90 and cesium 137, is much more efficient through leaves or other external parts of the trees than through the root systems.

The finding was surprising for strontium 90. Because it has a long half-life, strontium 90 stays in the soil for long periods. It was expected, therefore, that its uptake would be largely through root systems. However, the amounts of this radionuclide in trees were far greater than could be extrapolated from soil content. The researchers' conclusion: The excess came directly from the air.

They are now examining tree uptake of a number of elements found in particulate air pollutants. The distribution of lead in trees, for instance, "strongly suggests" a significant portion of this element in trees is due to deposition of lead from automobile exhausts on leaf surfaces.

NUCLEAR POWER

Danger of tritium

Tritium, an isotope of hydrogen, is a by-product of nuclear power plants. It is formed both within atomic piles and from neutron bombardment of water molecules in the cooling systems of the nuclear plants. Small amounts are released into the environment as tritiated water.

A University of Chicago radiologist, Dr. Dieudonne J. Mewissen, says that amounts of tritium some 50 times less than the maximum permissible level for power plant effluents, as established by the Atomic Energy Commission, causes cancer in mice.

In a study, Dr. Mewissen gave 1,500 newborn mice either tritium-labeled thymidine, a component of DNA, or normal, non-tritiated, thymidine. Mice in the tritiated group had a higher incidence of malignant tumors throughout most of their lifetimes.

Dr. Mewissen says that if the tritium became concentrated in the nuclei of human cells because of an affinity for thymidine, then these nuclei could receive far higher doses of radioactivity than the gross amount of tritium in the body would indicate.

But he admits many more factors must be investigated. These would include: the exact amounts of tritium released from the power plants, the proportion of the tritium retained by the DNA of men and animals, and the varying concentrations of tritium as it advances up the food chain.

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