European and U.S. forests in trouble

Evidence is accumulating that several species of trees across a wide area of the eastern United States have suffered a sharp decline in growth during the past two decades. The synchronized manner in which this abrupt growth slowdown has occurred in various pines and spruces from Maine to Alabama suggests that the decline can't be attributed just to local effects or normal ecological processes, according to several U.S. researchers. In the most serious case, red spruce trees in high-elevation forests in mountainous areas of Vermont, North Carolina and elsewhere are dying.

Even more extreme problems are showing up in European forests. A 1983 survey, for example, showed that about 34 percent of West Germany's forests were visibly damaged. A year before, less than 10 percent of the trees were identified as showing symptoms such as the yellowing and early loss of needles or leaves. A report from the Worldwatch Institute in Washington, D.C., released this week, concludes, "Accounts of forest damage in other European countries are not as well documented, but collectively they add to evidence of unprecedented forest devastation."

"This phenomenon certainly seems to be a real one," says Arthur H. Johnson of the University of Pennsylvania in Philadelphia. Johnson is one of several researchers who have documented tree growth changes in the United States. "A lot of work needs to be done to understand whether it's a natural phenomenon or whether it's due to air pollution or a combination of circumstances," Johnson says.

Sandra Postel, author of the Worldwatch report "Air Pollution, Acid Rain, and the Future of Forests," says, "No single hypothesis can explain everything that's happening everywhere." The report states, "A comprehensive look at worldwide forest damage reveals multiple pollutants — including acid-forming sulfates and nitrates, gaseous sulfur dioxide, ozone, and heavy metals — that acting alone or together place forests under severe stress."

Johnson notes that West German scientists are inclined to believe that air pollutants are the principal cause for the forest damage in Germany. However, except possibly in the case of red spruce, it isn't clear whether North American forests will suffer the same fate as German forests. This summer, teams of scientists from both countries will spend two weeks on field trips to compare the situations in the two countries. "Right now, it's difficult to judge how much overlap there is," says Johnson.

Postel says, "I think we're a little too complacent about future timber supplies."

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Acid rain may have contributed to the destruction of this spruce forest in the Harz Mountains of West Germany. The Black Forest has also been hard hit. In some areas of the woods, where the leafy canopy of beeches once was so dense that little sunlight ever reached the ground during the summer, people can now get a tan.

Her report recommends a greater emphasis on energy conservation and recycling along with emission control programs for fossil-fuel power plants to reduce air pollution.

Last week at a congressional subcommittee hearing, William D. Ruckelshaus, Environmental Protection Agency administrator, also recognized the potential problem in U.S. forests, but he added, "This new information, while troubling, raises the possibility that if we act too quickly, we may control the wrong pollutant." — *I. Peterson*

Sniffing out a new flu vaccine

A newly developed nose drop vaccine against the most deadly form of influenza virus holds promise as a better method of stopping a flu epidemic before it starts, say researchers who published results of the first clinical test of their experimental vaccine in the March 31 LANCET.

One or two drops of the new vaccine, squirted into the nostrils of healthy college-age volunteers who were later exposed to flu, protected all students tested from the muscle aches, coughing and high fever of flu. The treatment also kept those who contracted a mild, symptomless infection from spreading the virus to others. The findings, says Mary Lou Clements of the University of Maryland, are especially important for the elderly or those with chronic lung disease, in whom a bout of influenza A infection can escalate into fatal pneumonia.

Unlike conventional flu vaccines that rely on injections of a killed virus to trigger an immunity buildup, the new vaccine contains a live virus rendered harmless in the laboratory. Live virus vaccines generally provide longer lasting and more potent protection than killed or "inactivated" virus vaccines, but carry a small risk that they themselves will revert to a virile form and cause disease. The modified virus in the nose drop vaccine seems very stable, and not prone to such a reversion, says Brian R. Murphy of the National Institutes of Health, who collaborated in the study with Clements and Robert F. Betts of the University of Rochester in New York.

An influenza virus is composed of two parts, an inner nucleic acid core and an outer protein coat. While the inner core gives the organism its ability to produce disease by controlling such factors as growth and the ability to reproduce, the outer coat is the feature the human immune system uses to identify the viral enemy. By changing its coat every couple of years, the camouflaged virus outwits the body's defenses. John Maassab of the University of Michigan in Ann Arbor isolated a virus that had an innocuous core and outfitted it with the coat of a trouble-making virus from a recent flu epidemic. The hybrid product has a coat that prompts a buildup in the body's immune arsenal, but can't itself cause disease. Best of all, says Murphy, the harmless virus can be stored like a department store mannequin, ready to be "dressed" by vaccine makers in whichever protein coat an invader wears during a given flu season. Provided the experimental product passes further tests of safety and effectiveness in healthy elderly persons, a commercial vaccine could be ready in three to five years, he says, if a company is interested in producing it.

Flu viruses seem to grow best in cells that line the nose, throat and lungs, and the nose drop vaccine prompts a localized rise in immunity directly at the sight of infection, the researchers say. In contrast, conventional injected flu shots prompt a generalized rise in immune cells and their chemical weapons that circulate throughout the blood, raising respiratory immunity only slightly. The scientists suggest that this difference in the site of action might account for the greater resistance to flu infection found in volunteers given the experimental vaccine. — *D. Franklin.*

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