

ENVIRONMENTAL QUALITY

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ABSTRACTS

Acid Precipitation Control Strategies. THAD J. GODISH, Department of Natural Resources, Ball State University, Muncie, Indiana 47306.—This investigation was designed to develop and to evaluate technically and politically various alternative acid precipitation control strategies which primarily focus on SO_x emissions to the atmosphere. SO_x producing states of the Ohio River Basin and upper middle west were included in the model study area. SO_x control strategies based on universal coal cleaning requirements, emission limitations, total atmospheric burden, and best available control technology are described and evaluated.

Sensitivity of Weed Species to Ozone Exposures. THAD J. GODISH, Department of Natural Resources, Ball State University, Muncie, Indiana 47306.—Nine weed species common to the Midwest were exposed to concentrations of 0.15 and 0.25 ppm ozone for 3 hours in order to determine their sensitivity. Based on plant response to their exposures, the test species were classified as sensitive, slightly sensitive, intermediate-resistant and resistant. Smartweed (*Polygonum persicaria*) and cocklebur (*Xanthium chinense*) were rated as slightly sensitive with some plants showing symptoms at 0.15 ppm. Lambsquarters (*Chenopodium album*) was intermediate in sensitivity. Pigweed (*Amaranthus retroflexus*) was intermediate-resistant showing slight injury after an exposure to 0.25 ppm. All other species tested including giant ragweed (*Ambrosia trifida*), dwarf ragweed (*Ambrosia artemisiifolia*), jimsonweed (*Datura stramonium*), intermediate dogbane (*Apocynum medium*), flower of an hour (*Hibiscis trionium*) and velvetleaf (*Abutilon Theophrasti*) showed no symptoms after exposure to 0.25 ppm ozone and were classified as resistant.

Formaldehyde Air Pollution in Residential Housing. THAD J. GODISH, Department of Natural Resources, Ball State University, Muncie, Indiana 47306, and Virgil Konopinski and David Peterson, Division of Industrial Hygiene, Indiana State Board of Health, Indianapolis, Indiana 46206.—This report summarizes results of formaldehyde sampling in home interiors in Indiana conducted by the Indiana State Board of Health and Ball State University. In 26 cases investigated formaldehyde levels ranged from 0.03 to 1.35 ppm. Sources of free formaldehyde included urea-formaldehyde foam insulation, particleboard underlayment, cabinets, paneling, and furniture. A range of health symptoms were reported by homeowners to be associated with their homes including eye and upper respiratory irritation, rhinitis, coughing, difficulty in breathing, sinusitis, headaches, dizziness, tiredness, difficulty in sleeping, digestive problems, chest and abdominal pains, and abnormal stool or diarrhea.

The Chemical Properties of Biological Sludges. ROBERT H. L. HOWE, West Lafayette, Indiana 47906.—The Chemical Properties of Anaerobic and Aerobic Biological Sludges are discussed. Their values and useful potentials are presented.

The Meaning of pH in Environmental Control and Wastes Treatment. ROBERT H. L. HOWE, West Lafayette, Indiana 47906.—The meaning of pH and the computation of the "average" pH values by the proper hydrogen ion concentration and the final pH of a number of acid and basic solutions are explained. The logarithmic expression of the proper pH computation is emphasized.

A Groundwater Quality Study of the Franklin County Sanitary Landfill, Brookville, Indiana. PATRICK SULLIVAN, Department of Natural Resources, Ball State University, Muncie, Indiana 47306.—The Franklin County Sanitary Landfill is located in sand and gravel deposits within a meander of the Whitewater River. Given the high permeability of the geologic materials, this landfill site is not suitable for environmentally sound waste disposal. However, this circumstantial evidence does not prove that groundwater contamination is occurring. This uncertainty resulted in this project with the objective of identifying possible groundwater and/or surface water contamination.

Monitoring wells (PVC Pipe) were installed at four sites about the landfill boundary. Over a period of five months water samples were retrieved from the monitoring wells as well as upstream and downstream of the landfill. These samples were analyzed for: pH, TDS, COD, Cl, Cd, Zn, Pb, Ca, Ti, and Fe.

The results of the analysis indicated the following: a) leachate is leaving the landfill and is being detected in the monitoring wells, b) only Fe exceeded EPA standards, and 3) the reason higher levels of all parameters were not recorded was probably due to dilution.

The Effects of Acid Mists on Nitrogen-Fixing Blue-Green Algae. RONALD W. USHER AND EDMUND A. SCHOFIELD, The Institute of Ecology, Indianapolis, Indiana 46208.—Nitrogen-fixing blue-green algae are important components of the pioneer ecosystem on the foredunes of the Indiana Dunes State Park. They contribute combined nitrogen and reduced carbon to the soil, increase the soil's water-holding capacity, and provide a substratum suitable for the germination of seeds. Since blue-green algae require neutral to slightly alkaline conditions, it is significant that the pH of the precipitation currently falling on the dunes is 4.0 to 4.5. Because sand has a low buffering capacity, I hypothesized that acid precipitation may be inhibiting the growth of and nitrogen fixation by the blue-green algae growing on the Indiana Dunes. To test my hypothesis, I studied the distribution and ecological relationships of blue-green algae in the Indiana Dunes State Park. Crusts of nitrogen-fixing blue-green algae grew abundantly on the foredunes. They consisted of eight species of blue-green algae. The pH of the foredune sand was 8.0, that of Lake Michigan water, 7.9. In the laboratory, I subjected unialgal cultures of *Nostoc commune* (UTEX B1621), and *Scytonema hofmannii* (UTEX B1834) (two of the species identified in the crusts), as well as samples of dune crusts, to mists of pH 3.5, 4.5, 5.5, 6.5, 7.5, 8.5, and 9.5 over a period of several weeks. The mists inhibited nitrogen fixation by *N. commune* by as much as 90 percent, whereas they stimulated fixation by *S. hofmannii*. All of the *N. commune* cultures recovered from the effects of the mists, however. I obtained inconclusive results from the crusts collected at the Indiana Dunes, although they appeared to be stimulated by the treatments.