

ECOLOGY

Chairman: WILLIAM B. CRANKSHAW, Department of Biology,
Ball State University, Muncie, Indiana 47306

JOHN O. WHITAKER, Jr., Department of Life Sciences,
Indiana State University, Terre Haute, Indiana 47803
was elected Chairman for 1976

ABSTRACTS

The Reduction of Fecal Coliform by Biological Oxidation. ROBERT H. L. HOWE, West Lafayette, Indiana 47906.—The reduction of fecal coliform bacteria by the proper function and operation of several aerobic biological treatment processes is reviewed. Some data are presented, and points of significance in achieving the reduction are discussed.

A Rapid Technique for Instar Identification of Lake Michigan Copepods. BYRON G. TORKE, Biology Department, Ball State University, Muncie, Indiana 47306.—A method for identification with a dissecting microscope of the naupliar instars of copepod crustaceans based on body shape and the successive appearance of appendages is presented. Copepodid instars are identified on the basis of appendage and urosome segment numbers. The relevance of instar identification to the determination of growth rates in natural populations and to estimation of secondary production is discussed.

Phytoplankton Population Dynamics of the In-Shore Waters of Southern Lake Michigan Near Michigan City, Indiana from June, 1973 to May, 1974. THOMAS E. LAUER and THOMAS S. MCCOMISH, Biology Department, Ball State University, Muncie, Indiana 47306.—Monthly whole-water phytoplankton samples were collected in Lake Michigan near Michigan City, Indiana from June, 1973 to May, 1974 on three transects at eight stations with depths ranging from 5 to 18m.

A total of 226 taxa were identified in composite samples. The diatoms *Fragilaria crotonensis* (16%), *Thalassiosira fluviatilis* (11%), and *Tabellaria fenestrata* (9%) numerically dominated the Lake Michigan phytoplankton assemblage during the study period.

Species encountered in this study indicate continued succession of Lake Michigan phytoplankton and eutrophication of the southern near-shore water.

A Survey Of Chlorinated Hydrocarbon Insecticides In Fishes From Streams Of Central Indiana. MARY GOSSARD, DR. DAVID W. OSGOOD, Department of Biology, Butler University, Indianapolis, Indiana 46208.—Twenty-six fish from four stations in Central Indiana were collected in the summer and fall of 1974 and analyzed for aldrin, dieldrin, heptachlor, heptachlor epoxide and o,p-DDT. Dieldrin was found in all fish analyzed. In two of them, levels exceeded the action guidelines set by the Environmental Protection Agency. Generally higher levels of all pesticides analyzed were found in fishes from the Whitewater River in

Richmond than from other locations. Additional monitoring of pesticide levels in fishes from streams in Indiana should be undertaken, the sources identified and controlled.

Preliminary Report On The Status Of A Rare Shiner (*Notropis ardens lythrurus*) In The Little Blue River, Crawford County, Indiana. RONALD RIDENOUR, Indiana Department of Natural Resources and H. E. MC-REYNOLDS, U.S. Forest Service.—In Indiana, the Ohio rosefin shiner (*Notropis ardens lythrurus*) occurs only in a few southeastern and south central tributaries of the Ohio River. It has been considered to be allopatric to a related species (*Notropis umbratilis cyanocephalus*), the northern redfin shiner. Specimens of *N. ardens lythrurus* were taken in 1942 by Gerking (1945) at one locality in the Little Blue River. Preliminary efforts of this study have not disclosed the Ohio rosefin shiner in the mainstem of Little Blue River. However, the tributaries have not yet been sampled, and the study will continue next year.

Changes in Reproductive Effort Among Dominant Herbaceous Dicots in Early Old Field Succession. ALAN O. PRIEBE and DONALD R. WHITEHEAD, Indiana University, Bloomington, Indiana 47401.—Changes in community structure and reproductive effort were studied as part of a long term investigation of old field succession. For four years after the onset of succession, all species of reproductively active dominant herbs were sampled biweekly, individuals were separated into tissue types, and dry weights calculated to determine reproductive effort. Results to date show: Mean reproductive effort drops significantly from one year to the next for each of the four years. Within each year subsequent to the first, there appear to be three peaks for reproductive effort in the system, one each in spring, early summer and late summer. The spring peak is seen to increase progressively from one year to the next.

Four decades of vegetational change in Mount Rainier National Park, a photo-comparison study. ALTON A. LINDSEY, Department of Biological Sciences, Purdue University.—About 450 35-mm photographs were taken during 3 summers work in this park starting in 1933. Many of the sites were located and rephotographed during July-September, 1974. Comparison of the resulting photo-pairs, projected side by side on two screens, is the basis of this presentation.

Interpretations of the landscape and vegetational changes involve recovery from forest fires, revegetation of moraines, bedrock, and flood plain surfaces, disappearance of subalpine ponds, invasion of mountain meadows by *Abies lasiocarpa*, succession in avalanche chutes, degradation of dead standing and down timber, and seasonal advance.

Trace Elements in Natural Waters of Grant and Surrounding Counties. M. E. TAVENNER, D. KLOPFENSTEIN and E. NUSSBAUM, Mississinewa High School, Gas City, Indiana 46983, Taylor University, Upland, Indiana 46989.—Natural water samplings from the headwaters and from the first large urban areas along the three rivers—the Salamonie, Mississinewa and Wabash are analyzed for selected elements. In these

river water studies the geologic nature of the river beds are reflected in the metal ion content of the waters, along with the metal ions that might enter the rivers from industrial, agricultural and domestic sources. Our investigations included analysis for Ca^{++} , Mg^{++} , Fe^{+++} , Mn^{++} , Cu^{++} , Na^{+} and K^{+} . (Of these, only Na^{+} and Ca^{++} are analyzed on a regular basis by the Indiana Stream Pollution Control Board.) The concentrations of Na^{+} and K^{+} were determined by flame photometry. Other ions were analyzed by means of atomic absorption spectrophotometry.

Average concentrations of ions (ppm) in the water samples from the headwaters of the three rivers range from 54-120 of Ca^{++} , 18-32 of Mg^{++} , 0.20-6.55 of Fe^{+++} , 0.033-0.80 of Mn^{++} , 0.00-0.05 of Cu^{++} , 9-19 of Na^{+} , and 2.7-5.7 of K^{+} .

Flow rates of the rivers affected certain concentrations. Ca^{++} was nearly twice as abundant during dry weather, while iron content, in some instances, increased by a factor of 30 during the wet period. The magnesium content, however, remained unchanged.

In addition to the river water analyses, four deep wells were sampled. The Na^{+} was nearly 3 times as high at a well 2 miles from a highway department salt storage area as at other wells.

Hoot Woods: Composition and Tree Growth during 1965-1975. D. BRIAN ABRELL and MARION T. JACKSON, Department of Life Sciences, Indiana State University, Terre Haute, Indiana 47809.—In 1975, a 10-year resurvey was made of the 10.87-acre portion of the 64-acre old growth beech-maple stand that was mapped at a 33:1 scale in 1965. Tree-by-tree comparisons were made for changes in growth, accessions and mortality. Patterns of accessions and mortalities were checked for randomness.

Beech (*Fagus grandifolia* Ehrh.) remained the most important species, but declined in density, basal area and importance. The co-dominant sugar maple (*Acer saccharum* Marsh.) had corresponding increases. Log density-size class plots revealed density decreases in middle size classes and increases in larger trees. Accessions and mortalities tend toward clumped distribution.

Comparison of Vigo County, Indiana, Vegetation: Presettlement (1814) versus Contemporary (1974). F. ELLEN OLIVER DONSELMAN, Department of Health, Dayton, Ohio 45402, and MARION T. JACKSON, Indiana State University, Terre Haute, Indiana 47809.—Vegetation data for four physiographic units (floodplain, terrace, upland slope and upland flats) of Vigo County, Indiana, were obtained from the General Lands Office Survey Records of 1814 and by sampling 16 little-disturbed contemporary stands.

About 22% of the county was originally prairie, mostly located on the Wabash River terrace. The oak-hickory forests of the terrace have become more xeric in the past 160 years. The greatest changes in composition occurred on the Wabash River floodplain, where hydrophytic species increased 46% in importance, with corresponding declines for xeric and mesic species. Clearing for agriculture, plus increased

frequencies and duration of flooding may be responsible. Mesic species increased in upland forests, with xeric species declining.

No presettlement forest unit was mapped as beech-maple. Upland slopes were classed as mixed woods; oak-hickory predominated on the terrace and upland flats.

Composition of the Presettlement Forests of the "Unglaciated" Jo Daviess Hills of Northwestern, Illinois. JANE WEATHERHOLT FINNEY, Box 63, Centerton, Indiana 46116, and MARION T. JACKSON, Indiana State University, Terre Haute, Indiana 47809.—Forest composition was determined for the rugged "driftless" region of extreme northwestern Illinois by analysis of the General Land Office Survey Records of 1842.

Upland slope forests (86% of the area), containing 21 species, were 97% oak-hickory, with white oak, bur oak and black oak being the leading dominants. Ravine forests (7% of area) had more mesic species among the 19 total, with bur oak, elm, black oak, basswood and white oak the dominants. Terraces (2% of the area) contained only 8 species and were 95% oak-hickory. Mississippi River floodplain forests (5% of area), containing 13 species, were dominated by such hydrophytic species as soft maple, elm, river birch, ash and black willow.

These findings suggest that the original vegetation of the Jo Daviess Hills was predominantly oak-hickory and should not be typed maple-basswood as traditionally mapped.

Ecological Reactions. DONALD E. MILLER, Department of Biology, Ball State University, Muncie, Indiana 47306.—The term reaction refers to the influence exerted by an organism or a community of organisms upon the habitat. Ecologists recognize the importance of such influences but have been reluctant to use the term reaction. It is desirable to have a word or short expression to designate this concept. No one, to date, has suggested a better word than reaction. It is recommended that ecologists use the term reaction along with the terms coaction and response.