

## ECOLOGY

Chairman: JAMES R. GAMMON, Zoology Department,  
DePauw University, Greencastle, Indiana 46135

CARL KREKELER, Biology Department, Valparaiso University,  
Valparaiso, Indiana 46383, was elected Chairman for 1971

### ABSTRACTS

**The Effect of Limestone Sediment on Macroinvertebrates.** JAMES R. GAMMON and DAVID S. WHITE, Zoology Department, DePauw University, Greencastle, Indiana 46135.—From 1967 through 1969 a study was conducted on the effect of limestone sediment originating from a crushed rock quarry on the macroinvertebrate populations in the riffles of Deer Creek, Putnam County, Indiana. During this period more than 4,873,000 kilograms of sediment entered the stream. Monthly Surber samples of the macroinvertebrates were taken from the riffles above and below the quarry outfall and the average densities and diversities were examined and compared.

We found that when amounts of sediment less than 3600 kilograms per month entered the stream, the suspended solids load was less than twice the naturally occurring load and there was no detectable effect on the populations. When amounts greater than 3600 kilograms per month entered there was a 70% decrease in the population density. Even during periods of significant population decrease, however, there were no changes in species composition and little difference in diversity occurred as measured by the Whilm and Dorris index. When the input was great enough to cause a build-up of sediment in the riffles, there was also an immediate decrease in the population density by nearly 70 per cent. Recovery was almost immediate when the suspended and/or settled sediment was eliminated from the riffles.

**The Conchostracan *Lynceus* (Crustacea) found in Indiana.** WILLIAM R. EBERLY, Department of Biology, Manchester College, N. Manchester, Indiana 46962.—A Conchostracan crustacean of the genus *Lynceus*, probably *L. brachyurus*, has been collected on several occasions from a woodland temporary pond one mile north of North Manchester in Wabash County, Indiana. Apparently no member of this order of crustaceans has been reported from Indiana. *Lynceus* is completely enclosed in a nearly circular bivalve shell without growth rings. Maximum size is up to 4.5 millimeters. Oviparous females are as small as 3 millimeters. The pond is heavily overgrown by brush and trees. Adult *Lynceus* appear late in the spring (late May) though nauplii have been seen earlier. The adults as well as nauplii seem to spend much of their time foraging in the debris on the bottom of the pond, with the adults occasionally swimming in the open water above. At no time were they abundant; individuals were captured as they were observed swimming. They were associated with *Chiro-*

*cephalopsis bundyi* and *Diaptomus sanguineus* as well as other typical crustacea that occur in temporary ponds.

**A Rationale for the Retention of Lake Shores in a Natural State.** H. E. MCREYNOLDS, U. S. Forest Service, 633 W. Wisconsin Avenue, Milwaukee, Wisconsin 53203.—Lake and stream shore lands in an undeveloped state are rapidly disappearing. Until recently our philosophy—a vestige of Manifest Destiny—concerning these shore areas regarded them as wastelands until such time as human “improvements” upgraded them to a servitude to Man. As the amount of such lands decreases, and as we become more knowledgeable concerning the ecological interrelationships of our environment, we are beginning to appreciate the value of these “wastelands.”

This paper points out the increasingly recognized values for undeveloped shores of lakes and streams: hunting, fishing, wildlife viewing, botanical areas, ecological study sites, water quality improvement, fish spawning areas, wildlife habitat, aesthetics, and spatial buffering. These low-density uses have been neglected since their values are difficult to measure in the market place. The author attempts to show the beneficial effects of natural-state shoreline on water quality by using a series of theoretical lake problems. The discussion considers only one of the benefits (amelioration of pollutorial impact) that result from undeveloped shore lands.

**Radionuclide Uptake and Retention Time as Related to Epiphyllae in the Tropical Rain Forest.**<sup>1</sup> RAYMOND E. HENZLIK, Department of Physiology, Ball State University, Muncie, Indiana 47306.—Leaves of four species of rain forest trees, found on the side of El Yunque Mountain in eastern Puerto Rico, were contaminated with radioactive solutions of cesium-134 and strontium-85. One set of leaves had a rich growth of epiphyllae, the other set consisted of leaves macroscopically free of epiphyllous growth. Retention was measured in the two kinds of leaves under several conditions: 1) in a laboratory “washing” experiment, and 2) in the field where trees were contaminated for long-term studies. Comparisons were made with data obtained from investigation of natural radioactive fallout, the latter being a continuing input of radioactive contamination over many weeks and months. Results suggest that one massive injection or contamination incident, involving the radionuclides of cesium and strontium, eventuates in a different retention pattern than a gradual, continuing input from radioactive fallout.

A concurrent experiment was carried out to determine where radionuclides on epiphyllae might enter, or show up in, food chains of the Puerto Rican rain forest.

**Two Quantitative Methods of Evaluating Natural Areas and Predicting Magnitude of Change Following Modification by Man.** ROBERT PETTY,

---

<sup>1</sup> Facilities of the United States Atomic Energy Commission, the U.S. Forest Service, and the Puerto Rico Nuclear Center were made available for this study in conjunction with a summer research grant from the Oak Ridge Associated Universities.

Biology Department, Wabash College, Crawfordsville, Indiana 47933.— Mission-oriented characterization and evaluation of natural landscapes is one of the major challenges to ecologists. Resource agencies, utility companies, recreation specialists, planners and numerous other parties frequently require of professional ecologists that they provide summaries of ecological features and appraise the relative significance of a landscape to the regional ecosystem. When controversies over land-use revolve around such appraisals, it is especially incumbent upon the ecologist that he arrive at the most objective judgment possible as well as to not exceed his own technical expertise. While absolutes are not easily come by in such matters, an initial "educated guess" can serve as a useful beginning for more detailed studies.

Two methods were offered whereby two aspects of the above mentioned evaluation of a natural area may be made more objectively. One involves the initial determination of ecological diversity and the biotic community types present. A second method offers a means of comparing the relative ecological significance of landscapes, where priority ratings are important, by assigning quantitative values to various features of each tract. This involves weighting values in terms of developmental time represented by the feature, *i.e.* its ecological age or seral position, from zero for first-year abandonment to 300 for mature vegetation in regional climax, and 1,000 for post-climax assemblages. These in turn may be further weighted in terms of prior scientific history of the tract, *i.e.* value deriving from accumulated data on the landscape, previous and current institutional use made of the area and its potential use in predicting ecosystem functioning on a long-term basis.

**Tall Fescue (*Festuca arundinacea* Schreb.) Winter Pasture Developments On Fragipan Hill Soils of Southern Indiana.** MAURICE E. HEATH, Department of Agronomy, Purdue University, Lafayette, Indiana 47907.— Tall fescue has been increasingly grown on the fragipan hill soils of southern Indiana since 1950. The southern third of Indiana is in the primary area of tall fescue adaptation. Because of its ease of establishment and excellent growth, one area of research and development has been how to use tall fescue effectively as winter pasture in the soil-forage-ruminant ecosystem. As many as 196 cow days of grazing have been obtained in midwinter on what was formerly abandoned hill land.

The spring growth of tall fescue is harvested as round baled hay and left in the field. The regrowth and the round bales are rationed as winter pasture to the animals with an electric fence. Winter fescue growth occurs when temperatures are above 4.5 degrees Centigrade. The size of the area rationed should not exceed the quantity of forage consumed in a 15 to 30 day period for efficient utilization. Rationing resulted in 56 per cent more cow days than when the cattle were allowed the entire field. In principle, the tall fescue round bale sheds water like a thatched roof. Little spoilage was measured except where there was soil contact. A hill field may be used continuously for winter pasture when properly managed.

**Physical and Chemical Factors Influencing the Ecology of Borrow Pits.** MICHAEL F. BAYER, and WILLIAM B. CRANKSHAW, Biology Department, Ball State University, Muncie, Indiana 47306.—Three borrow pits located along Interstate Highway 69 in Delaware County, Indiana, were selected for physical and chemical factor analysis. The pits differed in size and configuration, in the amount and distribution of rooted vegetation, and in the land-use pattern around them. On-site tests were conducted at weekly intervals on the three pits at three depths. Determinations included water and air temperatures, turbidity, dissolved oxygen, carbon dioxide, pH, phosphate, nitrate and nitrite nitrogen. Evaluation of results indicated similarity for all three pits in physico-chemical factors.

#### NOTE

**New Records for *Craspedacusta* in Indiana.** WILLIAM R. EBERLY, Department of Biology, Manchester College, N. Manchester, Indiana 46962.—The occurrence of the medusa of the fresh-water jellyfish, *Craspedacusta*, is of interest to many zoologists and ecologists. Because the appearance of this organism in lakes and other bodies of fresh water is both sporadic and unpredictable, any knowledge of new locations will aid in a better understanding of the ecology of this interesting species. The most recent compilation of the distribution of *Craspedacusta* in Indiana is that of Lytle (1) who compiled records of 17 localities where the medusae had been collected and/or observed. The present paper adds five more new records for Indiana as well as a collection made in Michigan.

- 1) Oliver Lake, Lagrange County
- 2) Olin Lake, Lagrange County
- 3) Bass Hole, Lagrange County

Specimens were collected from the above 3 bodies of water during September and early October of both 1969 and 1970 by Roger Nelson, a biology student at Manchester College. These three lakes are closely associated in the same drainage system.

- 4) Stillwell Quarry, Madison County (near Alexandria)

Specimens were observed in large numbers near the middle of September. Though none were collected, they were reported by reliable observers, including Deborah Hall, a student at Manchester College. Stillwell Quarry is an abandoned stone quarry at the southwest edge of Alexandria.

- 5) Luken's Lake, Wabash County

Specimens were obtained September 4, 1961, by Mr. Galen Eiler, a biology teacher from Roann, Indiana. Luken's Lake, like the other bodies of water mentioned above, is a clear, relatively unpolluted lake with moderately hard water. None would be considered eutrophic waters.

Finally, it should be reported that specimens of *Craspedacusta* were obtained from Lake Elenor, near Brethren, Michigan (Manistee County) on September 7, 1970. They were brought to the writer by Manchester student Gary Sturdevant.

#### Literature Cited

1. LYTLE, CHARLES F. 1958. The records of freshwater Medusae in Indiana. Proc. Indiana Acad. Sci. 67:304-308.

#### OTHER PAPER READ

**Predator-Prey Relationship in Ponds.** PHILLIP HENDERSON, Indiana Department of Natural Resources, State Office Building, Indianapolis, Indiana 46204.