ECOLOGY

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ABSTRACTS

Seasonal Distribution of Brown Hydras. Donald E. Miller, Department of Biology, Ball State University, Muncie, Indiana 47306.——Observations were made, throughout the year, of hydra populations on vegetation and artificial supports in Hamlin Lake, Mason County, Michigan. Some observations were made of accumulations of other materials on supports. Water temperature records were kept. An attempt was made to relate hydra populations to temperature and to the condition of the supports. Some observations were made relative to the reproductive state of the hydras.

Asexual hydras were present throughout the year but they were most numerous in late spring, early summer, and autumn. Other organisms and accumulations on supports did not seem to be important factors in determining the number of hydras present. Physical, seasonal factors seemed to be most important in this regard. Temperature seemed to be most important in bringing about the formation of gonads. It seemed doubtful carbon dioxide in the surrounding water was very important in stimulating gonad formation.

Occurrence of *Argulus mississippiensis* (Crustacea: Branchiura) in Indiana. Robert S. Benda, Aquinas College, Grand Rapids, Michigan 49506.——*Argulus* is the only genus of the subclass Branchiura recorded in the United States to date. There are presently 23 valid species of this genus in the United States (1). One of these fish parasites, *Argulus mississippiensis*, was described by Wilson in 1916 (2). According to Cressey (1) its known distribution was limited to Iowa.

During the summers of 1969 and 1970 twenty-seven specimens of *Argulus mississippiensis* were collected in the White River from host species of longnose gar, *Lepisosteus osseus* and shortnose gar, *Lepisosteus platostomous*. The White River is in Pike County near Petersburg, Indiana below the confluence of the East and West Forks. They were identified by R. F. Cressey, Curator of Crustacea,

1. Cressey, R. F. 1972. Biota of freshwater ecosystems-Identification Manual No. 2-The genus *Argulus* (Crustacea: Branchiura) of the United States. Proj. No. 18050 ELD. Environmental Protection Agency.

2. Wilson, C. B. 1944. Parasitic copepods in the United States National Museum. Proc. U.S. National Museum, 94:529-582.

National Museum of Natural History, Smithsonian Institution. Twenty-one of the specimens are now in the Smithsonian Institution collection. Because individuals of *Argulus* are "loosely" attached to their hosts specimens are usually lost in the normal handling of collected fish. (1). This "loose" association rather than limited distribution is probably the reason no *Argulus mississippiensis* had previously been reported from fish in Indiana waters.

A Study of Site Characteristics and Associated Plant Species of the Equisetaceae of Vigo County, Indiana. MAX A. REED, Department of Life Sciences, Indiana State University, Terre Haute, Indiana 47809. ——A study was conducted of *Equisetum hyemale* and *E. arvense* at 37 sites in Vigo County, Indiana, in an effort to determine the distributional requirements of the species.

Equisetum hyemale was found most often on coarse sandy soils of neutral pH, with low nitrate and potassium, and high phosphorus and calcium levels. Shaded, humid floodplains were the most common sites, but dry railroad embankments also supported colonies of *E. hymale. Equisetum arvense* occurred in smaller habitats, but was less restrictive as to site requirements. *Equisetum fluviatile*, which was reported by Blatchley in 1896, was not located during this study.

The most common plant species associated at high frequencies with both species of *Equisetum* included sycamore, sugar maple, black willow, poison-ivy, wild carrot, wild sweet potato, conyza and jewelweed.

***Cenococcum graniforme*, a Mycorrhizal Fungus, in Relation to the Ecology and Distribution of *Fagus grandifolia*.** BYRON P. HOLLETT, Department of Life Sciences, Indiana State University, Terre Haute, Indiana 47809. ——Soil samples were taken from around five large beech trees in each of ten old-growth forest stands possessing differences in site and vegetation attributes. In addition, five seedlings were extracted, intact with their root systems, from each of the same stands. In the laboratory, all root material was washed free of soil. Counts were made of the total number of tips in the seedling material and the total number of mycorrhizal tips in the large tree material.

The mycorrhizal fungus, *Cenococcum graniforme*, appeared as a mycorrhizal associate of beech and showed its greatest importance in prairie border forest stands. Moisture relationships appear to be the most influential site factors in the distribution of beech and its mycorrhizal associates.

Status of Former Wildlife Refuges in East-Central Indiana. RALPH D. KIRKPATRICK, Department of Biology, Ball State University, Muncie, Indiana 47306.——The Indiana Department of Natural Resources leased 2,872 small areas for development of wildlife habitat during the years of 1941-1959. Areas were posted as refuges for the ten-year lease period. Food and cover plantings were made. In 1974, land-use, ownership and value to wildlife of a sample of these former refuge

areas were determined. Presence or absence of plantings was noted and a relative value to wildlife of each area was established. The sampled former refuges were, in most instances, of value to wildlife. Herbaceous plantings, with three exceptions, were no longer present; however, certain woody plantings are present and are providing wildlife habitat.