

BOTANY

Chairman: H. R. YOUSE, DePauw University

DANIEL DEN UYL, Purdue University, was elected chairman for 1953.

ABSTRACTS

The effect of starvation upon the ability of corn root tips to respire sugars. RAYMOND E. GIRTON, Purdue University.—One centimeter corn root tips were starved at warm room temperatures for overnight periods or longer. The ability of these root tips to respire various sugars was then tested by means of the Warburg manometer technique. Marked increases in the oxygen uptake by the starved roots as the result of sugar feeding was noted in contrast to the results obtained with non-starved roots. A comparison of the ability of these roots to utilize several different sugars was included in this study.

Plant communities on organic terrain in the northern Mackenzie Basin, Canada. ALTON A. LINDSEY, Purdue University.—The principal community types on organic terrain visited in Mackenzie District between 60° 50' N. Lat. and 69° 20' N. Lat., excepting mesic forest sites, are described. Five distinct moist tundra communities on sand, determined by exposure and drainage conditions, form an intimate mosaic. In the transition spruce forest farther southeast, a very large type of raised-center polygon has the center dominated by a flat stand of *Cladonia* and *Cetraria*, dotted with hummocks of *Sphagnum* and low ericaceous shrubs. An inland saline meadow exemplifies a habitat unique in this region. Bogs with true floating mats are rarely found, consequently *Sphagnum* is far less important in low wet sites than *Camptothecium*, *Aulacomnium*, and *Dicranum*. Where frequent stream flooding brings in silt, and on pond borders, reed-marsh communities are very prevalent. Their dense emergent growth, dominated by *Carex aquatilis*, *C. rostrata*, or *Equisetum limosum*, initiates peat accumulation. Communities upon deeper organic deposits include (1) tussock sedge—low willow, (2) ground birch "muskeg," (3) tall clumped willows, and (4) closed stands of tall willow and paper birch. These are not all related successionally. The black spruce—tamarack community is the edaphic climax in mature bogs in both the northern transition forest of the Precambrian Shield, and the Mackenzie Lowlands region. It has a shrub stratum of low, mostly ericaceous chamaephytes, and a ground cover of non-*Sphagnum* mosses and *Equisetum scirpoides*.

The phytoplankton of Lake Wawasee, Kosciusko County, Indiana. WILLIAM A. DAILY, Butler University, and EVERETT E. MINER, Syracuse, Indiana.—This study is based upon 41 plankton net collections made during 1950 and 1951. During 1951 samples were collected approximately weekly from April 28 to October 30. Twenty-nine genera and forty species representing six classes of the algae are recorded. (To be published in the Butler University Bot. Stud. XI.)

Hardwood tree planting on coal mine spoil banks. DANIEL DEN UYL, Purdue University.—The first organized forest tree planting on strip mine spoil banks in Indiana was begun in 1928. Although some results have been secured from these early attempts to reforest spoil banks, the great change in machinery used in mining operations has resulted in new land use problems for which no immediate solutions were available. Forest tree planting has expanded during the past fifteen (15) years and at present the member companies of the Indiana Coal Producers Association are planting about one and one-half million trees a year. Since the passage of strip mine legislation in 1941 and 1951 which requires the revegetation of spoil banks considerable attention has been given to revegetation problems. Consequently in co-operation with the Indiana Coal Producers Association investigations were started in 1949 to determine which species of hardwood trees are best suited for planting of the spoil banks of Indiana. Ten species of hardwoods have been tested on sixteen experimental plots throughout the strip mine area in Indiana.

Based on their survival records and early initial growth black locust, *Robinia Pseudo-Acacia* (L.), green ash, *Fraxinus penn. var. lanceolata* (Borkli.), cottonwood, *Populus deltoides* (Michx.), silver maple, *Acer saccharinum* (L.), sycamore, *Platanus occidentalis* (L.) and sweet gum, *Liquidamber styraciflua* (L.) are the species which up to the present time show the most promise of growing on spoil banks. Species which are apparently not suited for the spoil banks are ailanthus, *Ailanthus altissima* (Mill), red maple, *Acer rubrum* (L.), tulip poplar, *Liriodendron tulipifera* (L.), and black walnut, *Juglans nigra* (L.).

A comparative study of two established ponds. ATWELL M. WALLACE and JOHN R. THOMPSON, Ohio University.—The recent interest in farm ponds and the small number of studies on ponds, especially those which have been established for a number of years, prompted the following study. The two ponds considered are on the Athens State Hospital grounds and were constructed approximately 75 years ago. They have not been drained or disturbed for at least 15 years prior to this investigation.

Though connected near the water source by a small channel, it has been observed that the amount of algae and the species present varied greatly on the same dates. An attempt was made to discover what factor or factors might be causing this difference.

From the time the ice began to melt in February, 1950, until the first of May, 1950, records were made at the surface and 0.5 m beneath the surface of the temperature, light intensity, dissolved oxygen, free carbon dioxide, and pH. These readings were obtained each four days and the data utilized in interpretation of the total algae estimates and relative abundance of species as determined by population counts.

Both ponds are on the north base of a hill. Light measurements showed one pond to be significantly shaded by the steep hillside. The shaded pond averaged 2.3° C. cooler than the relatively unshaded pond. The dissolved oxygen remained near saturation in both ponds during the period of study. The free carbon dioxide content remained consistently higher in the shaded pond. The pH ranged from 7.1 to 8.1 in the shaded

pond and 7.6 and 8.5 in the open pond. Throughout the study the open pond contained approximately twice the quantity of filamentous algae as the shaded pond and was approaching a solid mat at the close of the period.

The only significant factor in the algal populations of these two ponds appears to be the difference in light intensity which is reflected in the higher temperature of the open pond, the increased algal population of it, and relative proportions of the different species present on particular dates. The higher rate of photosynthesis in the open pond probably accounts for the decrease in free carbon dioxide and consequent increase in pH.

Secondary succession in seven stands of red maple-sweet gum forests in Ripley County, Indiana. J. E. POTZGER and A. N. LIMING.—The quadrat study shows that the number of important dominants is large, and all show a high degree of fidelity in the seven stands, indicating great uniformity in this type forest. In terms of abundance of stems one inch or above in diameter they rank: red maple—sweet gum—American elm—shagbark hickory—pin oak—American ash—beech. Compared with the dominants in a mature stand (Klein woods, Jennings County) the Ripley County stands are essentially of the same structure. While sweet gum and red maple are the most aggressive early invaders, the developing forests show no typical succession, which is so common in the climax forest of Indiana. It seems, however, that beech, tulip poplar, and white oak are not so abundant in early succession as in the mature forest.

The morphological effects of petroleum naphtha on pine seedlings. J. DONALD LACROIX, Purdue University.—This investigation was undertaken to determine if there are correlations between stages or conditions of growth which make the seedlings more or less susceptible to the herbicide. Seedlings of slash pine (*Pinus caribaea*), white (*P. strobus*), red (*P. resinosa*), and scotch (*P. sylvestris*) were grown in the greenhouse during the winter and summer and were subjected to either pre-emergent or post-emergent treatments of approximately 200 gallons per acre at the following stages: (1) The soil sprayed and the seed planted; (2) the seed planted and the soil sprayed; (3) the seed planted and the soil sprayed after thirteen days; (4) seedlings two months old; (5) seedlings approximately seven months old; (6) one-year-old seedlings. The use of Standard Weed Killer at about 70 gallons per acre reduces the weeding problem and will cause little damage if applied while the seed coats are still on the cotyledons, or is applied after the trees have reached one year of age but at greater amounts, damage will result to the seedlings in both pre-emergent and post-emergent treatments. Pre-emergent sprays rather noticeably reduce the percentage of germination of all species and slash pine with seed coats is intolerant. Applications on five to nine-month-old slash pine result in needle burning and severe damage to the leaves, growing-point and cotyledons. One-year-old white pines appear to be highly susceptible.

Some aspects of plant succession on abandoned farm lands of southeastern Indiana. PAUL WESTMEYER, North Vernon, Indiana.—Thirty-six

abandoned fields in southeastern Indiana were sampled by quadrats to determine present dominants. The fields were chosen so that all were of white clay soil and were flat and poorly drained.

Putting the results together in order of the ages of the fields since abandonment shows the following apparent succession. First year—*Ambrosia artemisiifolia*, second year—*Setaria glauca* with *Bidens frondosa*, *Cyperus*, and *Erigeron annuus* present under certain conditions, third year—*Dactyloctenium aegyptium* with *Acer rubrum* beginning to develop and also with *Rubus villosus* and *Xanthium spinosum* occasionally present in sizable amounts, fourth year—*Aster multiflorus* with *Fraxinus americana* beginning to develop, fifth year—*Solidago* with *Ulmus americana* beginning to develop and usually with some *Aster* still present, sixth year—*Acer rubrum* is dominant, eighth to twenty-sixth years—*Liquidambar styraciflua* and occasionally *Acer rubrum* in large numbers, thirty-fourth year—*Liquidambar*, *Quercus*, and *Carya ovata*, and fortieth year—mixed mesophytic forest.

Factors relating to the development and germination of certain fungus sclerotia. C. L. PORTER and JACK G. THOMAS, Purdue University.—The importance of sclerotia in the life history of fungus pathogens has been discussed by many workers, but little attempt has been made by Mycologists to determine the details of their formation, the circumstances under which they may be formed, or the environmental conditions favorable to their germination and further development. Since it is assumed that many soil borne pathogens over-winter in the sclerotial stage it is of the greatest practical importance to know whether their formation might be delayed or prevented by appropriate cultural practices.

This investigation is an attempt to answer some of the questions concerning the circumstances attending sclerotial formation and germination.

New plant distribution records and collecting places of Parke and Fountain Counties, Indiana. FRANKLIN B. BUSER, University of Illinois.—The number of vascular plant species recorded for Parke County is 592 and for Fountain County 529, as listed by Deam in his *Flora of Indiana* and by subsequent issues of the *Indiana Plant Distribution Records*. Extensive collections, undertaken during the spring and summer of 1952, add considerably to these figures. For Parke County, 54 new county records are proposed and 146 for Fountain County. This brings the present totals for the two counties to 646 and 675 respectively. A specimen of each record has been deposited at Butler University. Such collecting places as the Silverwood "Swale," Covington Swamp and the Switzer Place in Fountain County, and the Casket Swamp and the Howard-West Union Road in Parke County are considered worthy of additional floristic attention.

A role for acetic acid in tomato fruit-set. A. C. LEOPOLD, FRANCES S. GUERNSEY, and RUBLE LANGSTON, Purdue University.—Studies of tomato fruit-set have been carried out using flowers of a self-sterile strain of John Baer tomatoes, excised and cultured on agar media. It has been found that acetic acid alone in the medium has little or no promotive effect on fruit-set. However, the addition of 10 ppm pantothenic acid results

in a large response to acetic acid (55-58%). This response is specific for acetic acid among the 8 acids tried, and is prevented by 10^{-4} M fluoroacetate. A liver concentrate rich in coenzyme A produces the same effect as pantothenic acid, and the simultaneous addition of the 4 known constituents of coenzyme A produces a larger response (73% set) than pantothenic acid alone. These observations plus a low assayable pantothenic acid content in tomato ovaries suggest that the entry of acetic acid into the tricarboxylic acid cycle can promote fruit-set, but such entry is normally limited due to limiting quantities of coenzyme A present.

The effect of nitrogen upon fruit abnormalities in the tomato. FRANCES SCOTT GUERNSEY and A. C. LEOPOLD, Purdue University.—Experiments were conducted varying the nitrogen level and the setting procedure in Michigan State Forcing tomatoes. The following effects on tomato fruit development under spring greenhouse conditions were found:

(1) The incidence and severity of puffiness was proportional to the nitrogen supply.

(2) PCA (parachlorophenoxyacetic acid) as a fruit-setting agent did not increase puffiness when sprayed on the front of the flower, except at excessive nitrogen levels.

(3) PCA sprayed on the back of the flower increased puffiness at every nitrogen level.

(4) Blossom-end rot, green locules, and white placentas were all most common at high nitrogen levels.

(5) Green locules and white placentas were almost entirely restricted to growth-regulator-set fruits. Blossom-end rot, however, was found with equal frequency regardless of the setting procedure followed.

A study of natural species—hybrids in the genus *Tragopogon*. DALE M. SMITH and A. T. GUARD, Purdue University.—Several locations were found in Tippecanoe County, Indiana, where the species *Tragopogon porrifolius* L., *T. pratensis* L., and *T. dubius* Scop. were found growing together. In each of these locations plants which were obviously hybrids between two of the species were found. The F_1 hybrid plants were almost completely sterile and there was little evidence of either back-crossed or F_2 plants.

Aneuploidy in *Claytonia virginica*. NORMAN V. ROTHWELL, Indiana University.—In the taxon, *Claytonia virginica*, the existence of at least nine different chromosome numbers has been established. The haploid numbers found so far form an aneuploid series as follows: $n = 8, 9, 11, 12, 14, 15, 16, 18,$ and 24 . It has not as yet been found possible to determine the chromosome number of any single plant by morphological examination.

Cytological examination suggests that the haploid number of eight is the basic one for the taxon and that the other numbers have arisen from it. That some of the extra chromosomes are homologous to those in the basic set of eight is indicated by the multivalent configurations which have been found in the $n = 9, 11, 12, 15, 16$ and 18 material. The $n = 16, 18,$ and 24 plants are believed to be autopolyploids of $n = 8, 9,$ and 12 .

Non-disjunction has been found in some $n = 8$ plants. Other $n = 8$ plants have been found in which one-to-four univalents lag at first anaphase. These laggards divide at first anaphase and give rise to some cells having more than eight chromosomes. In such a way $n = 9, 11,$ and 12 could arise from a basic set of eight.

The $n = 14$ and 15 plants are believed to have arisen from $n = 16$ and possibly also from $n = 18$ as a result of chromosome loss through non-disjunction.

A study of the relationship of pre-illumination, morphology and response in the slit pea test. JOSEPH M. RIEDHART and CARL A. LEOPOLD, Purdue University.—An investigation was made of the relationship of morphology, pre-illumination, and response in the slit pea test. Plants were grown in total darkness, others exposed to 1, 4, and 7 hours of red light per day from the time of planting to the time of harvesting. Macroscopic and microscopic observation were made. It was found that duration of pre-illumination affected plant height, color, leaf size, and sturdiness. And it was also found that duration of pre-illumination, while affecting cell length, did not affect initial negative curvature but will affect positive curvature. It appears that two factors are involved in this response-differential growth and differentiation. It was also found that the orientation of the vascular bundles will influence the degrees of curvature and the plane of curvature.

Preliminary report on the investigation of bud-break in woody plants of Porter County, Indiana. ROBERT J. KUSTER, Valparaiso University.—During the winter of 1951-52 an investigation was made concerning the time of bud-break on a number of woody plants found on the campus of Valparaiso University.

Twenty-three species were selected, healthy appearing twigs were gathered, brought into the laboratory and placed in test tubes containing tap water. Collections were made monthly from November through April, twig ends were re-cut and test tubes washed out every second week. Water was added as needed and records of observations were kept.

Many of the twigs died without outward evidence of response, some whose buds began to swell did not succeed in opening them. Of the 23 species examined, 8 gave very little or no response, 5 opened flower buds, 8 opened leaf buds and 2 showed both types.

Sugar maple, basswood, 2 species of pine, 2 of spruce, and 2 of buckeye responded very poorly. Ginkgo, silver and red maple, white ash, lilac, forsythia and privet responded consistently. With the latter group a decreasing lapse of time was noted month by month from the time of collection until bud-break. The actual elapsed time varied with the species and there seemed to be no correlation within a genus, some species being consistently later in this respect than others.

Ask the biologist. RICHARD R. ARMACOST, Purdue University.—To coordinate services to the schools, there has been established at Purdue a dual professor system whereby certain professors are members of both the School of Science and the Division of Education. These representatives of the University cooperatively and directly work with the high schools

of Indiana, providing various types of services and aids to high school science teachers and their students. A weekly, taped radio program "Ask the Biologist," is one of these services.

The Purdue University Department of Biological Sciences sponsors "Ask the Biologist" as a means of bringing, via radio or tape recordings, many members of its staff to the high schools of Indiana. This series consists mainly of question-answer broadcasts and interviews centered around biology topics of interest to high school students and their teachers. No speeches are given, and a valiant effort is made to present material in such a way that it is understandable, educational, and enjoyable.

The Purdue University Department of Biological Science feels that "Ask the Biologist" can be a means of contributing many fine ideas, and for that matter inspiration, to biology students and teachers of the Indiana high schools.

What is happening to the Indian varieties of corn? PAUL WEATHERWAX, Indiana University.—Information accumulated through many years of observation on agriculture in our Southwest indicates that community taboos against alien plants are breaking down, and this is having a profound effect on the primitive varieties of corn. One manifestation of this is the production of monstrous forms. From this can be drawn some conclusions as to the origin of midwest varieties.

Peculiarities in the embryology of *Tripsacum dactyloides*. LOIS FARQUHARSON, Indiana University.—The genus *Tripsacum* has long been of interest because of its close relationship with corn and the role which it may have played in the origin of the cultivated plant. Both diploid and tetraploid strains of *T. dactyloides* exist in the U. S., the latter type being found in southern Indiana. The embryology of the diploid plants is similar to that of corn. In the polyploid, however, twin embryos are frequent and triple embryos occur occasionally. These are usually located in one embryo sac although two embryo sacs have been observed in a few ovules. Apomixis undoubtedly occurs and embryos of over 100 cells are found although no endosperm is formed. Chromosome counts of twin plants are in progress.

Preliminary investigations in the cyto-genetics of some *Asters* in northern Indiana. ALBERT L. DELISLE, Notre Dame.—Investigations to determine the chromosome numbers of several species of wild *Asters* growing in northern Indiana were made. Applications of colchicine with a view to induce ploidy in these *Asters* were successful, so far, in only one species, *Aster novae-angliae* L.

As a result of reciprocal hybridization studies in *Aster novae-angliae* L., and *A. ericoides* L., it was noted that the maternal parent had a marked effect on the size of the resulting hybrid embryo. This effect of maternal inheritance on the size of the resulting hybrid embryo will be further investigated.

Hydrogen ion concentration in relation to absorption of water by *Poa pratensis* L. GORDON K. RASMUSSEN, Purdue University.—In this preliminary study five two-gram lots of seed were each soaked in unbuffered solutions, pH 3, 4, 5, 6, 7, 8, and buffered solutions of pH 4.8, 5.4,

6.0, 6.6, 7.2, and 7.8 for various periods. The greatest increases in weight occurred during the first twelve hours. The very greatest increase in weight occurred in the lot of seeds soaked in the unbuffered pH7 solution and amounted to 51.5 per cent. Of the seeds soaked in buffered solutions, those soaked in pH6.0 and pH7 solutions for twelve hours increased 49 per cent in weight. After the initial twelve hours there was a leveling off in the amount of water absorbed.

The change in pH of the unbuffered solutions was measured after each period of soaking. Each unbuffered solution changed to a pH 5.8-6.1 within 72 hours.

The same tests were run on merion bluegrass, a variety of *Poa pratensis*. Merion bluegrass absorbed more water (52-70%) in each period of time than did Kentucky bluegrass. The pH of the unbuffered solutions changed to 5.7-6.5 within the 72-hour period.

The use of the Verduin method for measuring the photosynthesis and respiration of aquatic plants. DON E. SEAMAN, Purdue University.—The rates of photosynthesis and respiration of aquatic plants are measured under near-natural conditions by a method involving the determination of CO₂ exchange through the use of pH and total alkalinity measurements. Results are expressed as micromoles of CO₂ either absorbed or evolved depending on the process being studied. The method is useful as a tool for research in aquatic plant physiology as well as in ecological studies. The results of some studies on phosphate fertilization and on depth of immersion are discussed to illustrate the use of the method in different types of studies and with various kinds of plant material.

The phylogenetic value of pollen morphology as illustrated by the Magnoliaceae. JAMES E. CANRIGHT, Indiana University.—During the course of a comparative morphological survey of the Magnoliaceae (*sensu stricto*), pollen of 50 species was investigated. In all cases, the pollen grains were found to be more or less ellipsoidal and monocolpate, i.e., with a single longitudinal germinal furrow. The sculpturing of the exine is minute to non-existent in most cases, therefore positive identification of species and even genera in this family from pollen samples is usually unreliable. The verrucosely-sculptured exine of pollen grains of *Liriodendron*, incidentally one of the most specialized genera in this family, provides the only significant exception to this rule. Although size measurements of pollen revealed that this family contains both among the largest and the smallest grains recorded for the angiosperms, attempted correlation of pollen size with degrees of polyploidy gave inconclusive results. In the few specimens where coherent tetrads were seen, it was discovered that not only were the tetrads of the comparatively uncommon tetragonal type, but also that the germinal furrow is distal in position. This discovery lends further support to the pollen phylogeny postulated by Wodehouse. It is significant that pollen grains of the medullosan seed ferns, Cordaitales, Bennettitales, Cycadales, and Ginkgoales are all of the monocolpate type. Among dicotyledons, only certain families in the ranalean complex (which includes the Magnoliaceae) are characterized by the retention of this ancestral type of pollen; all other dicots possess the more specialized tricolpate or derived types of pollen.

Work at the Mont Tremblant Biological Station, Quebec. J. E. POTZGER and ROBERT LIPSCOMB, Butler University, Indianapolis.—In March, 1952, Professor Albert Courtemanche, Director of the Biological Station, requested the senior author to spend all or part of last summer as guest member of the Station's science team, to make pollen analyses of bogs in the Laurentian Shield, where the Station is located on Lake Monroe. The Biological Station is only three years in operation but it radiates the stimulating enthusiasm of youth. It is very obvious to a visitor that the scientists and government officials of Quebec are intensely interested in the scientific facts underlying the wealth of Canada's biological inheritances. Their enthusiasm is, indeed, very stimulating. The work is being pushed by such leaders as Dr. Gustave Prevost, Director Quebec Biological Bureau, and Albert Courtemanche, Director of the Biological Station. The station sponsors some phases of applied science but especially the pure sciences, such as pollen analyses, regional study of dragonflies, desmids, and others. Use of plane to locate suitable bogs and the Bendix Depth Finder employed to determine contour as well as depths of lake basins were ultra-modern aids to a pollen analyst. The junior author aided in the field and laboratory work and served as chief photographer on the trips. The history of Quebec forests is very complex, and it seems to reflect the influence of the post-glacial history of the St. Lawrence valley.

Opportunities in the Indiana flora. CHARLES B. HEISER, JR., Indiana University.—Through the efforts of Charles C. Deam and other botanists in the state, Indiana has a flora that is exceedingly well known. As a result of this work the Indiana flora offers excellent opportunities for the study of taxonomic problems connected with variation and hybridization. These problems can be approached through the detailed analysis of natural populations by means of mass collections, through studies of chromosome number, and whenever possible through actual cultivation of plants and hybridization studies. Such approaches have already proved rewarding as shown by Charlotte Avers' study of *Aster*, Norman Rothwell's study of *Claytonia virginica*, and Robert Long's and Dale Smith's investigation of the perennial *Helianthi* of Indiana. In connection with the cytological studies it might prove feasible to develop an atlas of the chromosome numbers of Indiana plants.

Variation in *Heliopsis*. T. RICHARD FISHER, Indiana University.—There has been considerable confusion in regard to the taxonomic status of *Heliopsis helianthoides* (L.) Sweet and *H. scabra* Dunal. The former taxon in its purest form centers around Virginia, West Virginia, and Pennsylvania, whereas the latter centers in the area of North and South Dakota, Nebraska, and Minnesota. Seven characters have been chosen for study and they reveal a gradual intergradation from one geographic range to the other. The range of intermediate forms seems to extend over an area of several hundreds of miles. The artificial hybrid between the two taxons has been produced and is fully fertile. In view of these facts it seems best to regard these two taxons as subspecies as has been done by Fernald in his treatment for Gray's Manual (1950).

The cultivated *Gaillardia*. WARREN P. STOUTAMIRE, Indiana University.—*Gaillardia pulchella*, an annual native of Texas, Louisiana, and states to the west, and *G. aristata*, a native perennial of the northwest section of the United States, have been grown in European gardens since the early nineteenth century. About 1856, a hybrid arose spontaneously in a French garden which was probably a tetraploid (*G. grandiflora*). At least six named varieties of *G. pulchella* and 15 of *G. grandiflora* are carried at present by nurseries here and in Europe. Experience in Bloomington shows that the tetraploid varieties are very variable and many named forms are not distinct.

The diploid forms of *G. pulchella* have escaped from cultivation into sandy areas along the Atlantic Coast from Virginia to Florida. Tetraploid *G. grandiflora* has also been found growing wild twice along railroad tracks in Indiana. Both species may persist as ruderal weeds.

Gaillardia pulchella has been treated with colchicine to produce auto-tetraploids and this species has also been crossed with *G. grandiflora* to produce triploids. Experiments are under way in an attempt to recreate *G. grandiflora* through crossing of *G. pulchella* and *G. aristata*.

The Characeae of Indiana. FAY KENOYER DAILY, Butler University.—About 500 specimens of the Characeae collected from 56 counties in Indiana were studied. Previously reported specimens extant as well as many other collections were obtained and found to represent 19 species. A distributional study, key descriptions, illustrations, and citation of specimens have been prepared. (To be published in the Butler University Botanical Studies, 1953.)