

# The Characeae of Indiana - A Preliminary Report

Fay Kenoyer Daily

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**Butler University**  
**Botanical Studies**  
(1929-1964)

*Edited by*

**Ray C. Friesner**

The *Butler University Botanical Studies* journal was published by the Botany Department of Butler University, Indianapolis, Indiana, from 1929 to 1964. The scientific journal featured original papers primarily on plant ecology, taxonomy, and microbiology. The papers contain valuable historical studies, especially floristic surveys that document Indiana's vegetation in past decades. Authors were Butler faculty, current and former master's degree students and undergraduates, and other Indiana botanists. The journal was started by Stanley Cain, noted conservation biologist, and edited through most of its years of production by Ray C. Friesner, Butler's first botanist and founder of the department in 1919. The journal was distributed to learned societies and libraries through exchange.

During the years of the journal's publication, the Butler University Botany Department had an active program of research and student training. 201 bachelor's degrees and 75 master's degrees in Botany were conferred during this period. Thirty-five of these graduates went on to earn doctorates at other institutions.

The Botany Department attracted many notable faculty members and students. Distinguished faculty, in addition to Cain and Friesner, included John E. Potzger, a forest ecologist and palynologist, Willard Nelson Clute, co-founder of the American Fern Society, Marion T. Hall, former director of the Morton Arboretum, C. Mervin Palmer, Rex Webster, and John Pelton. Some of the former undergraduate and master's students who made active contributions to the fields of botany and ecology include Dwight W. Billings, Fay Kenoyer Daily, William A. Daily, Rexford Daudenmire, Francis Hueber, Frank McCormick, Scott McCoy, Robert Petty, Potzger, Helene Starcs, and Theodore Sperry. Cain, Daubenmire, Potzger, and Billings served as Presidents of the Ecological Society of America.

Requests for use of materials, especially figures and tables for use in ecology text books, from the *Butler University Botanical Studies* continue to be granted. For more information, visit [www.butler.edu/herbarium](http://www.butler.edu/herbarium).

# THE CHARACEAE OF INDIANA—A PRELIMINARY REPORT\*

By FAY KENOYER DAILY  
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It has been demonstrated by others that the study of algae of Indiana in general has been neglected. In 1929 in an introduction to a classified check list of the algae of Indiana, Dr. C. M. Palmer (5) remarked, "Few papers have been published giving the names of the algae of Indiana." Also in 1932 after giving a phycological history of Indiana, Dr. B. H. Smith (7) observed, "This review of literature shows very clearly the meager amount of work which has been done on the algae in the state since the beginning fifty-five years ago." These statements are especially true of the Characeae, during the study of which group Dr. B. W. Everman and H. W. Clark (3) noted, "Indeed there have been so few workers in the field and relatively little material collected over the country generally that classification is exceedingly difficult." This statement was made almost twenty-five years ago, but the same condition still exists.

Recently a study of the Characeae of Nebraska was made by Dr. Walter Kiener (4) and the author (2). Dr. Kiener made an important contribution in collecting many new specimens from that state, and he also made available herbarium specimens located at the University of Nebraska. After a study of the available material, a key and descriptions were published. An attempt is now being made by the author to make a similar taxonomic study of the Characeae of Indiana. One hundred and ten specimens have been assembled and identified, but it is desirable to have considerably more before attempting to prepare a key and descriptions. Since there is a wide divergence in form with many intermediates within some species of the Characeae, and since the division of these species complexes into new species, varieties and forms seems to have caused a great deal of confusion in the past, the present paper uses only the species complex name in such instances. Further division may be made at a later date if deemed justifiable in the light of future study.

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\* A contribution in recognition of the 25th Anniversary of the Botany Department of Butler University.

The three-fold purpose of this paper, then, is to report the data concerning collections made in Indiana which have not already been published; to make an appeal for any specimens of the Characeae now extant; and to stimulate the collection of new material.

Concerning the latter, it might be well to make a few comments upon collection of this group. The plants are generally found in ponds and lakes or sluggishly flowing streams. They are usually growing in less than ten feet of water and quite often are about the edge of the water upon the moist soil of the shore. The whole plant should be obtained if it can be reached from the shore or by wading. This includes the rhizoidal portion which must be obtained by digging it out of the mud. This is not always possible, however, because some of the plants may be reached only by use of a "Chara rake" similar to the one recommended by Nordstedt (in Allen, 1). After collection, the material should be washed gently to free it from debris, and should be laid out on paper to dry. Crowding should be avoided when arranging the collection as some of the more brittle forms are crushed by grinding of stem against stem if they are overlapped a great deal. Specimens may be dried by first pressing the material lightly for a short time to somewhat flatten the mount and then storing in a warm, airy place to dry rapidly. However, they may be placed in a drier, used for the flowering plants if too much pressure is not applied to cause collapse of the cortex in the corticated forms. The Nitelleae are best prepared by floating out the more delicate forms on suitable paper and covering with cotton cloth or wax paper. To speed drying, when using the latter, all excess moisture should be removed by blotting lightly.

If it were more convenient for the collector, any of the usual laboratory reagents for preserving the algae, such as two per cent formalin, etc., could be used. However, one disadvantage of this method is that usually one can only make small collections. The color and natural appearance of such collections are also impaired, making the material less desirable for herbarium mounts when finally dried. The chief advantage of this method is that tissue is preserved in a more natural state for microscopic examination. If too much pressure and heat are avoided in the former method, however, it is preferred as the tissue will resume its normal condition when soaked in water or vinegar or any other suitable dilute acid usually used in removing the lime on incrustated forms.

In reporting the new collections below, the herbaria in which they may be found are indicated as follows:—BU, Butler University; CM, Chicago Natural History Museum; IU, Indiana University; DU, DePauw University. (Duplicates of some collections are available for further distribution.)

When specimens are listed as "probably" *C. contraria*, etc., this means that the condition of the material is such that complete observations were impossible. However, enough characteristics have been observed to be reasonably sure of the identification.

The author wishes to acknowledge the aid of Dr. Ray C. Friesner for making available the facilities of the Butler University Botany Department; Dr. Francis Drouet of the Chicago Natural History Museum, Dr. Charles C. Deam of Bluffton, Indiana, Dr. Winona H. Welch of DePauw University, Dr. Naomi Mullendore of Franklin College, and Miss Rosalie Weikert of the New York Botanical Garden for the loan or gift of specimens; Dr. C Mervin Palmer, Dr. John E. Potzger, and Mr. William A. Daily, all of Butler University, for many kindnesses rendered.

## NITELLA

*Nitella flexilis* Ag. MARION COUNTY: Fall Creek Water Works, Indianapolis, *C. M. Palmer Id. 18*, Apr. 26, 1931 (BU); probably *N. flexilis*, in a large pond near Keystone av. and Fall creek, Indianapolis, *W. A. Daily*, Mar. 15, 1941 (CM, BU), *W. A. Daily, F. K. Daily, F. Drouet, E. R. Hupp, C. M. Palmer 929*, Aug. 16, 1942 (CM, BU), *W. A. & F. K. Daily 40* Oct. 25, 1942 (BU). STEUBEN COUNTY: Margin of Lake James, *W. H. Welch*, July 18, 1935 (DU, BU).

*Nitella opaca* Ag. WAYNE COUNTY: Drainage ditch (by N. S. road), Elliott's Mills Bog south of Richmond, *L. J. King 384*, May 11, 1941 (CM, BU).

## CHARA

*Chara aspera* Willd. (Nearest var. *Macounii* Allen or *Chara Macounii* Allen as Robinson, 6, considered it). KOSCIUSKO COUNTY: Abundant in Beaver Dam lake, *W. A. Daily 79*, June 10, 1939 (CM, BU).

*Chara Brittonii* Allen. (As nearly as it has been possible to determine, this species has been known until the present only from the type specimen.) LA PORTE COUNTY: In standing water forming a "mat" on the surface, Mill Creek Bog, Mill Creek, *W. A. Daily 89*,

July 22, 1939 (BU). RANDOLPH COUNTY: Raised bog along Highway 1 where it crosses Cabin creek 6.3 mi. north of Modoc, in water from second artesian well, *J. E. Potzger*, July 22, 1944 (BU), *R. C. Friesner, J. E. Potzger, W. A. & F. K. Daily* 48, Sept. 2, 1944 (BU).

*Chara contraria* A. Br. BARTHOLOMEW COUNTY: Probably *C. contraria* in ponds near overpass on Highway 31, north of Columbus, *W. A. & F. K. Daily* 32, Oct. 11, 1942 (BU). CASS COUNTY: Quarry west of Logansport on U. S. Highway 24, *W. A. & F. K. Daily* 39, Sept. 10, 1942 (BU). DEKALB COUNTY: In Indian lake, sec. 29, 2 mi. west of Corunna, *C. C. Deam* 52272, July 13, 1932 (IU, BU). ELKHART COUNTY: Probably immature *C. contraria*, St. Joseph river near Bristol, *C. C. Deam* 55184, July 18, 1934 (IU, BU). FULTON COUNTY: Probably *C. contraria*, abundant in 6 ft. of water, Lake Manitou, *C. C. Deam* 56495, Aug. 8, 1935 (IU, BU). HANCOCK COUNTY: Drainage ditch in Carlisle muck area 2 mi. north and 1.5 mi. east of Eden, *R. C. Friesner* 18600, Aug. 5, 1944 (BU). JASPER COUNTY: Common in old channel of the Kankakee river north of Tefft, *C. C. Deam* 42227, Aug. 19, 1925 (IU, BU). JOHNSON COUNTY: *N. Mullendore*, July 12, 1937 (BU). KOSCIUSKO COUNTY: In 3 feet of water in outlet of Tippecanoe lake, *C. C. Deam* 49265, in 2½ ft. of water, *C. C. Deam* 49276, July 24, 1930 (IU, BU); in 1½ ft. of water in the Tippecanoe river at the outlet of Tippecanoe lake, *C. C. Deam* 49283, July 24, 1930 (IU, BU); Big Tippecanoe lake, Oswego, *W. H. Welch* 2096, July 20, 1935 (DU); not abundant, Loon lake adjoining Silver Lake Bog, Silver Lake, *W. A. Daily* 78, June 10, 1939 (CM, BU). LAGRANGE COUNTY: In ditch beside tamarack swamp and road, very abundant, on Road 20 about 7 mi. west of county line, *C. M. Palmer B* 1028, July 29, 1933 (BU). LAKE COUNTY: Slough at Pine, *O. E. Lansing Jr.* 1718, June 4, 1903 (CM); in drainage ditch along U. S. Highway 12 near boundary of Lake county and Porter county, *D. Richards* 190, July 14, 1939 (CM). MARION COUNTY: Aquarium in Conservatory of Jordan Hall, Butler University, Indianapolis, *C. M. Palmer Id.* 146, Aug. 1930 (BU); probably *C. contraria*, Ind. State Fish Hatchery, Indianapolis, *C. M. Palmer Id.* 78, Aug. 4, 1931 (BU); swampy pool north of Broad Ripple and just east of interurban tracks and College av., south of White river, *C. M. & S. M. Palmer B* 147, Oct. 18, 1934 (BU); in large pond near Fall creek at Keystone av., Indianapolis, *W. A. & F. K. Daily, F. Drouet, E. R. Hupp, & C. M. Palmer* 930, Aug. 1942 (BU); ponds at Keystone and Fall creek, Indianapolis, *F. Drouet*,

*C. M. Palmer, E. R. Hupp, W. A. & F. K. Daily* 41, 42, Aug. 15, 1942 (BU); Emerald pool, John Holliday Park, Indianapolis, *C. T. Kenoyer, W. A. & F. K. Daily* 1, Sept. 27, 1942 (BU); Trout pool, John Holliday Park, Indianapolis, *C. T. Kenoyer, W. A. & F. K. Daily* 2, Sept. 27, 1942 (BU); in ponds at Keystone av. and Fall creek, Indianapolis, *W. A. & F. K. Daily* 18, Oct. 25, 1942 (BU); second pool at Goodman's Estate in Crow's Nest, Indianapolis, *H. T. Smolenski, W. A. & F. K. Daily* 3, Aug. 21, 1943 (BU); bridge pool, Goodman's Estate in Crow's Nest, Indianapolis, *H. T. Smolenski, W. A. & F. K. Daily* 4, Aug. 21, 1943 (BU); Trout pool, Goodman's Estate in Crow's Nest, Indianapolis, *H. T. Smolenski, W. A. & F. K. Daily* 6, Aug. 21, 1943 (BU); in pond at Marian College, Indianapolis, *C. T. Kenoyer, W. A. & F. K. Daily* 29, Oct. 17, 1943 (BU); at bridge over White river north of Broad Ripple on State Road 431 at city limit, the American Aggregate Gravel Pit, *W. A. & F. K. Daily* 27, May 1, 1944 (BU); Seventy-third st. near Keystone av., Indianapolis, old gravel pit pond near road at Builder's Sand & Gravel Co., *W. A. & F. K. Daily* 19, July 9, 1944 (BU). MARSHALL COUNTY: East side of Lake of the Woods, *C. C. Deam* 49255, July 23, 1930 (IU, BU). NOBLE COUNTY: With *C. fragilis*, shallow water east side of Bear lake, *C. C. Deam* 47576, Aug. 7, 1929 (IU, BU); in shallow water in Bear lake, *C. C. Deam* 49385, Aug. 14, 1930 (IU, BU). PORTER COUNTY: Shallow slough at Dune Park, *A. Chase*, Sept. 1, 1902 (CM); in dredge ditch 1 mi. south of Hebron, *C. C. Deam* 42270, Aug. 20, 1925 (IU, BU). PUTNAM COUNTY: Along Raccoon creek in stagnant pool, *E. J. Grimes* 802, Sept. 10, 1911 (DU). RANDOLPH COUNTY: Probably *C. contraria*, first artesian well in bog 6.3 mi. north of Modoc south of Cabin creek, *R. C. Friesner, J. E. Potzger, W. A. & F. K. Daily* 43, Sept. 2, 1944 (BU). SHELBY COUNTY: In gravel pit at Shelbyville, *F. K. & W. A. Daily* 888, Aug. 31, 1941 (CM, BU); Burnside Gravel Pit at Shelbyville, *W. A. & F. K. Daily* 38, Oct. 11, 1942 (BU), 25, Oct. 3, 1943 (BU). STEUBEN COUNTY: In outlet of Crooked lake, *C. C. Deam*, June 17, 1903 (DU, BU); in ditch about  $\frac{1}{4}$  mi. east of Hogback lake, *C. C. Deam* 1258, July 24, 1906 (DU, BU); probably *C. contraria* at edge of Reed lake about  $1\frac{1}{2}$  mi. northwest of Reed Lake, *C. C. Deam* 14381, July 5, 1914 (DU, BU); shallow water near bank of Bass lake, *C. M. Palmer B* 1008, July 28, 1933 (BU); sandy north shore of Fox lake,  $1\frac{1}{2}$  mi. southwest of Angola, *C. M. Palmer B* 1017, July 28, 1933 (BU); probably *C. contraria* attached and floating at edge of Failing lake



north of Angola, *C. M. Palmer B 1020, B 1021, B 1024*, July 28, 1933 (BU); with *C. fragilis* at bottom in 8 in. of water along margin of Crooked lake, *C. M. Palmer 1190*, Sept. 30, 1933 (BU); in 6 ft. of water in Hamilton lake at Hamilton, *C. C. Deam 56684*, Aug. 20, 1935 (IU, BU). WAYNE COUNTY: In shallow and deeper water at edge of Lake Wehi, *W. A. & F. K. Daily 16*, July 16, 1944 (BU); in small stream in shallow sluggish water, 5 mi. north of Hagerstown, 0.3 mi. along Road 1 from junction with 35, *R. C. Friesner, J. E. Potzger, W. A. & F. K. Daily 56*, Sept. 2, 1944 (BU). WHITLEY COUNTY: Probably *C. contraria* submerged in water at northeast border of Shriner lake, *C. C. Deam 14575*, Aug. 24, 1914 (DU, BU); Loon lake, *C. C. Deam 49403*, Aug. 14, 1930 (IU, BU); in old lake, *C. C. Deam 49427 B*, Aug. 14, 1930 (IU, BU).

*Chara coronata* Ziz. MARTIN COUNTY: In creek near Indian Springs, *C. C. Deam 43493*, July 23, 1926 (IU, BU). PORTER COUNTY: With *C. contraria*, shallow slough, Dune Park, *A. Chase*, Sept. 1, 1902 (CM, BU); shallow slough, Dune Park, *A. Chase 1984*, Sept. 1, 1902 (CM, BU).

*Chara foetida* A. Br. CARROLL COUNTY: 5½ mi. south of Norway Dam on east bluff fed by springs, *W. A. Daily 12*, July 28, 1938 (BU). KOSCIUSKO COUNTY: In ditch in gravel pit north of Winona, *C. C. Deam 1497*, Aug. 17, 1906 (DU, BU). LAGRANGE COUNTY: In gravel pit along Pigeon river about 3 mi. southeast of Mongo, *E. B. Williamson*, Oct. 21, 1928 (IU, BU); at edge of Pigeon river pool above and below water level, *C. M. Palmer B 56*, Oct. 1, 1933 (BU). LAKE COUNTY: Wolf lake near Hammond, *N. Mullendore J23*, 1923. RANDOLPH COUNTY: Growing on wet peat near top of elevated bog on south side of Cabin creek at junction with Road 1, 6.3 mi. north of Modoc, *R. C. Friesner 18501*, July 22, 1944 (BU); from first artesian well in bog 6.3 mi. north of Modoc south of Cabin creek, *R. C. Friesner, J. E. Potzger, W. A. & F. K. Daily 45, 46*, Sept. 2, 1944 (BU). ST. JOSEPH COUNTY: On mud bottom of spring near St. Joseph river south of St. Mary's College, Holy Cross, *D. Parker, E. M. Reed, D. Richards, and J. C. Strickland 583*, May 11, 1940 (CM, BU). TIPPECANOE COUNTY: Near mouth of Tippecanoe river at Hog Point, *C. C. Deam 17710*, July 20, 1915 (DU, BU). WAYNE COUNTY: In small stream in shallow sluggish water 5 mi. north of Hagerstown, 0.3 mi. along Rd. 1 from junction with 35, *R. C. Friesner, J. E. Potzger, W. A. & F. K. Daily 55*, Sept. 2, 1944 (BU).

*Chara fragilis* Desv. BARTHOLOMEW COUNTY: In ponds near

overpass on Highway 31 north of Columbus, *C. T. Kenoyer, W. A. & F. K. Daily* 22, Sept. 19, 1943 (BU); probably *C. fragilis*, ponds near overpass on Highway 31 north of Columbus, *C. T. Kenoyer, W. A. & F. K. Daily* 26, Sept. 19, 1943. DECATUR COUNTY: In water at edge of Lake McCoy, *W. A. & F. K. Daily* 28, 36, Oct. 11, 1942 (BU). HAMILTON COUNTY: Fox Prairie Bog, *R. Prettyman*, June 19, 1937 (BU). MARION COUNTY: Small stream on Road 52, southeast part of county, *C. M. Palmer Id. 130*, June 25, 1932 (BU); driveway pool at Goodman's Estate in Crow's Nest, Indianapolis, *H. T. Smolenski, W. A. & F. K. Daily* 5, Aug. 21, 1943 (BU). NOBLE COUNTY: Shallow water east side of Bear lake, *C. C. Deam 47576*, Aug. 7, 1929 (IU, BU). SHELBY COUNTY: Burnside Gravel Pit, Shelbyville, *W. A. & F. K. Daily* 24, Oct. 3, 1943 (BU). STEUBEN COUNTY: At bottom in 8 inches of water along lake margin, Crooked lake, *C. M. Palmer 1190*, Sept. 30, 1933 (BU); probably *C. fragilis* at lake margin not attached, Lake James, *C. M. Palmer B 29*, Sept. 30, 1933 (BU). UNION COUNTY: In about 6 ft. of water in old abandoned gravel pit, Robert's Pond, near Liberty, *A. & I. Ehlers* with *W. A. & F. K. Daily* 17, July 15, 1944 (BU). WAYNE COUNTY: In shallow water at edge of Lake Wehi, *W. A. & F. K. Daily* 15, July 16, 1944 (BU); with *C. contraria*, in shallow and deeper water at edge of Lake Wehi, *W. A. & F. K. Daily* 16, July 16, 1944 (BU).

*Chara gymnopitys* A. Br. CASS COUNTY: Moist soil and in water at edge of Lake Cicott, *W. A. & F. K. Daily* 7, 10, Sept. 9, 1942 (BU). LAKE COUNTY: Moist sandy soil of slough at Miller's near Lake Michigan, *C. C. Deam 21271*, Aug. 26, 1916 (DU, BU). LA PORTE COUNTY: Upon soil at the edge of water, Mill Creek Bog, Mill Creek, *W. A. Daily* 90, July 22, 1939 (BU). MORGAN COUNTY: In shallow water at pool's edge at Jewel lake at Bethany Park near Martinsville, *W. A. & F. K. Daily* 37, Sept. 20, 1942 (BU).

*Chara gymnopus* A. Br. BARTHOLOMEW COUNTY: In pond north of Columbus near overpass on Highway 31, *W. A. & F. K. Daily* 33, Oct. 11, 1942 (BU); in water trickling through grass near overpass on Highway 31 north of Columbus, *W. A. & F. K. Daily* 35, Oct. 11, 1942 (BU); ponds near overpass on Highway 31 north of Columbus, *C. T. Kenoyer, W. A. & F. K. Daily* 20, 23, Sept. 19, 1943 (BU). CASS COUNTY: In water at edge, Lake Cicott, *W. A. & F. K. Daily* 12, Sept. 9, 1942 (BU). JEFFERSON COUNTY: In pond along railway just north of North Madison, *C. C. Deam 56483*, Aug. 3, 1935 (IU, BU). LAKE COUNTY: In shallow water of Calumet river among

sand dunes north of Miller Station, *P. D. Voth & F. Drouet 2362*, Sept. 28, 1938 (CM). NOBLE COUNTY: In 2 ft. of water in Elkhart river just below Jones lake and just before Wallen lake, *students of Will Scott (C. C. Deam 6)*, Aug. 25, 1930 (IU, BU). WHITLEY COUNTY: In old lake, *C. C. Deam 49427 A*, Aug. 14, 1930 (IU, BU).

*Chara hydrophytes* Reich. LAKE COUNTY: Shallow sloughs, Pine, *E. I. Hill 141/1882*, Sept. 16, 1882 (CM). PORTER COUNTY: Shallow slough at Dune Park, *A. Chasc 1983*, Sept. 1, 1902 (CM). WAYNE COUNTY: In shallow water of Lake Wehi, near German town, *W. A. & F. K. Daily 14*, July 16, 1944 (BU).

*Chara sejuncta* A. Br. PORTER COUNTY: Calumet river, Forsyth, *E. J. Hill 197/1880*, Sept. 18, 1880 (CM). SPENCER COUNTY: Artificial pond at Lincoln City, *C. C. Deam 22343*, Oct. 11, 1916 (IU, BU). STEUBEN COUNTY: In the outlet of Crooked lake, *C. C. Deam 20924*, Aug. 19, 1916 (IU, BU). SULLIVAN COUNTY: In old coal strip mine at margin of the water 5 mi. south of Sullivan, *C. M. Palmer B 25*, Sept. 7, 1933 (BU).

*Chara verrucosa* Itzig. NOBLE COUNTY: With *C. contraria* in shallow water in Bear lake, *C. C. Deam 49385*, Aug 14, 1930 (IU, BU).

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