

## Some Algae From Lake Carl Blackwell, Oklahoma

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Since monographic and floristic studies consulted do not report species of algae from Lake Carl Blackwell, a survey of the algal flora of this lake was undertaken in partial fulfillment of the requirements for a Master's Degree at Oklahoma State University under the direction of Dr. Arthur G. Carroll whose encouragement and aid are gratefully acknowledged. The temperature and pH of the water at various collecting stations was measured. Included is a list of the algae found, with three species thought to be new records for the state.

The determination of the various taxa was carried out by the use of available monographic treatments whenever possible. Handbooks and manuals concerning the algae were used for taxa on which monographs were not available. Representatives of the determinations are deposited at the Oklahoma State University. In a few instances, where poor specimen preservation was apt to occur, photomicrographs are deposited in lieu of specimens. Semi-permanent slides were made for selected specimens, (Prescott, 1954).

In most cases the material was preserved immediately upon returning from the field. Some collections were not preserved and were periodically examined for the production of sexual or asexual reproductive structures which would permit species determination. The inclusion, in the taxonomic list, of a generic determination was the result of not having adequate reproductive structures.

Ten collecting stations were selected to represent different habitats, to which seventeen collecting trips were taken during one year with the procurement of 414 vials of material. Dates of the trips were: June 29, July 13, July 28, August 12, August 26, September 8, September 22, October 6, October 19, November 9, and December 9, 1963, January 25, February 29, April 3, May 14, June 6, and June 25, 1964.

Plankton samples were obtained by using a tow net constructed of number 20 bolting silk cloth. Littoral collections were made by wading into the water and scraping rocks, stems and leaves of aquatic spermatophytes, and other submerged objects.

Vinyard (1958) presented a compendium of the algal flora of the state based on his own collections plus those of previous investigators. This report also included notes on the geochemistry of habitats in which his collections were made. He reported a total algal flora of 764 species, varieties and forms, exclusive of the diatoms. Maloney (1944) and Leake (1945) listed a total of 79 species and varieties of diatoms. If this number is added to that given by Vinyard, the number of algae known from the state is 843.

Lake Carl Blackwell is located in Payne County, Oklahoma, nine miles northwest of Stillwater. The impoundment was formed by the construction of a dam across Stillwater Creek. The dam was completed in 1937 and the basin was completely filled with water in 1945. The basin covers an area of about 3200 acres and has many shallow arms which present a shore line of about 100 miles. The drainage area is about 14 times the size of the lake surface. The long axis of the lake lies east and west which is at right angles to the prevailing wind from the south.

The lake is located in the Redbeds Plains physiographic region as described by Bruner (1931). The soils of the region are fine and were derived from the Permian clays and shale. Locally the region is one of rolling hills with alternations of prairie and wooded areas.

During the course of this study 33 species, varieties, and forms in 24 genera representing 18 families of algae were recognized as occurring in Lake Carl Blackwell. The largest family was the Zygnemataceae with five species, followed by the Desmidiaceae, Hydrodictyaceae, and Oscillatoriaceae with four representatives each.

Three species of algae were found in Lake Carl Blackwell that are thought not to have been previously reported as occurring in Oklahoma, since they are not listed by Vinyard (1958). These are: *Anabaena affinis* Lemm., *Gloetrichia natans* (Hedw.) Rab., and *Oscillatoria nigra* Vaucher.

*Anabaena affinis* Lemm. was collected on June 6, 1964. It occurred very abundantly in the surface water along with *Botryococcus Braunii* and *Microcystis aeruginosa*.

*Gloetrichia natans* (Hedw.) was collected from July until September 1963. Many large colonies (up to 2.5 cm in diameter) were found along the margin of the lake.

*Oscillatoria nigra* Vaucher, was collected on October 6 and 19. The trichomes were found growing on the muddy bottom and aggregated to form a dark-green mass.

The recorded seasonal range of the temperature of the surface water at the various collecting stations was 4 C in January to 33 C in July, August, and September. The pH of the water at the stations was consistently alkaline, pH 7.6 to 8.8.

#### TAXONOMIC LIST

Those species preceded by an asterisk are thought to be new records for Oklahoma. The number following each name in the list refers to the author's collection number of the representative specimen on deposit at the Oklahoma State University.

#### CHLOROPHYTA

##### VOLVOCACEAE

*Eudorina elegans* Ehr. — 16

*Pandorina morum* (Muell.) Bory — 30

##### PALMELLACEAE

*Gleocystis gigas* (Kuetz.) Lagerheim — 23

##### CHAETOPHORACEAE

*Aphanochaete repens* A. Braun — 32

##### PROTOCOCCACEAE

*Protococcus viridis* Agardh — 6

##### CLADOPHORACEAE

*Cladophora aegagropila* Kuetzing — 4

##### OEDOGONIACEAE

*Bulbochaete* sp. — 20

##### HYDRODICTYACEAE

*Pediastrum duplex* Meyen var. *duplex* — 34

*Pediastrum duplex* Meyen var. *gracilium* West & West — 13

*Pediastrum duplex* Meyen var. *reticulatum* Lagerheim — 14

*Pediastrum simplex* (Meyen) Lemm. var. *duodenarium* (Bailey) Raben. — 12

COELASTRACEAE

*Coelastrum reticulatum* (Dang.) Senn — 22

BOTRYOCOCCACEAE

*Botryococcus Braunii* Kuetzing — 28

OOCYSTACEAE

*Planktosphaeria gelatinosa* G. M. Smith — 15

ZYGNEMATACEAE

*Spirogyra fluviatilis* Hilse — 8  
*Spirogyra majuscula* Kuetzing — 29  
*Spirogyra neglecta* (Hassall) Kuetzing — 9  
*Spirogyra reticulata* Nordstedt — 5  
*Spirogyra setiformis* (Roth) Kuetzing — 3

DESMIDIACEAE

*Closterium gracile* DeBreb. var. *elongatum* West & West 33  
*Closterium moniliferum* (Bory) Ehr. — 7  
*Cosmarium subcrenatum* Hantzsch. — 21  
*Staurostrum chaetoceras* (Schroder) G. M. Smith — 19

CHARACEAE

*Chara Zeylanica* Willdenow forma *Michauxii* (Braun) H. & J. Groves — 2

PYRROPHYTA

CERATIACEAE

*Ceratium hirundinella* (Muell.) Dujardin — 11

CYANOPHYTA

CHROOCOCCACEAE

*Microcystis aeruginosa* Kuetzing emend. Elenkin — 31

OSCILLATORIACEAE

*Oscillatoria limosa* (Roth) Agardh — 26  
*\*Oscillatoria nigra* Vaucher — 10  
*Oscillatoria princeps* Vaucher — 24  
*Spirulina major* Kuetzing — 17

NOSTOCACEAE

*\*Anabaena affinis* Lemm. — 27  
*Aphanizomenon flos-aquae* (L.) Ralfs — 25

RIVULARIACEAE

*\*Gloeotrichia natans* (Hedw.) Raben. — 1

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