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Preliminary Survey of the Algae of Lake Ahquabi

Donald G. DeLisle

Dennis H. Takahashi

Steve W. Weeber

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This important principle for use in purification of the inhibitor was made possible because of the capacity of the bacterial assay to detect very small quantities of the inhibitor on paper chromatograms. The inhibitor, as located by bacterial assay, and the Tollen's reagent for reducing groups were found at the same position on the chromatograms for all solvents used. The identical location of the Tollen's positive material and the microbiologically active component lends support to a similar relationship proposed by Farley (1) for the Tollen's sensitive substances and chick activity; the two relationships considered together provided support for the belief that the inhibitors for *B. polymyxa* and the chick are the same.

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Preliminary Survey of the Algae of Lake Ahquabi

DONALD G. DELISLE, DENNIS H. TAKAHASHI
AND STEVE W. WEEBER

Abstract: Forty-one genera of algae are reported from Lake Ahquabi, Warren County, Iowa. The most commonly occurring genera are *Cladophora*, *Spirogyra*, *Hydrodictyon*, *Microcystis*, *Oscillatoria* and *Aphanizomenon*. The latter three contribute to extensive blooms on the lake in late summer and fall.

Lake Ahquabi, located in Warren County, Iowa, is a 130 acre artificial lake occupying parts of sections 14 and 23, R24W, T75N. The lake was established by impoundment in 1935 in an area of the Kansan drift covered by loess and underlain by a bedrock of sandstone and shale. Average depth of the lake is approximately 10 feet with a maximum depth of 22 feet in one area. The shallow littoral zones in the north and south arms

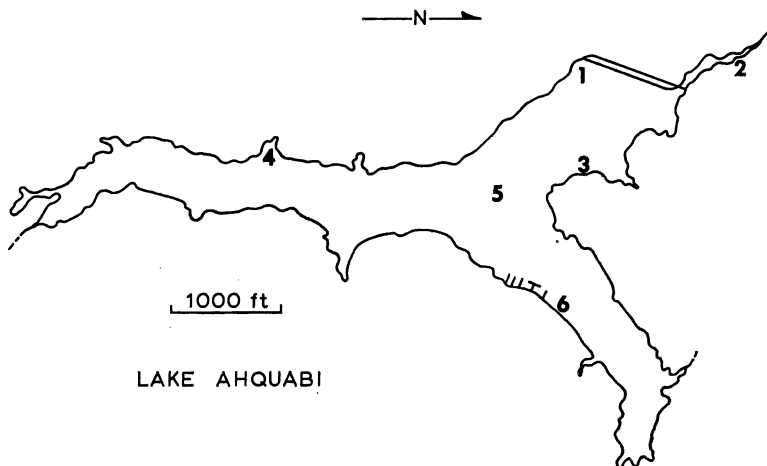


Figure 1. Map of Lake Ahquabi showing locations of the six collecting stations

contain abundant growths of *Sagittaria latifolia*, *Nymphaea tuberosa*, *Ceratophyllum demersum* and several species of *Potamogeton*. *Typha latifolia* is also common especially along the north shore. Drainage from the dam at the north end flows ultimately into the South River near Indianola.

The lake is bounded by a mixed hardwood forest in the State Park which bears its name. It serves as a prime recreation area during the summer months and is intensively used for boating, fishing and swimming.

Hennemuth (1) made a study of the growth of fish populations, but no investigations have been done on the development of the aquatic microflora and fauna since the lake was established. The present survey was undertaken to determine the nature and extent of the algal flora in Lake Ahquabi as a basis for subsequent limnological and ecological studies of the area.

Algal collections were made at weekly intervals during spring, late summer, fall and early winter of 1964. Sampling was done at each of six collecting stations (Figure 1). Large or abundant algae were collected manually. For smaller forms a 175-mesh plankton net was used. This was dragged through the water several times at each station to provide a concentrated sample. Collections were taken immediately to the laboratory for examination. All identifications are based on the manuals of Smith (3) and Prescott (2).

DISCUSSION

A total of 41 genera representing 5 divisions were collected and identified during the survey. The collection sites and relative abundance of each species are shown in Table 1.

Table 1. Algae from Lake Ahquabi

Species	Collecting Station	Relative Abundance
<i>Chlorophyta</i>		
<i>Cladophora</i> sp.	1,2,3,4,6	***
<i>Closterium moniliforme</i> (Bory) Ehren.	1,2	**
<i>Coelastrum microporum</i> Naegeli	4	*
<i>Cosmarium reniforme</i> (Ralfs) Arch.	2,6	**
<i>Crucigenia lauterbornii</i> Schmidle	5	*
<i>Dimorphococcus lunatus</i> A. Braun	4	*
<i>Draparnaldia</i> sp.	2	**
<i>Franceia droescheri</i> (Lemm.) G. M. Smith	5	*
<i>Gloeocystis planctonica</i> (West & West) Lemm.	4	*
<i>Gonium sociale</i> (Duj.) Warming	2	*
<i>Hydrodictyon reticulatum</i> (L.) Lagerh.	2	***
<i>Kirchneriella obesa</i> (W. West) Schmidle	4	*
<i>Mougeotia</i> sp.	1,4,6	**
<i>Oedogonium</i> sp.	1,5,2	**
<i>Oocystis</i> sp.	2,6	*
<i>Pediastrum boryanum</i> (Turp.) Menegh.	1,3,4,6	*
<i>Planktosphaeria gelatinosa</i> G. M. Smith	5	*
<i>Scenedesmus</i> sp.	all	**
<i>Sphaerocystis schroeteri</i> Chod.	1,3,4	**
<i>Spirogyra</i> sp.	1,2,3,4	***
<i>Staurastrum paradoxum</i> Meyen	5	*
<i>Staurastrum natator</i> W. & G. West	5	*
<i>Tetraedron</i> sp.	all	**
<i>Volvox aureus</i> Ehren.	4	*
<i>Chrysochyta</i>		
<i>Dinobryon sertularia</i> Ehren.	1,3	*
<i>Symura uvella</i> Ehren.	1,3,6	**
<i>Tribonema</i> sp.	all	**
<i>Mallomonas</i> sp.	all	**
<i>Asterionella</i> sp.	1,3,5	*
<i>Tetracyclus</i> sp.	5	*
<i>Gomphonema vibrio</i> Ehren.	1,2,3,6	**
<i>Cyanophyta</i>		
<i>Anabaena</i> sp.	all	**
<i>Aphanizomenon flos-aquae</i> (L.) Ralfs	all	***
<i>Aphanocapsa endophytica</i> G. M. Smith	4	*
<i>Chroococcus turgidus</i> (Kutz.) Naegeli	all	**
<i>Microcystis aeruginosa</i> (Keutz.) Elenkin	all	***
<i>Nodularia spumigena</i> Mert.	6	*
<i>Oscillatoria</i> sp.	all	***
<i>Euglenophyta</i>		
<i>Colacium arbuscula</i> Stein	1,2	*
<i>Euglena</i> sp.	6	**
<i>Phacus</i> sp.	1,3,6	**
<i>Pyrrophyta</i>		
<i>Ceratium hirundinella</i> (O. F. M.) Schrank	5,6	**

* Rare; 1-2 individuals per sample.

** Common; 3-10 individuals per sample.

*** Abundant; 11 or more (usually at least 15) individuals per sample.

During late summer and fall extensive blooms were observed at stations 1 and 2 and along the dam. The primary constituents of these algal growths were species of *Microcystis* and *Oscillatoria* and *Aphanizomenon flos-aquae*. Species of *Anabaena* are often associated with blooms of this sort but we observed relatively few numbers of this alga in our collections. Although the

blooms generally dissipate by the middle of November their presence results in a disagreeable odor that detracts from the recreational value of the lake.

Cladophora is abundant during summer and fall, usually attached to rocks along the northern and western shoreline and along the spillway.

Extensive growths of *Hydrodictyon reticulatum* were found throughout late summer and fall along the spillway and in the shallow pools at station 2. This species occurred in large masses containing colonies of various sizes.

One species of *Spirogyra* was prevalent at stations 1, 2 and 3, especially in the shallow pools of the spillway. It was found at all other stations in lesser numbers.

The six most common and widespread genera of algae found in the lake are *Cladophora*, *Hydrodictyon*, *Spirogyra*, *Aphanizomenon*, *Microcystis* and *Oscillatoria*. Initial observations of some of these genera during the collecting period indicate considerable fluctuations in the numbers of individuals. Studies now underway will attempt to correlate the seasonal variation and distribution of these and other species of algae with both the physical and chemical factors of the lake water.

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Changes in the Aquatic Vascular Flora of Lake East Okoboji in Historic Times

ROGER VOLKER¹ AND S. GALEN SMITH²

Abstract: The submerged, floating, and emergent vascular flora of Lake East Okoboji, Dickenson County, Iowa, was surveyed by the senior author in the summer of 1961, with collections made at 21 stations. Emergent species and one hybrid, and 7 submerged or floating species were found. A comparison is made with a 1915 survey in which a very rich flora of about 18 emergents and 26 submerged or floating species was reported. Pollution by sewage and by agricultural fertilizers and other factors that may have caused changes in the vascular flora are discussed.

¹ Webster City Junior College, Webster City, Iowa.

² Iowa State University, Ames, Iowa.