Algae of the Ozark Mountains[1]

DOROTHY V. LEAKE, Southeastern State College, Durant

Roughly defined, the Ozark Mountains are located south of the Missouri, west of the Mississippi and north of the Arkansas rivers; the west line angling southwestward from the Missouri to the place where Kansas, Oklahoma and Missouri meet; from there cutting out a semicircle in Oklahoma along the valley of the Neosho river. The whole area is about 50,000 square miles in extent.

In the geological sense, there are really no Ozark Mountains—for the area is historically a dissected plateau. The Bostons in the southern part most nearly fit the definition of mountains, being the most rugged, with the highest elevation (2500 feet) and the greatest local relief (800-900 feet).

The geological history has, of course, influenced the natural history of the region. Ancient porphyry lavas, a billion years old, and massive granites have yielded soil habitats for acid plants. The limestone areas have soils which support an entirely different flora, while the sinks, springs, bluffs and water-soaked cliffs harbor the rare plants that live in such habitats.

The place of the present investigation is the White River Hills region. Some of the hills reach an altitude of 1700 to 1800 feet and generally the relief is not more than 400 feet.

The characteristic rocks of this area are the Burlington-Boone formation limestones "containing a high percentage of chert, as nodules, lenses and beds." A mantle-rock of chert has been left on the hilltops where drainage is rapid and the watertable is low. Impervious rock layers outcropping on the hillsides make possible a horizontal seepage, and consequently a more moist soil.

A special feature of this topography is the abundance of springs. They are outlets for underground streams and their summer temperatures are much cooler (52°-60° F.) than the streams into which they flow.

The spring stream from which most of the collections were made for this study is Crane Creek, a tributary of James River, which in turn flows into the White. The headwater spring of Crane Creek arises at the foot of a railroad embankment which separates it from the limestone bluff where it had its original source. For a quarter of a mile along the stream other springs contribute to the flow. Consequently, along this whole stretch, the water is cool. Its temperature varies little throughout the year and the stream is never frozen.

Naturally, both the lowness of the temperature and its constancy have an effect upon the aquatic vegetation. Like other streams of its type, Crane Creek varies greatly in depth and swiftness. Its bottom materials are also varied—mud, sand, gravel, rock and combinations of the four. All these factors influence the distribution, variety and abundance of the plant life.

Water cress (*Nasturtium officinale*) is a dominant plant of the cold spring water of Crane Creek. Associated with it are water milfoil (*Myriophyllum heterophyllum*), water starwort (*Callitriche heterophylla*), burreed (*Sparganium americanum*), pondweeds (*Potamogeton illinoensis* and *P. foliosus* var. *genuinus*), water purslane, (*Ludwigia palustris* var. *americana*). The moss, *Fontinalis* sp. and the liverwort, *Riccia fluitans*, become abundant in summer, especially during drought years when the water is lower and warmer due to lessened spring flow.

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The red alga *Batrachospermum* grows attached to pebbles in the swiftest coldest water. *Vaucheria* felts the rocks over which the springs gush. Blue-green algae and diatoms form slippery films over the rocks everywhere. Attached and unattached filamentous forms and free floating unicellular forms grow in the quiet backwaters.

Another White River Hills region habitat from which a few collections have been made is the farm pond. One such pond was very spectacular with its blood-red surface film composed of a pure culture of *Euglena rubra*.

The only previous records on the freshwater algae of the White River Hills region are those of Drouet, who listed seven species in 1932. The present investigation adds 43 genera and 51 species to the list. The collections which are the basis of this investigation were made over a period of three years, from 1952 to 1954. The most intensive work was done during the spring of 1954. Most of the collections were examined under the microscope before they were preserved. Where identification could not be made immediately the specimens were preserved in Transeau's solution and kept for further study.

Not enough data on periodicity were accumulated to tell whether or not they agree with Transeau's classification of the algae of central Illinois into six major groups: winter annuals, spring annuals, summer annuals, autumn annuals, perennials, and ephemerals. As Tiffany suggests, stream algae are difficult to catalog because of the extreme variability in physical and physiological factors. In Crane Creek, the study of periodicity should be aided by the constancy of temperature factor, but much more careful work will have to be done.

The taxonomic list is still too limited to furnish any evidence on the correlation between distribution of algae in the Ozark Plateau and the geological history of the area. Phytogeographers have found that the vegetations of the Ozark Plateau and the Appalachian Upland are similar. The geologic history of the two areas is the same, as they have both been land surface since the end of the Palezoic era. Between them the old vegetation has been destroyed by glaciers and oceans and a new and different one has developed. It would not be surprising to find an even closer similarity between the algae floras than exists between the higher vegetations.

A small amount of information has been gleaned on succession but not enough to report at present.

Since the taxonomic list is by no means complete, it is planned to continue this investigation. Future study will also include ecological and physiological problems.

TAXONOMIC LIST

Chlorophyta

Volvocales (3 genera, 4 species)

Eudorina morum
Gonium pectorale
Gonium sociale
Pandorina morum

Tetrasporales (3 genera, 4 species)

Gleocystis major
Sphaerocystis schroeteri
Tetraspora cylindrica
Tetraspora gelatinosa

Ulotrichales (6 genera 6 species)

Aphanochaete repens
Drapernaldia acuta
Hormidium klebsii

Stigeoclonium subsecundum
Ulothrix subconstricta
Ulvella sp

Oedogoniales (1 genus, 2 species)
Oedogonium abbreviatum
Oedogonium varians

Zygnematales (4 genera, 6 species)
Closterium moniliferum
Closterium acerosum var. *elongatum*
Cosmarium obtusatum
Mougeotia robusta
Spirogyra collinsii
Spirogyra reticulata

Chlorococcales (6 genera, 9 species)
Characium angustatum
Characium obtusum
Coelastrum speciosum
Excentrosphaera viridis
Ophiocytium capitatum
Ophiocytium desertum
Scenedesmus abundans
Scenedesmus bijuga
Westella linearis

Siphonales (1 genus, 1 species)
Vaucheria geminata

Chrysophyta (10 genera, 10 species)
Achnanthidium sp.
Botrydium granulatum
Cocconeis pediculus
Cymbella janischii
Gomphonema sp.
Melosira varians
Nitschia sp.
Stauroneis anceps
Synura ulvella
Tribonema bombycinum

Euglenophyta (3 genera, 11 species)
Euglena acus var. *rigida*
Euglena alata
Euglena gracilis
Euglena intermedia
Euglena proxima
Euglena spirogyra
Euglena rubra
Euglena viridis
Phacus triqueter
Trachelomonas hispida var. *coronata*
Trachelomonas robusta

Cyanophyta (5 genera, 2 species)
Anabaena sp.
Dactylococcopsis fascicularis
Merismopedia convoluta
Oscillatoria sp.
Spirulina sp.

Rhodophyta (1 genus, 2 species)
Batrachospermum moniliforme
Batrachospermum vagum

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