

NEW ADDITIONS TO THE DIATOM (BACILLARIOPHYCEAE) FLORA OF OKLAHOMA

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Twenty-three species of diatoms are reported as new state records for Oklahoma. All taxa were collected from 5 sites on the North Canadian River.

INTRODUCTION

The water quality of a pond, lake, or river can be determined by analyzing the community structure of its diatom population (1). Consequently, many of the recent ecological studies of aquatic systems in the United States have concentrated on interactions between environmental factors and diatom communities. Such studies conducted in Oklahoma include those of Koch and Risser (2), Koch (3), and Troeger (4,5,6). Wilhm et al. (7) investigated diatom communities in the Arkansas River, while Pfiester et al. (8,9) reported on the diatom flora of the Grand River system. As a result of these studies the diatom flora of Oklahoma is becoming better known. Such baseline data are critical to an understanding of changing water quality. This report, taken from a study (10) analyzing water quality of the North Canadian River, presents new state records for twenty-three diatom species.

MATERIALS AND METHODS

The North Canadian River transects Oklahoma from the western boundary of the Panhandle to Lake Eufaula in the east-central part of the state. Samples were taken by using periphytometers which were placed in the river and collected after one month of exposure. The locations of the five sample sites are (Fig. 1):

1. Guymon. US 64, 4.1 km north of Guymon, Texas Co., Oklahoma: 100 m west of bridge: R15E, T3N, Sec.18.

2. Woodward. OK 34, 1.6 km north of Woodward, Woodward Co., Oklahoma; 50 m west of new bridge; R21W, T23N, Sec. 25.

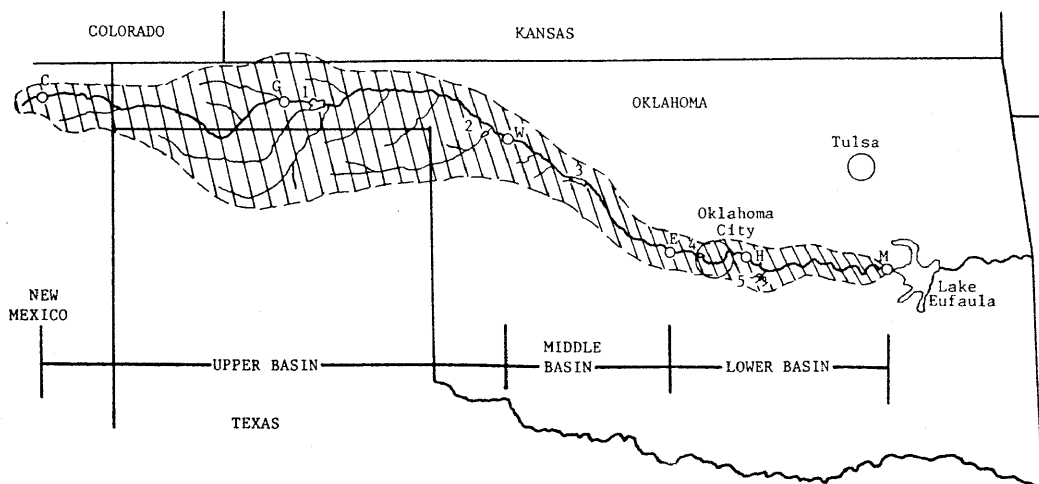


FIGURE 1. North Canadian River. C — Corrumpa Creek, G — Guymon, W — Woodward, E — El Reno, H — Harrah, M — Mouth at Lake Eufaula, 1 — Optima Reservoir, 2 — Ft. Supply Reservoir, 3 — Canton Lake, 4 — Lake Overholser, 5 — Shawnee Lakes. Hatched area represents water-shed.

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3. El Reno. US 81, 3.2 km north of county courthouse, El Reno, Canadian Co., Oklahoma; 15 m west of old bridge; R7W, T13N, Sec. 32.

4. Harrah. US 62, 1.6 km northeast of Harrah, Oklahoma Co., Oklahoma; 50 m southeast of bridge; R1E, T12N, Sec. 23.

5. Lake Eufaula. 2.4 km southeast of Interstate 40, Tiger Mountain Exit (#247); 14 km east of Henryetta, Oklahoma (site is in McIntosh Co.); 10 m east of large sandspit in south to east bend of river: R14E, T11N, Sec. 27.

Collections were made in May 1980, August 1980, December 1980, March 1981, and May 1981. All material on the growth surfaces of one periphytometer per site was scraped into a vial and preserved with Transeau's solution (11). Cleaning was accomplished by placing a 1.0-ml aliquot of the preserved sample on a coverslip, slowly evaporating the liquid, and then oxidizing all organic matter on a hot plate (550 C). The coverslip and cleaned frustules were then inverted onto a drop of Hyrax mounting medium on a microscope slide.

Taxa were identified according to Patrick and Reimer (12,13) and Hustedt (14). Strip counts were made of each slide until 500+ diatoms per sample (15) were identified and enumerated. Percent relative abundance of each species was then determined.

RESULTS AND DISCUSSION

Table 1 lists twenty-three species of diatoms which are reported for the first time for the state and their collection sites and dates. With the exception of *Navicula arvensis* and *N. gysingensis* at Guymon in May 1981, no species ever constituted more than 5% of the sample in which it was identified. Patrick (1) and Patrick and Reimer (12) discuss the importance of identifying and enumerating the rare species collected in order to more exactly quantify community diversity. The number of species and their relative abundances may be more pertinent to environmental conditions than a knowledge of which species are present (1).

Many diatoms have fairly narrow habitat parameters and are considered to be "indicator species" (16). No information is presently reported in the literature concerning the pollution tolerance or the environmental requirements of the species reported (17). Their presence along with taxa which have defined parameters makes it possible to begin to elucidate their growth requirements. This in turn should allow future researchers to more fully utilize the "indicator species" concept.

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TABLE 1. *New Diatom Species Records for Oklahoma.*

| | Guymon | Woodward | El Reno | Harrah | L. Eufaula |
|--|--------|----------|---------|--------|------------|
| <i>Amphora acutiuscula</i> Kutz. | — | — | 3 | — | 2 |
| <i>A. coffeiformis</i> (Ag.) Kutz. | 1,5 | 1,2,3,4 | 1,4 | 5 | 1,3,5 |
| <i>Cocconeis fluviatilis</i> Wall. | — | — | — | 3 | — |
| <i>Cymbella angustata</i> (W. Sm.) Cl. | — | — | 1 | 1 | — |
| <i>C. laevis</i> Naeg. ex Kutz. | 5 | — | — | — | — |
| <i>C. sinuata</i> Greg. | — | 4 | — | — | — |
| <i>Denticula tenuis</i> Kutz. | 1,5 | 2,5 | — | — | — |
| <i>Entomoensis robusta</i> (McCall) Reim. | — | 2,3 | 1,2,3 | 1,3 | 3 |
| <i>Mastogloia elliptica</i> (Ag.) Cl. | — | 1,3,5 | — | — | — |
| <i>M. grevillei</i> W. Sm. | — | 4 | — | — | — |
| <i>Navicula amphibola</i> Cl. | — | — | — | — | 3 |
| <i>N. arvensis</i> Hust. | 5 | 1,4,5 | 2 | 1,4 | 1,4 |
| <i>N. gysingensis</i> Foged | 5 | — | — | — | — |
| <i>N. integra</i> (W. Sm.) Ralfs | — | 4 | 3,4,5 | 5 | — |
| <i>N. peregrina</i> (Ehr.) Kutz. | — | 1,2,5 | — | — | 1,4 |
| <i>Neidium bisulcatum</i> (Lagerst.) Cl. | — | 2 | — | — | — |
| <i>Nitzschia angularis</i> Kutz. | — | — | — | 1 | 3 |
| <i>N. subtilis</i> Kutz. | — | — | — | — | 3 |
| <i>N. vermicularis</i> (Kutz.) Grun. | — | 1,3 | 1 | — | 1,4 |
| <i>Pleurosigma strigosum</i> W. Sm. | — | 3 | — | — | — |
| <i>Rhopalodia parallela</i> (Grun.) O.F.M. | 1 | 1,4 | 3 | — | — |
| <i>Synedra cycloppum</i> Brutschy | 1 | — | — | — | — |
| <i>S. gaillonii</i> (Bory) Ehr. | 1,5 | 3,4,5 | 1,4 | — | — |

1 - May 1980, 2 - August 1980, 3 - December 1980, 4 - March 1981, 5 - May 1981

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