

SOME PLANKTON DIATOMS FROM THE DETROIT RIVER AND THE WESTERN END OF LAKE ERIE ADJACENT TO THE DETROIT RIVER

DANIEL E. WUJEK

Department of Biology, Wisconsin State University, La Crosse, Wisconsin

ABSTRACT

Plankton samples were taken from the Detroit River and the western end of Lake Erie from May, 1962 through August, 1963. The plankton diatom flora consisted of 82 species and varieties representing 12 families. Thirteen species were dominant forms at one time or another.

Plankton diatom populations of the Detroit River and western end of Lake Erie adjacent to the Detroit River were collected semi-monthly, from May, 1962, through August, 1963, for species composition. No large-scale study of the region has been attempted to date, aside from Williams and Scott's (1962) report on water quality. This study consisted of analyses of plankton diatom populations to determine their proportional abundance, their seasonal variation, and the differences in population densities at various stations in relation to water quality.

The samples studied were collected as part of a comprehensive program at the U. S. Public Health Service, Grosse Isle, Michigan, which included analysis of bacteriological, organic, and inorganic chemical and physical parameters.

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METHODS

Grab samples for phytoplankton analysis were collected by means of a Kemmerer water sampler from the headwaters of the Detroit River at Lake St. Clair Light to Turtle Island in western Lake Erie (fig. 1). To each sample, consisting of 3 L of untreated water, was added 70 ml of preservative (thimerosal, 0.1%, plus Lugol's solution, 1%), and the samples were then stored in polyethylene bottles.

Phytoplankton analysis followed the method of Williams and Scott (1962). Diatoms were enumerated using permanent hyrax slides from which proportional counts, counting until the total number reached 250-350, were made. Higher counts were necessary in the few cases where only 1 or 2 species were abundant. A qualitative analysis of the slides was done separately. All slides were made using the burnt-mount method, with hyrax as the mounting medium for species identification. Burnt-mount slides were made by settling the contents of a liter sample, evaporating 5-10 drops of the concentrate on a number one coverglass, and then ashing the material in place on the coverslip, over a red-hot hotplate. All slides are in the possession of the U.S.P.H.S., U.S. Naval Air Station, Grosse Isle, Michigan.

RESULTS AND DISCUSSION

This paper is simply a floristic list, resulting from analysis of a portion of the samples taken during a larger research program (Vaughan and Harlow, 1965). Papers on the floristics and ecology of this area are few. Pieters (1894) listed several species of diatom in his list of aquatic plants from Lake St. Clair. Following Snow's study (1902), the number of investigations were few until the work

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of Tiffany (1934, 1937) and Chandler (1940, 1942, 1944). Since that time, Taft (1942, 1945, 1964) and Wood (1947) have added to our knowledge of the algae of this region, particularly in the vicinity of the Bass Islands.

As a result of the present study, the waters of the Detroit River, from headwaters to mouth, were found to contain low numbers of planktonic algae, with counts averaging 500 per ml. Plankton entering the river from Lake St. Clair

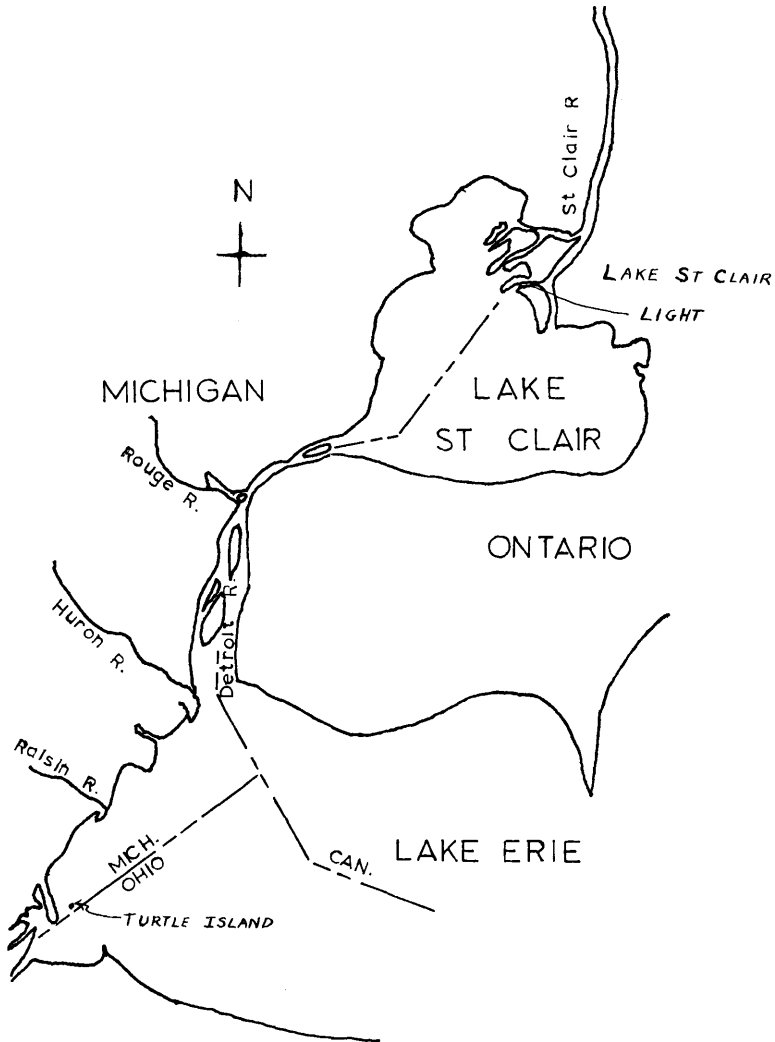


FIGURE 1. Map of the Detroit River and western end of Lake Erie.

were carried as a "standing crop" downriver to Lake Erie, with little change in density or species composition, either vertically or horizontally, across the river.

Waters of Lake Erie adjacent to the mouth of the Detroit River, in contrast to river waters, were found to be rich in plankton, with counts as high as 22,425 per ml (Vaughan and Harlow, 1965). The lake area nearest the shore supported especially dense populations of phytoplankton. Plankton were responsible for the observable turbidity of much of the Michigan waters of the lake.

Collections from Lake Erie near the mouth of the Detroit River had phytoplankton counts throughout the season 4 to 7 times lower than those farther out in the lake. The high lake counts were probably due to the shallowness of the western basin of Lake Erie, which, coupled with wind and current action, brought about an almost uniform vertical distribution of temperature and nutrients, thus creating an optimal environment for the growth and reproduction of the plankters.

A detailed study of the diatom species and their distribution in Lake Erie and the Bass Island region by Hohn is now in progress.

SPECIES LIST

Families and genera of the diatoms identified from these samples are arranged according to Boyer (1926, 1927), with some modifications after Hustedt (1930). The starred (*) species are those that occupied 10 per cent or more of any given plankton diatom population.

Coscinodiseaceae

- Cyclotella bodanica* Eulenstein
- C. comta* (Ehr.) Kutz.
- **C. kutziana* Thw.
- **C. meneghiniana* Kutz.
- C. ocellata* Pant.
- C. pseudostelligera* Hust.
- C. stelligera* Cl. et Grun.
- **Melosira ambigua* (Grun.) Mull.
- **M. binderana* Kutz.
- **M. granulata* (Ehr.) Ralfs.
- M. granulata* var. *angustissima* Mull.
- M. varians* Ag.
- **Coscinodiscus radiatus* Ehr.
- **Stephanodiscus astraea* (Ehr.) Grun.
- **S. astraea* var. *minutus* (Kutz.) Grun.
- S. niagarae* Ehr.
- Thalassiosira fluviatilis* Hust.

Rhizosoleniaceae

- Rhizosolenia eriensis* H.L. Sm.

Fragilariaceae

- Asterionella formosa* Hassal
- **Fragilaria capucina* Desmez.
- F. construens* (Ehr.) Grun.
- **F. crotonensis* Kitton
- F. pinnata* Ehr.
- Synedra acus* Kutz.
- **S. acus* var. *radians* (Kutz.) Hust.
- S. nana* Meister
- S. parasitica* (W. Sm.) Hust.
- S. pulchella* (Ralfs) Kutz.
- **S. ulna* (Nitz.) Ehr.
- S. vaucheriae* var. *capitata* Grun.
- Opephora martyi* Heribaud.

Tabellariaceae

- **Tabellaria fenestrata* (Lyngb.) Kutz.
- T. flocculosa* (Roth) Kutz.

Diatomaceae

- Diatoma elongatum* Ag.
- D. vulgare* Bory.

Achnanthaceae

- Achnanthes clevei* Grun.
- A. lanceolata* var. *rostrata* Hust.
- Cocconeis disculus* (Schum.) Cl.
- C. flexella* (Kutz.) Cl.
- C. pediculus* Ehr.
- C. placentula* Ehr.
- Rhicosphenia curvata* (Kurtz.) Grun.

Naviculaceae

- Caloneis silicula* (Ehr.) Cl.
- C. silicula* var. *gibberula* (Kutz.) Cl.
- Anomoconeis follis* (Ehr.) Cl.
- Neidium iridis* (Ehr.) Cl.
- N. iridis* var. *amphigomphus* Ehr.
- Navicula anglica* Ralfs.
- N. bacilliformis* Grun.
- N. cryptocephala* Kutz.
- N. exigua* (Greg.) O. Mull.
- N. gracilis* Ehr.
- N. hungarica* var. *capitata* (Ehr.) Cl.
- N. menisculus* Schum.
- N. pupula* Kutz.
- N. pygmaea* Kutz.
- N. reinhardtii* Grun.
- N. rotaeana* (Rabh.) Grun.
- N. scutellioides* W. Sm.
- N. tuscula* (Ehr.) Grun.
- N. viridula* Kutz.
- Gyrosigma attenuatum* (Kutz.) Cl.
- G. spencerii* (Quekett) Cl.
- Stauroneis phoenicenteron* Ehr.
- S. smithii* Grun.
- Amphiprora ornata* Bailey

Gomphonemataceae

- Gomphonema constrictum* var. *capitatum* (Ehr.) Cl.
- G. constrictum* var. *capitatum* f. *turgidum* (Ehr.) A. Mayer
- G. intraceatum* var. *pumila* Grun.

Cymbellaceae

- Amphora ovalis* Kutz.
- Cymbella cistula* (Hemp.) Grun.
- C. turgida* (Greg.) Cl.
- C. ventriocosa* Kutz.

Epithemiaceae

- Epithemia zebra* (Ehr.) Kutz.

Nitzschiaceae

- Nitzschia dissipata* (Kutz.) Grun.
- N. palea* (Kutz.) W. Sm.
- N. sigmoidea* (Ehr.) W. Sm.
- N. tryblionella* Hantzsch

Surirellaceae

- Cymatopleura elliptica* (Breb.) W. Sm.
- C. solea* (Breb.) W. Sm.
- Surirella angustata* Kutz.
- S. ovata* Kutz.

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