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Ryan W. Drum
Iowa State University

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Notes on Iowa Diatoms

III. Occurrence of the Genus *Pleurosigma* in the Des Moines River¹

RYAN W. DRUM²

Abstract. A member of the diatom genus *Pleurosigma* was collected from the Des Moines River from 12 stations. Earlier investigators did not report it. This organism may be suitable as an ecological indicator, since most members of the genus occur in salt or brackish water. Positive identification was not made, the organism is probably a variety of *P. delicatulum* Wm. Smith.

A member of the diatom genus *Pleurosigma* was first collected from the Des Moines River by E. F. Stoermer in the fall of 1959 at the Ledges State Park, Iowa. Since that time the organism has been identified in plankton samples and bottom sediments collected by the author from twelve stations between the headwaters of the West Fork at Lake Shetek, Minnesota, and Farmington, Iowa, a distance of 450 miles of river: from this, the widespread distribution of the organism is clearly indicated. The peculiar significance of a member of the diatom genus *Pleurosigma* occurring in the Des Moines River exists in the relationship of this phenomenon to a generally accepted hypothesis that the members of this genus are found primarily in brackish-water and marine environments. According to Hustedt (1), all species are saltwater forms, but some are regularly found in salterns and other salty waters of the inland. Smith (2) modified this viewpoint, indicating that, although most species of *Pleurosigma* are found in salt or brackish-water, there are two species found in freshwater in this country, *P. boyeri* Keeley and *P. delicatulum* Wm. Smith. In his study of the diatoms of Nebraska, Elmore (3) identified as *P. delicatulum* specimens found in creeks and rivers such as the Crete, Julian, and North Platte. From these references we conclude that, while neither frequent nor abundant, the genus *Pleurosigma* is not necessarily a stranger to freshwater habitats.

The Des Moines River begins in southern Minnesota; the

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² Department of Botany and Plant Pathology, Iowa State University, Ames, Iowa

West Fork originating at Lake Shetek, and the East Fork at Tuttle Lake: the two forks converge south of Humboldt, Iowa, and the river proceeds diagonally across the states, from northwest to southeast, its confluence with the Mississippi occurring a few miles south of Keokuk, Iowa. At the point where the organism was first collected (Ledges State Park) the river water has a total salinity of 500 ppm as compared to 35,000 ppm for sea water (4).

The length of time during which this member of the diatom genus *Pleurosigma* has been in the Des Moines River is not known and is presumed to be indeterminate. The possibility that it may be a recently introduced species is considered since it was not reported in an earlier study by Starrett and Patrick (5) on the plankton and bottom flora of the Des Moines River carried on in 1946-17. Continued investigation may determine the relative permanence of this organism as a member of the diatom flora of the Des Moines River. Perhaps it may be indicative of a particular set of ecological conditions, in which case it could serve as an indicator of this set of conditions.

A taxonomic consideration of the organism led the author to several possible conclusions as to its identity. On the basis of environmental and morphological data, the organism from the Des Moines River approaches *P. delicatulum* Wm. Smith, but not enough to suggest that the two are identical. No attempt will be made to describe it as a species at this time.

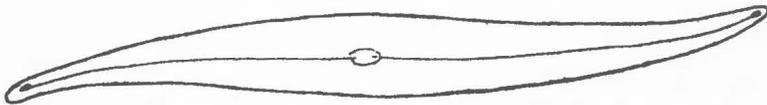


Figure 1. Outline drawing of a representative specimen from the Des Moines River. (1600X)

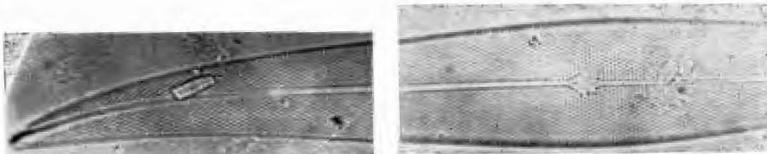


Figure 2. Two photomicrographs showing the transverse, longitudinal, and oblique striation of the central and apical portions of valve of *P. delicatulum* from the Des Moines River. (1600X)

Figure 1 is of a representative specimen of the population found in the Des Moines River, which serves to illustrate the general appearance of a frustule of the organism. Figure 2 is an enlarged view of the central portion of a valve which shows the transverse, longitudinal, and oblique ornamentation which is characteristic of the genus *Pleurosigma*. Table 1 presents a

comparison of the dimensions of specimens of *P. delicatulum* as given by Wm. Smith (5), Grunow (6), and Elmore (3), with those of the specimens collected by the author. For the benefit of the reader who may not be familiar with the criteria by which diatoms are classified, the number of striae per ten microns of the valve surface is considered an important species characteristic since it usually varies only slightly, even though a large population of the same species may exhibit large variations in other measurements.

Table 1
Measurements of P. delicatulum from three Different Sources Compared with Specimens from the Des Moines River

Source	Length	Width	Transverse striae/10 ^u	Oblique striae/10 ^u
Brackish water (Wm. Smith, original description)	227 ^u	17 ^u	20	
Caspian Sea—salinity (Grunow)	100–300 ^u	14–17 ^u	22.5-23	24
8000-20,000 ppm North Platte River (Elmore)	139–280 ^u	14–30 ^u	18-25	same
Des Moines River (Drum)	125–175 ^u	14–17 ^u	22-23	23

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