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Notes on Iowa Diatoms X: New and Rare Diatoms from Iowa

DR. REX L. LOWE

SYNOPSIS: Diatom species new to Iowa are illustrated. Four diatoms new to science are described and illustrated: *Fragillaria*

vaucheriae f. *contorta* nov. fo. *Navicula cryptogaster* spec. nov. *Surirella iowensis* spec. nov., *Surirella stoermerii* spec. nov.

INTRODUCTION

In the past ten years the diatom flora of Iowa has been under intensive investigation at Iowa State University, resulting in several doctoral dissertations and many scientific publications. "Notes on Iowa diatoms" was begun by Dodd and Stoermer (1962); this paper continues that series.

While examining diatom communities of some central Iowa drainage ditches (Lowe, 1972), several taxa were observed not previously recorded from Iowa, including some that are new to science. Rare species encountered, and new species descriptions, are presented in this paper. Illustrations and, in some cases, descriptions of morphological variability, are included for each taxon.

The diatoms described here were identified from samples collected from October, 1967 to May, 1970. Several parameters of the physical and chemical environment were also determined. These data along with absolute and relative abundances of diatoms observed are found in the original dissertation (Lowe, 1970) and will be published elsewhere (Lowe, 1972). Descriptions of the drainage ditches, referred to here as ditch 1, ditch 2, and ditch 3 are given also.

Representative specimens, including holotypes of new taxa, have been deposited in the Iowa State University (ISC) Diatom Herbarium. Isotypes remain in the author's herbarium as well as the Academy of Natural Science (A-G. C.), Philadelphia, Pennsylvania.

Systematic Section
Fragilariaceae
Fragillaria Lyngbye

Fragillaria vaucheriae f. *contorta* nov. fo. Plate 1, figs. 1-20.

Frustuales plerumque sola aut in vinculis brevibus accidunt. Epistomium lineare ad fines rostratos aliquando capitatos subito contrahit. Medium plerumque unilaterale sed non tumidum sicut genus nominatum. Epistomia plerumque flexa non aequaliter. Striae 10 ad 14 in 10 μ paucae saepe absunt omissae spatia magna inter striae quae adsunt.

Frustules usually occur singly or in short chains. Valve linear, narrowing abruptly to rostrate, sometimes capitate, ends. The central area is usually unilateral but is not swollen as is characteristic of the nominate variety. The valves are usually warped in an asymmetric fashion. Striae are 10 to 14 in 10 μ . Often several are absent leaving large spaces between existing striae. The length is from 11 to 35 μ and the breadth from 3 to 6 μ .

Holotype: slide 7-4-69 #2 RLL

This taxon is referred to as *Synedra* sp. #1 in Lowe (1972). It was observed in large numbers over a period of three years usually reaching maximum abundance in mid-

July. It was found in great concentrations growing mixed with filamentous green algae. Valves without warped margins were rare in all collections.

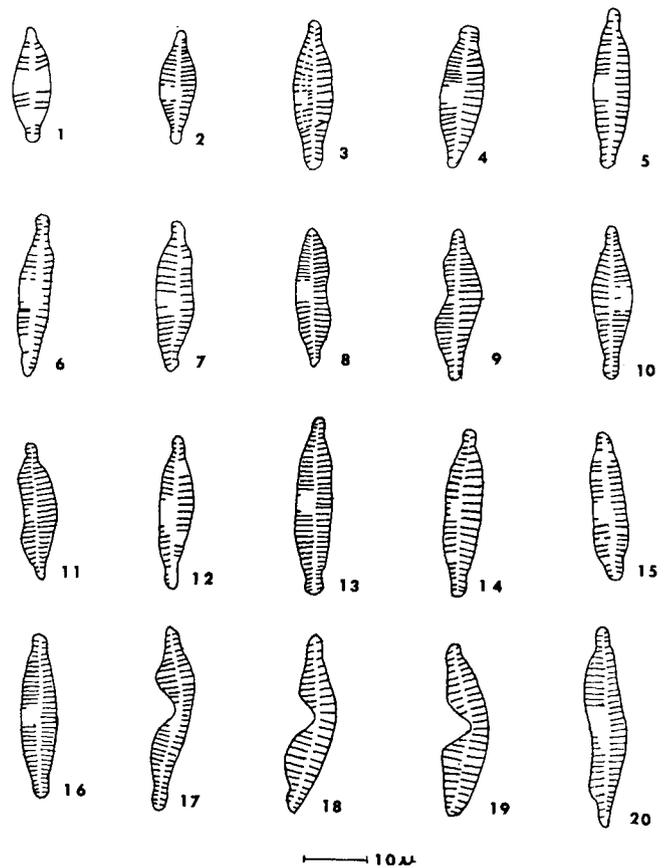


PLATE I. Figures 1-20. *Fragillaria vaucheriae* f. *contorta*

Naviculaceae

Diploneis Ehrenberg

Diploneis elliptica (Kütz.) Cl. Plate 2, fig. 6.

Slide 11-5-67 #8 duplicate #1

This taxon was collected in ditch 2 in 1967 in large numbers. It was very rare, however, in collections from the same area during the following two years. I have also collected this taxon from an artesian well in north central Iowa.

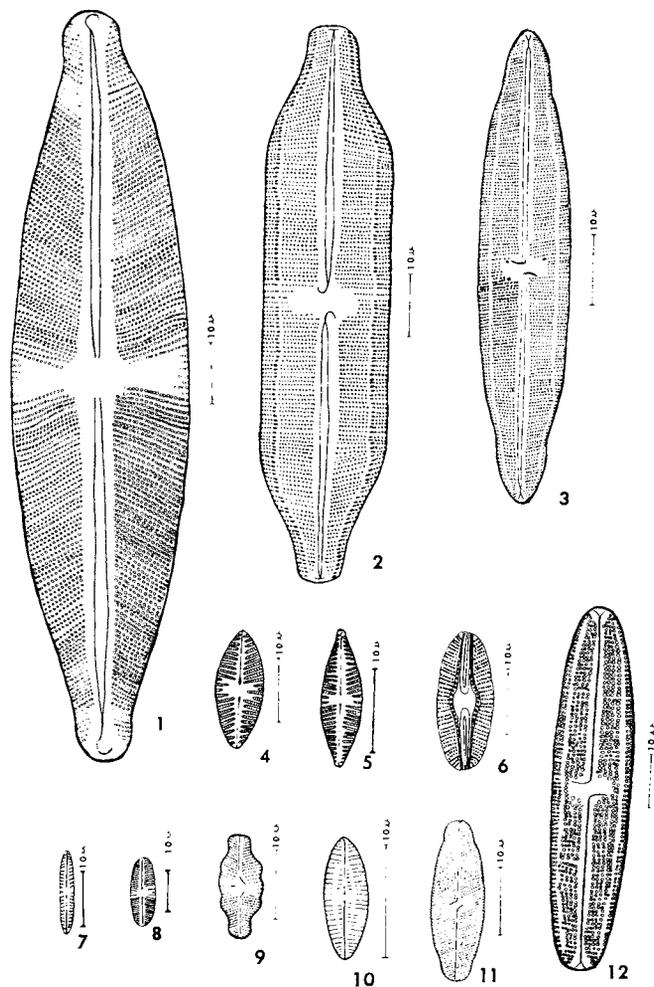


PLATE II. Fig. 1. *Stauroneis phoenicenteron* var. *brunii*. Fig. 2. *Neidium productum*. Fig. 3. *Neidium affine* var. *bonsaensis*. Fig. 4. *Navicula pseudoreinhardtii*. Fig. 5. *Navicula cryptocephala* f. *terrestris*. Fig. 6. *Diploneis elliptica*. Fig. 7. *Navicula tenelloides*. Fig. 8. *Navicula seminulum* var. *intermedia*. Fig. 9. *Navicula mutica* var. *undulata*. Fig. 10. *Navicula cryptogaster*. Fig. 11. *Neidium hercynicum* f. *subrostrata*. Fig. 12. *Neidium munckii*.

Navicula Bory

Navicula cryptocephala f. *terrestris* Lund Plate 2, fig. 5.

Slide 3-20-70 #3s

This diatom was originally described from a soil flora (Lund, 1945). Its regular occurrence in shallow drainage ditches with ground water sources is not too surprising.

Navicula cryptogaster nov. spec. Plate 2, fig. 10.

Epistomia ovata cum finibus contrahentibus et teretibus. Spatium angustum secundum axem. Striae intermissae in lateribus utrisque aream lyratam in superficie epistomii faciunt. Ubique striae paulo radiunt, 26 ad 30 in 10 μ. Longitudo 10-13 μ. Latitudo 3-4 μ.

Valves elliptical with narrowing rounded ends. Axial area narrow. Striae interrupted on both sides forming a lyrate area on the valve surface. Striae slightly radiate throughout, 26 to 30 in 10 μ. Length 10-13 μ. Breadth 3-4 μ.

Holotype: slide 11-14-69 #3 RLL

This species is referred to as *Navicula* sp. #8 in Lowe (1972). It was never observed in large numbers but appeared in several collections from all three ditches.

Navicula mutica var. *undulata* (Hilse) Grun. Plate 2, fig. 9. Slide 5-17-68 #2

This taxon was encountered only once during this study. Patrick and Reimer (1966) indicate its presence in Maryland, Ohio and California. Reimer (1970) noted its presence in moist soil from Cayler Prairie, Iowa.

Navicula pseudoreinhardtii Patr. Plate 2, fig. 4. Slide 2-27-70 #1s

This taxon was rare in collections from ditch 2 but common from ditches 1 and 3.

Navicula seminulum var. *intermedia* Hust. Plate 2, fig. 8. Slide 9-19-69

Although *N. seminulum* was also observed in the collections, var. *intermedia* is easily separated by the coarseness and angle of the striae. It was much less abundant than the nominate variety.

Navicula tenelloides Hust. Plate 2, fig. 7. Slide 11-7-69 #3

I observed only one specimen of this taxon which is often reported from soil floras. This taxon was also reported by Fee (1967) and Stoermer (1962).

Neidium Pfitzer

Neidium affine var. *bonsaensis* Foged Plate 2, fig. 3. Slide 4-17-70 #2s

This variety, which has not previously been reported from the United States, was found in only one collection. It is easily distinguished by the long rostrate, wedge shaped ends.

Neidium hercynicum f. *subrostrata* Reim. Plate 2, fig. 11. Slide: In the author's herbarium.

Only one specimen of this taxon was observed in an August, 1969 collection from ditch 1.

Neidium munckii Foged plate 2, fig. 12. Slide 4-17-70 #2s, duplicate #5

This taxon has not previously been reported from the United States. It was observed rarely from ditch 2.

Neidium productum (W. Sm.) Cl. Plate 2, fig. 2. Slide 11-5-67 #1, duplicate #2

This taxon was observed very rarely only from ditch 2.

Pinnularia Ehrenberg

Pinnularia biceps f. *petersenii* Ross Plate 3, fig. 5. Slide 11-5-67 #8 duplicate #5

This taxon was observed only rarely at station 2.

Pinnularia flexuosa Cl. Plate 3, fig. 1. Slide 5-2-70 #2-4

This species was very rare. It was collected only from ditch 2 in the spring of 1970.

Pinnularia fluminea Patr. Plate 3, fig. 6. Slide 4-10-70 #2s

This taxon was referred to as *P. sp. #1* in Lowe (1972). It was found in small numbers from station 2 in the spring of 1970.

Pinnularia gibba f. *subundulata* Mayer. Plate 3, fig. 4. Slide 4-3-70 #2s

This species was found in many samples but was never encountered in large numbers.

Pinnularia gracilis Hust. Plate 3, fig. 2. Slide 4-17-70 #2s, duplicate #3

This was a rare diatom found only at ditch 2.

Pinnularia streptoraphe Cl. Plate 3, fig. 3.

Slide 4-17-70 #2s, duplicate #4

Only a few specimens of this taxon were collected in bottom samples from ditch 2.

Pinnularia torta (Mann.) Patr. Plate 3, fig. 8.

Slide 11-5-67 #8, duplicate #3

Only one specimen of this taxon was collected.

Stauroneis Ehrenberg

Stauroneis borrichii (Petersen) Lund Plate 4, fig. 6.

Slide 11-7-69 #2

Only a few frustules of this typically soil diatom were observed. They were found at all three stations.

Stauroneis phoenicenteron var. *brunii* (M. Perag. & Herib.)

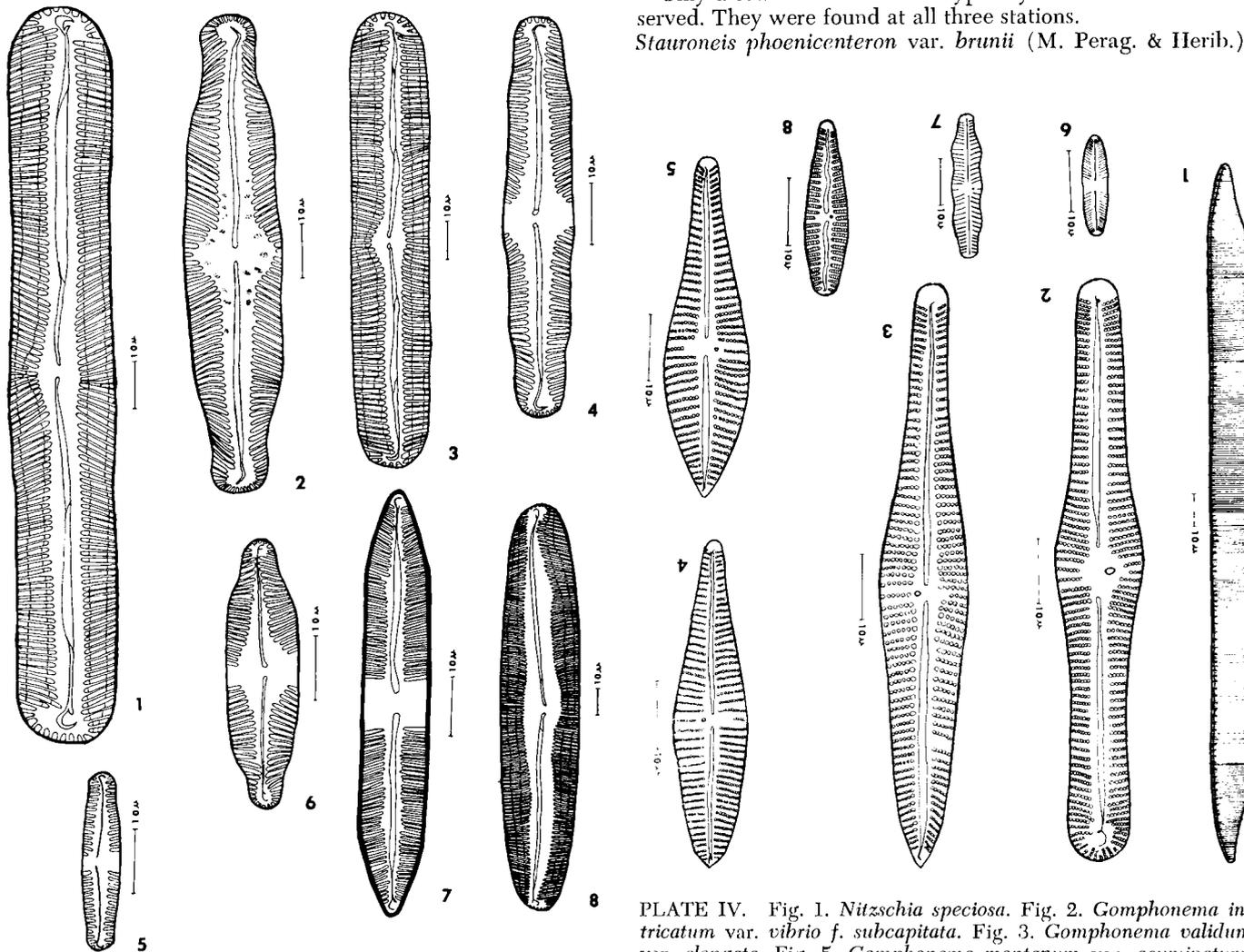


PLATE III. Fig. 1. *Pinnularia flexuosa*. Fig. 2. *Pinnularia gracilis*. Fig. 3. *Pinnularia streptoraphe*. Fig. 4. *Pinnularia gibba* f. *subundulata*. Fig. 5. *Pinnularia biceps* f. *petersenii*. Fig. 6. *Pinnularia fluminea*. Fig. 7. *Pinnularia titusiana*. Fig. 8. *Pinnularia torta*.

PLATE IV. Fig. 1. *Nitzschia speciosa*. Fig. 2. *Gomphonema intricatum* var. *vibrio* f. *subcapitata*. Fig. 3. *Gomphonema validum* var. *elongata*. Fig. 5. *Gomphonema montanum* var. *acuminatum*. Fig. 4. *Gomphonema turris*. Fig. 6. *Stauroneis borrichii*. Fig. 7. *Gomphonema angustatum* var. *undulata*. Fig. 8. *Gomphonema montanum* var. *subclavata*.

Pinnularia titusiana Hagelstein Plate 3, fig. 7.

Slide 11-5-67 #8, duplicate #5

This taxon has not previously been reported from the United States. A specimen of this species could not be located in Hagelstein's type material but the illustration from his original description (Hagelstein, 1939) leaves no doubt as to the identity of this diatom.

The species was collected in large numbers in 1967 from ditch 2 but has not been observed in later collections.

Voigt Plate 2, fig. 1.

Slide 4-17-70 #2s, duplicate #6

Only two specimens were collected, both from ditch 2.

Gomphonemaceae

Gomphonema Ehr.

Gomphonema angustatum var. *undulata* (Greg.) Grun. Plate 4, fig. 7.

Slide 4-17-70 #2s, duplicate #2

Only two specimens of this taxon were observed, both of them from ditch 2.

Gomphonema intricatum var. *vibrio* f. *subcapitata* Mayer Plate 4, fig. 2.

Slide 11-5-67 #1, duplicate #1

I found only one specimen of this taxon in a collection from a rock surface in a quiet pool in ditch 2.

Gomphonema montanum var. *acuminatum* (Per. & Heribaud) Mayer Plate 4, fig. 5.

Slide 11-5-67 #1

A few frustules of this diatom were observed in collections from ditch 2 in 1967.

Gomphonema montanum var. *subclavata* Grun. Plate 4, fig. 8.

Slides 5-24-68 #1

This species was found in moderate numbers in all three ditches with the greatest number of individuals collected in late fall and early winter. This taxon is most easily identified by the undulating raphe.

Gomphonema turris Ehr. Plate 4, fig. 4.

Slide 11-5-67 #1

Infrequent observations of this diatom were made from collections from ditch 2.

Gomphonema validum var. *elongata* Cl. Plate 4, fig. 3.

Slide 4-17-70 #4

This taxon was collected in very small numbers in 1970 only from ditch 2.

Nitzschiaceae
Nitzschia Hassall

Nitzschia speciosa Hust. Plate 4, fig. 1.

Slide 2-27-30 #3s

This large *Nitzschia* species was represented by only two specimens from ditch 3.

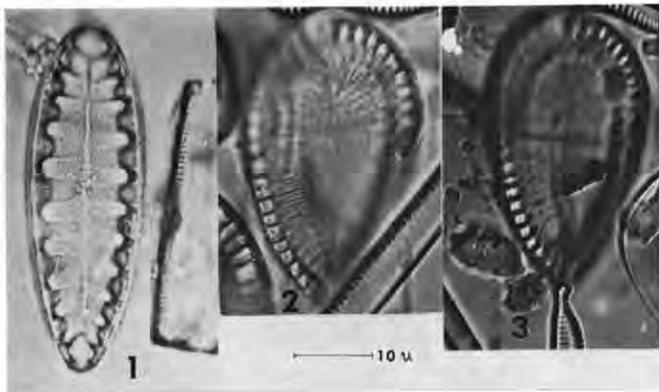


PLATE V. Fig. 1. *Surirella stoermerii*. Figs. 2-3. *Surirella iowensis*.

Surirellaceae
Surirella Turpin

Surirella iowensis spec. nov. Plate 5, figs. 2 and 3.

Cellae heteropolarae, aliquantum firmiter tortae axibus transapicibus. Valvae ovoidae late tereto polo "capite" et firmiter tereto polo "pede"; longitudo 17-54, latitudo 10-25 μ . Alae parum cretae, "fenestrae" non apertae. Canales alares 5-7 in 10 μ , extendens in media valva ubi pseudoraphe angusto interrumpuntur. Superficies partis mediae valvae striatae, striae fere 18 in 10 μ .

Cells heteropolar, more or less torsioned about the transapical axis. Valves ovoid, with broadly rounded headpole and more narrowly rounded footpole, 17-54 μ long, 10-25 μ broad. Wings little developed, "windows" not apparent. Wing canals 5-7 in 10 μ , extending to center of valve where they are interrupted by a narrow pseudoraphe. Surface of central portion of valve striate, striae about 18 in 10 μ .

Holotype: slide 5-3-68 #1 RLL

In 1968 *S. iowensis* was a dominant bottom form in ditch 1. It comprised over 50% of the population at this time and was most abundant in collections from the ditch bottom. Stoermer (1963) reports this taxon to be widely distributed in Iowa, including both East and West Lake Okoboji, Silver Lake fen, Des Moines river, Little Sioux river, and Squaw creek at Ames.

Surirella stoermerii spec. nov. Plate 5, fig. 1.

Epistomium ovatum. Alae distinctae et parallelae in epistomio medio ad apices valde radiant, 2 ad 3 in 10 μ . Alae in aream mediam planam et glebosam mergunt. Axis apiciei notata pseudoraphe angusta. Longitudo 41-48 μ . Latitudo 14-16 μ .

Valve ovate. Alae distinct, parallel in the center of the valve and strongly radiate at the apices, 2-3 in 10 μ . Alae merge into a flat granular central area. Apical axis marked by a narrow pseudoraphe. Length 41-48 μ , breadth 14-16 μ .

Holotype: slide 11-5-67 #4 RLL

Surirella stoermerii is named in honor of Dr. Eugene F. Stoermer, the first investigator at Iowa State University to describe in detail a diatom flora in Iowa.

ACKNOWLEDGMENTS

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