Marina Mesopotamica 7 (2) : 203 - 240 (1992)

CONTRIBUTION TO THE DIATOM FLORA OF THE MARSHES NEAR QURNA, SOUTHERN IRAQ

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ABSTRACT

156 taxa of diatoms have been recorded from the marshes in southern Iraq. 32 taxa are new records for Iraq. Dimensions and photographs are given for most species.

INTRODUCTION

The southern marshes of Iraq are an extensive swamps area which cover about 15500 Km^2 of the country around Qurna. Few previous publications exist on the algae of these marshes (Al-Kaisi, 1970 & 1976; Pankow et al., 1979; Hinton & Maulood, 1980; Maulood et al., 1981; Al-Saadi et al., 1981; Islam, 1982; Islam & Haroon, 1983). The informations from the above publications suffest that phycological as well as limnological studies in the vast marshy areas of southern Iraq are far from complete. There are many areas in these marshes still left unexplored from the above standpoints. Documentation of algal flora and diatoms in particular would appear to be essential especially in view of their richness and diversity.

The present paper deals with 156 taxa of diatoms including 32 genera and species recorded for the first time in Iraq. Brief descriptions, dimension and photographs are given for these taxa.

STUDY AREA, MATERIAL AND METHODS

Samples were collected monthly between July 1983 and June 1984 from three locations in the marshes near Qurna, southern

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Iraq(Figure 1). These locations are locally known as Dair, Al Shaffi and Um-Al-Schwaich. They are shallow and under the influence of tide movements of Shatt Al-Arab estuary. The vegetation of these immense shallow waters consist largely of dense associations of *Phragmites communis* and *Typha angustata*. The water surface is often covered by floating leaves of *Ceratophyllum demersum*, *Potamogeton* spp., *Ranunculus* spp. and *Salvinia* spp. *Cladophora* sp., *Oedogonium* spp. and *Batrachospermum* spp. were common epiphytes. Balls of the blue-green algae *Aphanothece bullosa* and clumps of *Spirogyra* spp. and *Cladophora* spp. were also frequently found floating on the water surface. The muddy bed of these marshes is covered by dense growth of algae which in some shallow places form a continuous cover on the mud surface.

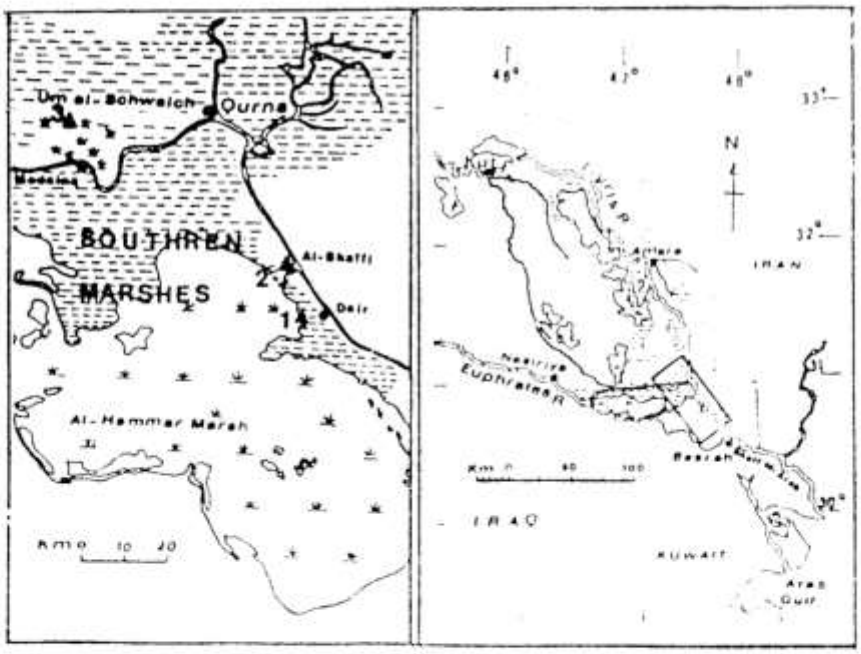

Figure 1) : Map of the southern marshes of Iraq, showing sampling sites.

Samples for identification of diatoms were taken from different habitats of the study area. Plankton diatoms were collected by phytoplankton net (mesh size 20 μm). Epiphytic diatoms growing on stems and leaves of the macrophytic plants were separated by scraping gentley from the host surface. Epipelic diatoms were collected from the uppermost 1 cm of the muddy bed and separated by the lense tissue method (Eaton & Moss, 1966).

Diatom samples from various locations and habitats were cleared using chromic or concentrated nitric acids and mounted with naphrax. Identifications was made at 1000 X magnification using Ziess research photomicroscope.

SYSTEMATIC ACCOUNT

In this section all the genera shown are listed systematically (following Hustedt, 1930) but species within each genus are arranged alphabetically. The literatures used for identification ar listed beside each taxon.

All the measurements are given in microns (μm). Abbreviations used are as follow : L = length; W = breadth or width and Dia = diameter. Taxa with an asteric (*) mark represent new records for Iraq. Numbers in brackets indicate sites at which each taxon was recorded.

Mlosira Agardh

Melosira italica (Ehr.) Kuetz (Pl. 1, Fig. 1)
(Lawson & Rushforth, 1975, 8 , Pl. 1, Fig. 3; Foged, 1976, 30, Pl. 1, Fig. 5).
L = 8.5 - 11.4 μm , W = 4.3 - 5.7 μm (2).

M. lineata (Dillw.) Ag. (Pl. 1, Figs. 2-3)
(Germain, 1981, 22, Pl. 1, Figs. 3-7 as *M. lineata*)
L = 34.1 μm , W = 29.8 μm (3).

M. varians Ag. (Pl. 1, Fig. 4)
(Lawson & Rushforth, 1975, 8, Fig. 4; Hadi et al., 1984, 518, Pl. 1, Fig. 21; Pl. 8, Fig. 131).
L = 27.1 μm , W = 13.5 μm (3).

Thalassiosira Cleve

Thalassiosira fallax Meunier (Pl. 1, Fig. 5)
(Hustedt, 1930, 95, Fig. 61; Pankow, 1976, 70, Figs. 88-90 as *T. fluviatilis*).
Dia = 14.2 - 28.4 μm; costae = 11 - 13 μm (1,2,3).

Cyclotella Kuetzing

Cyclotella meneghiniana Kuetz (Pl. 1, Fig. 6)
(Hustedt, 1930, 100, Fig. 67).
Dia = 8.5 - 24.1 μm ; costae = 8 in 10 μm (1,2,3).

C. stelligera (Cleve et Grnu.) Van Heurck
(Hustedt, 1930, 100, Fig. 65).
Dia 8.52 μm (3).

C. striata (Kuetz.) Grun.
(Hustedt, 1930, 101, Fig. 71).
Dia = 35.5 - 39.8 μm ; costae = 8 in 10 μm (3).

Cyclotella sp. (Pl. 1, Fig. 7)
Dia = 4.3 - 8.5 μm ; costae 11 in 10 μm (1,2).

Stephanodiscus Ehrenberg

Stephanodiscus sp. (Pl. 1, Figs. 8-9)
Dia = 24.1 - 38.3 μm ; areolae = 15 in 10 μm (3).

Coscinodiscus Ehrenberg

Coscinodiscus sp. (Pl. 1, Fig. 10)
Dia 75 μm ; areolae 3.5 in 10 μm near central region, 4 in 10 μm near the peripheral region (3).

Chaetoceros Ehrenberg

Chaetoceros sp. (Pl. 1, Fig. 11)
Dia = 8.5 μm (1).

Diatoma De Candolle

Diatoma tenue var. elongatum Lyngb. (Pl. 1, Fig. 12)

(Patric & Reimer, 1966, 109, Pl. 2, Fig. 6; Germain, 1981, 52, Pl. 14, Figs. 1-10).
L = 21.3 – 36.9 μm ; W = 3.5- 4.9 μm (2).

Fragilaria Lyngbye

Fragilaria brevistriata var. *inflata* (Pant.) Hust. (Pl. 1, Fig.13)
(Hustedt, I930,145,Fig.152; Hinton & Maulood, 1980, 480, Fig. 16).
L = 12.8 μm ; W = 4.3 μm ; striae = 11 in 10 μm (1,3).

F. construens (Ehr.) Grun.
(Germain, 1981, 68, Pl. 21, Figs. 1-5).
L = 17 μm ; W = 10μm ; striae = 11 – 12 in 10 μm (3).

F. intermedia Grun.
(Foged,1977,Pl. 6,Figs. 10-11;Germain,1981,66,Pl. 20,Figs.1 - 10).
L = 42.6 μm ; W = 3.5 μm ; striae 9 - 10 in 10 μm (3).

F. pinnata Ehr. (Pl. 1, Fig. 14)
(Hustedt, 1930, 142, Figs. 141 a-d).
L = 10 – 11.4 μm ; W = 4.3 μm ; striae = 12 - 13 in 10 μm (1,2,3).

Fragilaria sp. (Pl. 1, Fig. 15)
L = 24.2 – 37.8 μm ; W = 3.2 - 3.6 μm ; striae 16 in 10 μm (3).

Synedra Ehrenberg

Synedra acus var. *radians* (Kuetz.) Hust. (Pl. 1, Figs. 16-17)
(Hustedt,1930,155,Fig.171; Patrick & Reimer,1966,137,Pl. 5,Fig.4).
L = 66.7-135 μm; W = 3.5-4.2 μm; striae = 14-15 in 10 μm (3).

S. capitata Ehr. (Pl. 1, Figs. 18-19)
(Hustedt,1930,154,Fig.169; Patrick & Reimer,1966,147,Pl.6,Fig.15).
L = 247.8-300.9 μm ; W = 11.3 μm; striae = 10 in 10 μm (2,3).

S. fasciculata (Ag.) Kuetz. (Pl. 1, Figs. 20-21)
(Hustedt,1930,159,Fig.184;Patrick & Reimer,1966,141,Pl.5,Fig.17-18).
L = 158.4-183.6 μm; W = 4.2-5.7 μm; striae = 13-14 in 10 μm (1).

S. Ulna (Nitz.) Ehr. (Pl. 2, Figs. 22-24)
(Hustedt, 1930, 151, Figs. 158 - 159; Clark & Rushforth, 1977, 41, Pl. 8, Fig. 11 ; Pl. 9, Fig. 1).
L=107-291 μm ; W=4.3-7.1 μm ; striae = 10-12 in 10 μm (1,2,3).

S. ulna var. *spathulifera* (Grun.) Van Heurck
(Cleve-Euler, 1953, 63, Figs. 383 d-e).
L=205.2-324.5 μm ; W=4.9-5.7 μm ; striae = 10-11 in 10 μm (3).

S. Ulna var ? (Pl. 2, Figs. 25-26)
(Unidntified variety).
L = 153.3 μm ; W = 5.7 μm ; striae = 11-12 in 10 μm (3).

Eunotia Ehrenberg

Eunotia formica Ehr. (Pl. 2, Fig. 28)
(Foged, 1978, 58, Pl. 11, Figs. 2-9).
L=66.74-103.66 μm ; W=9.94 μm ; striae=8-10 in 10 μm (3).

E. lunaris (Ehr.) Grun. (Pl. 2, Fig. 27)
Hustedt, 1930,183,Fig. 249;Germain,1981,94,Pl. 32, Figs. 7-10).
L=78.1-124.2 μm; W=4.26 μm; striae=14-16 in 10 μm (3).

E. pectinalis var. *undulata* (Ralfs)Rabh. (Pl. 2, Figs. 29-30)
(Germain, 1981, 98, Pl. 35, Figs. 3-11;Pl. 37, Figs. 1-4).
L = 38.33 - 75.26 μm (3).

Eunotia sp. (Pl. 2, Fig. 31)
L=46.86-50 μm ; W=8.9-9.23 μm ; frustule without striae (3).

Cocconeis Ehrenberg

Cocconeis placentula var. *euglypta* (Ehr.) Cl. (Pl. 2, Fig. 32)
(Hustedt , 1930 , 190 , Fig. 261 ; Patrick & Reimer , 1966 ,241 , Pl. 15, Fig. 8).
L=19.88-26.98 μm;W=11.36-15.62 μm;striae=20-21 in 10 μm (1,2,3).

C. placentula var. *lineata* (Ehr.) Cl. (Pl.2, Fig. 33)
(Hustedt , 1930 , 190 , Fig. 262 ; Patrick & Reimer , 1966 ,242 , Pl. 15, Fig. 5-6).
L=28.4-32.66 μm ; W=15.6-21.3 μm ; striae=21 in 10 μm (1,2,3).

Achnanthes Bory

Achnanthes hungarica Grun. (Pl. 2, Fig. 34)
(Patrick & Raimer, 1966, 259, Pl. 16, Figs. 27-28 ; Germain, 1981, 112, Pl. 41, Figs. 38-45)
L = 21-42 μm ; W = 6.42 μm ; striae = 20 in 10 μm (3).

A. lanceolate var. elliptico - lanceolata
(Schaar.) R. Ross comb. nov. (Pl. 2, Fig. 35)
(Hustedt, 1930, 208, Fig. 306 b as A. lanceolata var. rostrata).
L = 9.94-12.78 ; W - 5.68 μm ; striae = 12 in 10 μm (1,2,3).

A. minutissima Kuetz
(Hustedt, 1930, 198 , Fig. 274)
L=11.36-19.88 μm ; W=2.84-3.55 μm ; very fine stria (1,2,3).

Rhoicosphenia Grunow

Rhoicosphenia curvata (Kuetz.) Grun. (Pl. 2, Fig. 36)
(Hustdt, 1930 , 211 , Fig. 311).
L = 47.6 μm ; W = 8.52μm ; striae = 13 in 10 μm (2).

Mastogloia Thwaites

Mastogloia braunii Grun. (Pl. 2, Fig. 37)
(Hustedt, 1930, 218, Fig. 320 ; Patrick & Reimer, 1966 , 302 , Pl. 20 , Figs. 18 - 19).
L=31.24-62.48 μm ; W=11.36-18.46 μm ; striae 15-16 in 10 μm ; loculi = 5-7 in 10 μm (1,3).

M. elliptica var. dansei (Thwa.) Cleve (Pl. 2, Fig. 38)
(Hustedt, 1930, 217, Fig. 318 ; Patrick & Reimer, 1966 , 300 , Pl. 20 , Figs. 20 - 23).
L 31.24 - 39.28 μm ; W 12.7 ; striae = 15 - 16 in 10 μm ; loculi = 8 in 10 μm (3).

M. smithii var. amphicephala Grun. (Pl. 2, Fig. 39)
(Hustedt , 1930 , 216 , Fig. 315).
L= 31.24 - 35.5 μm ; W - 11.36 μm ; striae 15 - 16 in 10 μm ; loculi=6-7 in 10 μm (3).

M. smithii var. lacustris Grun. (Pl. 2, Figs. 40-41)
(Hustedt, 1930, 217, Fig. 316 ; Patrick & Reimer, 1966 , 300 , Pl. 20 , Figs. 12 - 13).
L= 25.56-34.08 μm ; W= 9.94-11.36 μm ; striae 15-18 in 10 μm ; loculi = 6-8 in 10 μm (1,2).

Amphipleura Kuetzing

Amphipleura pellucida (Kuetz.) Kuetz. (Pl. 2, Fig. 42)

(Foged, 1977,28,Pl. 19,Fig. 4; Germain, 1981,137,Pl. 51,Fig. 1).
L=68.62-136.8 µm; W=7.1-8.52 µm; striae very finee (1,3).

Gyrosigma Hassall

Gyrosigma acuminatum (Kuetz.) Rabh. (Pl. 2, Figs. 43-44)
(Hustedt, 1930, 222 , Fig. 329 ; Patrick & Reimer , 1966 , 322 , Pl. 23 , Figs. 1 - 3).
L= 102.24 - 112.8 µm ; W = 14.7 - 17.9 µm ; transverse striae = 22 - 23 in 10 µm (2).

•*G. obscurm* (W. Sm.) Griff. and Henfr. (Pl. 3, Figs. 45-46)
(Patrick & Reimer, 1966 , 323 , Pl. 24 , Fig. 7).
L = 116 - 165.6 µm ; W = 11.6 - 12.78 µm ; transverse striae more than 28 in 10 µm (3).

•*G. strigile* W. Sm. (Pl. 3, Figs. 48-51)
(Hustedt, 1930 , 224 , Figs. 332 a-b , Patrick & Reimer, 1966 , 326 , Pl. 25 , Fig. 5).
L = 413.3 µm ; W = 34.2 µm ; transverse striae =12 in 10 µm ; longitudinal striae = 14 in 10 µm (1).

G. tenuirostrum (Grun.) Cl. (Pl. 3, Fig. 47)
(Cleve-Euler , 1952 , 13 , Fig. 1240).
L = 201.6 - 226.6 µm ; W = 13.3 - 14.4 µm (2).

Pleurosigma W. Smith

Pleurosigma delicatulum W. Sm. (Pl. 3, Figs. 40-42)
(Patrick & Reimer ,1966 , 336 , Pl. 28 , Figs. 4 a-b).
L = 198 - 226.8 µm ; W = 19.88 - 22.8 µm , transverse striae and diagonal striae = 20 in 10 µm (1,2,3).

Caloneis Cleve

Caloneis lanceolata (Grun.) Cleve (Pl. 3, Fig. 52)
(Hustedt , 1930 , 236 , Fig. 350 ; Patrick & Reimer , 1966 , 586 , Pl. 54 , Fig. 8).
L = 40.71 µm ; W = 9.20 µm ; striae = 21 - 22 in 10 µm (3).

C. permagna (Bail.) Cl. (Pl. 3, Figs. 53-54)
(Hustedt, 1930,232, Fig. 349, Germain, 1981,236, Pl. 86, Fig. 1)
L=90-118.8 µm ; W 34.08-39.76 µm ; striae=12-13 in 10 µm (3).

Neidium Pfitzer

Neidium iridis (Ehr.) Cl. (Pl. 3, Fig. 55)
(Hustedt, 1930,245,Fig. 379; Germain, 1981,148, Pl. 57, Fig. 1-4).
L=79.52-90 μm ; W=17.85-18.46 μm ; striae = 16-17 in 10 μm (3).

Diploneis Ehrenberg

Diploneis ovalis (Hisle) Cl. (Pl. 3, Fig. 56)
(Hustedt, 1930,249,Fig. 390; Germain,1981,142,Pl. 55, Figs. 1-8).
L=19.88-67.85 μm; W=11.36-25 μm; striae=10-12 in 10 μm (1,2,3).

D. ovalis var. *oblongella* (Naeg.) Cl. (Pl. 3, Fig. 57)
(Hustedt, 1930,249,Fig. 391; Germain,1981,144,Pl. 55, Figs. 9-11).
L= 35.71 μm ; W = 14.28 μm ; striae = 11 in 10 μm (1,3).

Stauroneis Ehrenberg

Stauroneis phoenicenteron Ehr. (Pl. 3, Fig. 58)
(Hustedt, 1930, 255, Fig. 404; Foged, 1977, 107, Pl. 24, Fig. 1).
L=78.1-89 μm ; W=18.46-21.3 μm ; striae=12-13 in 10 μm (3).

**S. smithii* Grun. (Pl. 3, Fig. 59)
(Hustdt , 1930, 261 , Fig. 420 ; Patrick & Reimer, 1966 , 365 , Pl. 30 , Fig. 12).
L=24.14-25.56 μm ; W=7.1 μm ; striae more than 21 in 10 μm (3).

Anomoeneis Pfitzer

Anomoeoeis costata (Kuetz.) Hust. (P. 3, Fig. 60)
(Hustedt , 1930 , 264 , Fig. 429 as *A. exilis*).
L=22.72-25.56 μm ; W=5.68 μm ; striae very fine (3).

A. sphaerophora (Ehr.) Pfitz.
(Hustedt, 1930,262, Fig. 422; Germain, 1981,162,Pl. 61, Fig. 1).
L=67.48-65.32 μm; W=18.46-19.88 μm; striae=15-16 in 10 μm (3).

Navicula Bory

**Navicula buccella* Hohn et Hellerman
(Hohn & Hellerman, 1963 , 239 , Pl. 4 , Fig. 22).
L 9.94-10.65 μm; W=2.84 μm ; striae 28 in 10 μm (1).

N. caterva Hohn et Hellerman (Pl. 4, Fig. 61)
(Hustedt , 1930 , 298 , Fig. 510 , Pankow , 1976 , 236 , Fig. 491 as *N. cincta*)
L=19.88-21.3 µm ; W=5.68 µm ; striae=12-15 in 10 µm (2,3).

**N. cincta* var. *heufleri* Grun.
(Hustedt, 1930, 298, Fig. 511; Pankow, 1976, 236, Fig. 492).
L=17.04 µm ; W=3.55 µm ; striae=9-10 in 10 µm (2).

N. cryptocephala Kuetz. f. *minuta* Boy-P. (Pl. 4, Fig. 62)
(Czarnecki & Blinn, 1978, 80, Pl. 18, Fig. 10 ; Hadi et al., 1984, 532, Pl. 4, Fig. 65; Pl. 10, Fig. 185).
L=18.46 µm ; W=5.69 µm ; striae=16 in 10 µm (1,3).

N. cryptocephala var. *intermedia* Grun.
(Hustedt, 1930, 295, Fig. 497a; Pankow, 1976, 235, Fig. 489).
L=25.56-28.4 µm ; W=4.97-6.39 µm ; striae=15-17 in 10 µm (2).

N. cuspidata Kuetz.
(Hustedt , 1930 , 268 , Fig. 433 ; Foged , 1978 , 87 , Pl. 27 , Figs. 1-3 & 8).
L=92.2-118.8 µm; W=22.72-29.82 µm ; striae=13-14 in 10 µm (2).

N. cuspidata var. *heribaudi* Perag. (Pl. 4, Fig. 63)
(Germain, 1981 , 169 , Pl. 64 , Figs. 2-3).
L=55.38 µm ; W=14.2 µm ; striae=15-16 in 10 µm (3).

**N. gracilis* Ehr.
(Hustedt, 1930, 299, Fig. 514; Pankow, 1976, 236, Fig. 493).
L=44.02 µm ; W=7.81 µm ; striae=10-12 in 10 µm (3).

**N.* [illegible] A. Mayer
(Hustedt, 1930, 299, Fig. 515 , Pankow, 1976, 238, Fig. 495 ; Patrick & Reimer, 1966, 516, Pl. 49, Figs. 9-10).
L=26.98-28.4 µm ; W=7.1 µm ; striae=10-13 in 10 µm (2).

N. halophila (Grun.) Cl.
(Hustedt, 1930,268,Fig. 436; Foged, 1976,34,Pl. 10,Figs. 10-12).
L=68.16-82.36 µm ; W=12.78-14.2 µm ; striae=17-18 in 10 µm (2,3).

**N. halophila* var. *subtus* f. *capitata* Petrp (Pl. 4,Fig. 64)
(Germain , 1981 , 172 , Pl. 61 , Figs. 9-10).
L=39.28 µm , W=7.85 µm ; striae=18 in 10 µm (1).

N. inexpectans J.R. Carter (Pl. 4, Fig. 65)
(Cleve-Euler , 1953 , 175 , Fig. 867 ; Hinton & Maulood , 1980 , 483 , Fig. 27 as *N. inflata*).
L=32.66-42.6 μm ; W=7.1 μm ; striae more than 21 in 10 μm (1,2,3).

N. oblonga Kuetz (Pl. 4, Fig. 66)
(Hustedt, 1930,307,Fig. 550; Foged, 1977,83,Pl. 26, Figs. 6-7).
L=118.8 μm ; W=16.2 μm ; striae=6-7 in 10 μm (3).

N. perrotettii Grun. (Pl. 4, Figs. 67-68)
(Foged, 1980, 652 , Pl. 8 , Figs. 1-2 ; Hadi et al., 1984 , 533 , Pl. 11 , Figs. 189-190).
L=183.6 μm ; W=42.6 μm ; striae=13 in 10 μm (1).

**N. placentula* (Ehr.) Grun. (Pl. 4, Fig. 69)
(Hustedt , 1930 , 303 , Fig. 532).
L=32.85 μm ; W=15 μm ; striae=9 in 10 μm (3).

N. placentula (Ehr.) Grun. fo. *rostrata* A. Mayer (Hust.) (Pl. 4 , Fig. 70)
(Hustedt , 1930 , 304 , Fig. 533)
L=29.28 μm ; W=11.42 μm ; striae=11 in 10 μm (3).

N. pupula var. *capitata* Hust.
(Hustedt , 1930 , 281 , Fig. 467c ; Patrick & Reimer , 1966 , 496 , Fig. 8).
L=32.66 μm ; W=8.52 μm ; striae=16-17 in 10 μm (3).

N. pupula var. *rectangularis* (Greg.) Grun. (Pl. 4, Fig. 71)
Hustedt, 1930, 281, Fig. 467b; Foged, 1977, 86, Pl. 29, Fig. 17).
L=28.4-32.66 μm ; W=9.94 μm ; striae=19-20 in 10 μm (3).

N. pygmaea Kuetz.
(Hustedt , 1930 , 312 , Fig. 561 ; Patrick & Reimer , 1966 , 442 , Pl. 39 , Fig. 4).
L=31.24-34.08 μm ; W=12.78 μm ; striae about 28 in 10 μm (3).

N. radiosa Kuetz. (Pl. 4, Fig. 72)
(Hustedt , 1930 , 299 , Fig. 513 ; Patrick & Reimer , 1966 , 509 , Pl. 48 , Fig. 15).
L=63.9-79.52 μm ; W=11.36-12.78 μm ; striae 10-11 in 10 μm (3).

N. radiosa var. *tenella* (Bre'b.) Grun. (Pl. 4, Fig. 73)
(Patrick & Reimr , 1966 , Pl. 48 , Fig. 17).
L=38.57 μm ; W=6.78 μm ; striae=13-14 in 10 μm (2,3).

N.rhynchocephala Kuetz. (Pl. 4, Fig. 74)
(Patrick & Reimer,1966,505,Pl. 48,Fig. 6; Germain, 1981,180,Pl.69, Fig. 1). L=35.5-41.18 μm;W=9.94 μm;striae=13-14 in 10 μm (3).

**N. salinarum* var. *capitata* Schulz
(Germain , 1981 , 189 , Pl. 72 , Fig. 13).
L=32.66 μm ; W=8.52 μm ; striae=15-16 in 10 μm (2).

**N. schroeteri* Meister (Pl. 4, Fig. 75)
(Foged , 1978 , 99 , Pl. 30 , Fig. 13 ; Germain , 1981 , 195 , Pl. 74 , Figs. 1-6).
L=42.6 μm ; W=8.52 μm ; striae=12 in 10 μm (3).

N. spicula (Hickie) Cl. (Pl. 4, Fig. 76)
(Hustedt, 1930,270, Fig. 440; Germain, 1981,168, Pl. 62, Fig. 6).
L=59.64-65.32 μm ; W=8.52 μm ; striae about 28 in 10 μm (1,2,3).

**N. tenera* Hust.
(Patrick & Reimer , 1966 , 441 , Pl. 39 , Fig. 2).
L=12.78 μm ; W 5.68 μm ; striae =16-17 in 10 μm (1).

**N. viridula* var. *rostellata* (Kuetz.) Cl. (Pl. 4, Fig. 77)
(Patrick & Reimer , 1966 , 507 , Pl. 48 , Fig. 12 ; Germian, 1981, 178 , Pl. 67 , Figs. 3-5).
L=47.19-52.54 μm ; W=8.94 μm ; striae 12-13 in 10 μm (3).

Pinnularia Ehrenberg

**Pinnularia appendiculata* (Ag.) Cl.
(HUstedt , 1930 , 217 , Fig. 570 ; Germain , 1981 , 245 , Pl. 88 , Figs. 29-32).
L=19.88 μm ; W=4.26 μm ; striae=17-18 in 10 μm (3).

P. brebissonii (Kuetz.) Rabh. (Pl. 4, Fig. 78)
(Patrick & Reimer , 1966 , 614 , Pl. 58 , Fig. 6 ; Hadi et al., 1984 , pl. 11 , Fig. 198).
L=48.28-71 μm , W=11.26-13.2 μm , striae 12-13 in 10 μm (3).

**P. gentilis* (Donk.) Cl. (Pl. 4, Fig. 79)
(Hustedt , 1930 , 235 , Fig. 618 ; Foged , 1978 , 114 , Pl. 33 , Fig. 4 ; Germain , 1981 , 268 , Pl. 97 , Figs. 3-5).
L=222.2 μm ; W=28.4 μm ; striae 7-8 in 10 μm (3).

Amphiprora Ehrenberg

Amphiprora alata Kuetz. (Pl. 5, Fig. 80)
(Hustedt, 1930,340,Fig. 625; Germain, 1981,136,Pl. 50,Figs. 3-5).
L=51.12-56.8 μm;W=24.14-28.4 μm,striae more than 21 in 10 μm (3).

Amphiprora sp.
(L=39.76-41.18 μm ; W-22.72 μm in girdlee view striae reticulate near the sides of the valve and about 10 in 10 μm (2,3).

Plagiotropis Pfitzer

Plagiotropis lepidoptera (Pfitz.) Cl. (Pl. 5, Figs. 81-82)
(Pankow , 1976 , 168 , Pl. 13 , Figs. 11-12 ; Germain , 1981 , 136 , Pl. 50 , Figs. 1-2).
L=129.8 μm ; W=22.72-25.56 μm ; striae =14 in 10 μm near the center and 18 longitudinal and transverse striae in 10 μm towards the ends (1).

Amphora Ehrenberg

Amphora *coffeaeformis* Ag.
(Hustedt , 1930 , 345 , Fig. 634 ; Czarnecki & Blinn , 1978 , 55 , Pl. 14 , Fig. 1).
L=35.5-36.92 μm ; W=5.68μm ; striae= 18 in 10 μm (1).

**A. ovalis* var. *lypica* (Ehr.) Cl. (Pl. 5, Fig. 83)
(Pankow , 1976 , 271 , Fig. 572 ; Foged , 1980 , 634 , Pl. 9 , Figs. 1-7 ; Pl. 9 , Fig. 4).
L=38.34 μm , W 17.04 μm ; striae 12-13 in 10 μm (3).

A. *veneta* Kuetz.
(Hustedt , 1930 , 345 , Fig. 631).
L=26.98 μm ; W=5.6 μm ; striae=15-16 in 10 μm (1, 3).

Cymbella Agardh

Cymbella affinis Kuetz. (Pl. 5, Fig. 84)
(Hirano, 1973,115,Pl. 5,Figs. 1-7; Foged, 1980,639,Pl. 9,Fig. 7).
L=32.66-46.6 μm; W=8.52-11.36 μm; striae=9-10 dorsally and 9-11 ventrally in 10 μm (3).

C. aspera (Ehr.) Cl. (Pl. 5, Fig. 85)
(Hustedt, 1930, 355, Fig. 680, Foged, 1978, 46, Pl. 39, Fig. 8).
L=107.92-136.8 μm; W=24.14-28.4 μm; striae=7-8dorsally and 7-9 ventrally in 10 μm (3).

C. cespitosa var. *auerswaldii* (Rabh.) mh. (Pl. 5, fig. 86)
(Cleve-Euler , 1955 , 126 , Figs. 1178 a-c).
L = 32.8 μm ; W =11.4 μm ; striae = 10 dorsally and 9-10 ventrally in 10 μm (3).

C. lanceolata (Hemp.) Grun. (Pl. 5, Figs. 87-88)
(Hustedt, 1930,363,Fig. 676a; Foged, 1977,40, Pl. 37, Figs. 6-7).
L = 42.6 - 55.38 µm ; W = 12.78 - 15.62 µm ; striae 8 - 9 dorsally and 9 - 10 ventrally in 10 µm; punctae 18 in 10 µm (3).

C. cymbiformis (Ag.) (Pl. 5, Fig. 89)
(Hustedt , 1930 , 362 , Fig. 672).
L = 66.66 µm ; W = 11.6 µm ; striae - 9 dorsally and 10 ventrally in 10 µm (3).

C. differta (A. Cleve) Krieger (Pl. 5, Fig. 90)
(Cleve - Euler , 1955 , 151 , Fig. 1225 ; Hirano , 1973 , 119 , Pl. 2 , Figs. 4-8).
L 24.14 - 28.4 µm ; W = 8.52 - 9.94 µm ; striae = 9 10 dorsally and 11 - 12 ventrally in 10 µm (3).

C. Hustedtii Krasske
(Hustedt , 1930 , 360 , Fig. 674).
L = 19.88 µm ; W = 7.1 µm ; striae = 10 in 10 µm (3).

C. microcephala Grun. (Pl. 5, Fig. 91)
(Hustedt , 1930 , 351 , Fig. 637).
L=15.62-19.46 µm ; W=4.26 µm; striae about 20 in 10 µm (3).

*C. sumatrensis Hust. (Pl. 5, Fig. 92)
(Foged , 1978 , 49 , Pl. 37 , Figs. 9 - 10).
L = 62.48 - 77.84 µm ; W = 11.36 - 12.78 ; striae - 8 dorsally and 9 ventrally in 10 µm (3).

C. tumida (Brèb. ex Kuetz.) Grun. (Pl. 5, Figs. 93-94)
(Hustedt, 1930,366, Fig. 677; Foged, 1978,49,Pl. 37, Figs. 2-3).
L 52.54 µm ; W 18.46 ; striae punctate , 20 punctae in 10 µm , striae - 10 dorsally and 9 ventrally in 10 µm (3).

C. turgida Greg. (Pl. 5, Fig. 95)
(Hustedt, 1930, Fig. 660; Hadi et al., 1984,534, Pl. 4, Fig. 68).
L 44.02 - 49.96 µm ; W 11.36 µm ; striae 8 dorsally and 8-9 ventrally in 10 µm (3).

Cymbella sp. (Pl. 5, Fig. 96)
L 22.8-28.4 µm;W 7.1-9.94 µm;striae 10 dorsally and 12 ventrally in 10 µm (3).

Gomphonema Agardh

Gomphonema augur Ehr.
(Hustedt, 1930,370,Fig. 680; Germain,1981,301,Pl. 111,Fig. 7-8).

L=26.98 µm ; W 9.94 µm ; striae = 11 in 10 µm (3).

G. constrictum var. capitata (Ehr.) Cl. (Pl. 6, Fig. 97)
(Hustedt, 1930, 377 , Fig. 715 ; Hadi et al. 1984 , 535 , Pl. 5 , Fig. 79 ; Pl. 11 , Figs. 202 - 203).
L=34.08-41.18 µm; W 9.94-11.36 µm; striae=9 - 11 in 10 µm (3).

G. gracile Ehr. (Pl. 6, Fig. 98)
(Hustedt , 1930 , 376 , Fig. 702 ; Germain , 1981 , 312 , Pl. 115, Figs. 1 - 14).
L=56.8-68.16 µm; W=8.52-9.94 µm; striae 11 in 10 µm (3).

*G. intricatum var. lunatum Germain (Pl. 6, Fig. 99)
(Germain, 1981, 306,Pl. 113, Figs. 6-11; Pl. 161, Figs. 2-3).
L=50 µm ; W 6.4 µm ; striae=8 in 10 µm (1,3).

*G. lanceolatum Ehr.to. turris (Ehr.e.p.) Hust. (Pl. 6,Fig. 100)
(Foged, 1978,70, Pl. 41, Figs. 1,2,4; 1980,644, Pl. 10, Figs.2-3).
L=52.85-55.38 µm ; W=11.36 µm ; striae=11 in 10 µm (3).

*G. montanum (Schum.)Van Heurck (Pl. 6, Fig. 101)
(Lawson& Rushforth,1975, Pl.35,Fig.4;Patrick & Reimer,1975,Pl.16, Fig.7). L=51.42 µm; W=5.7µm ; striae =10 in 10 µm (3).

*G. montanum var. subtilissimum Meyer. (Pl. 6, Fig. 102)
(Cleve - Euler , 1955 , 183 , Figs. 1276 a-k).
L=29.82-32.14 µm ; W=7.14 µm ; striae=13-14 µm (3).

*G. montanum var. turriforme Cl. (Pl. 6, Fig. 103)
(Cleve - Euler , 1955 , 182 , Figs. 1275 a-b)
L = 45 µm ; W = 11.42 µm ; striae = 13 in 10 µm (3).

G. parvulum (Kuetz.) Kuetz. (Pl. 6, Fig. 104)
(Hustedt , 1930 , 372 , Fig. 713 a).
L=21.2-26.98 µm ; W 5.68 8.52 µm ; striae=14 15 in 10 µm (3).

Denticula Kuetzing

Denticula rainierensis Sov. (Pl. 6, Fig. 105)
(Czarnecki & Blinn , 1978 , 98 , Pl. 22 , Figs. 5 a-b).
L=11.36-32.14 µm ; W 7.5 7.84 µm , striae 7 8 in 10 µm (3).

Epithemia Bre'bisson

Epithemia turgida (Ehr.) Kuetz. (Pl. 6, Fig. 106)
(Hustedt, 1930,387, Fig. 733; Foged, 1977,52, Pl. 43, Fig. 1).
L 145-162 µm ; W = 15-18 µm ; costae = 5 in 10 µm , 2 - 3 rows of areolae between the costae (3).

E. zebra (Ehr.) Kuetz. (Pl. 6, Fig. 107)
(Hustedt , 1930 , 384 , Fig. 729).
L = 38.34 - 55.38 µm ; W = 9.94 µm ; costae = 3-4 in 10 µm , 2-4 rows of areolae between the costae (1,3).

E. zebra var. proboscidea (Kuetz.) Grun. (Pl. 6, Fig. 108)
(Hustedt , 1930 , 385 , Fig. 731)
L = 52.54-65.32 µm ; W = 11.36 µm ; costae 3-4 in 10 µm , 2-4 rows of areolae between the costae (3).

Rhopalodia O. Mueller

Rhopalodia gibba (Ehr.) O. Mueller (Pl. 6, Fig. 109)
(Hustedt , 1930 , 390 , Fig. 740).
L = 85.2-136.8 µm ; W = 18.46-24.14 µm; costae = 7 in 10 µm (1,3).

*R. parallela (Grun.) O. Mueller (Pl. 6, Fig. 110)
(Foged , 1977 , 105 , Pl. 42 , Fig. 5 ; Germain , 1981 , 320 , Pl. 120 , Figs. 1-3).
L = 166.6 µm ; W [illegible] ; costae 7-8 in 10 µm (3).

Cylindrotheca Rabenhorst

*Cylindrotheca gracilis (Breb.) Grun. (Pl. 6, Fig. 111)
(Hustedt, 1930, 393, Fig. 746 ; Germain , 1981 , 324 , Pl. 121 , Fig. 10 ; Czarnecki & Blinn , 1978 , 103 , Pl. 23 , Fig. 2).
L = 97.98 µm ; W 4.26 µm (1).

Hantzschia Grunow

*Hantzschia amphioxys var. major Grun.
(Hustedt , 1930 , 394 , Fig. 749).
L = 194.4 µm; W = 15.62 µm ; striae = 10 in 10 µm ; Kiel punctae 4 -5 in 10 µm (3).

Bacillaria Gmelin

Bacillaria paxillifer (O.F. Muller) Hendey (Pl. 6, Figs. 112-113)
(Hustdt , 1930 , 396 , Fig. 755 [illegible]).
L 82.36-105.08 µm ; W = 5.68 µm ; striae about 25 in 10 µm ; Kiel punctae 5-6 in 10 µm (1,2,3)

Nitzschia Hassall

Nitzschia acicularis W. Sm. (Pl. 6, Fig. 114)
(Hustedt, 1930,423,Fig. 821; Germain, 1981,362,Pl. 137,Figs. 5-9).
L 59.54-107.24 µm , W 4.26 µm ; kiel punctae 12-13 in 10 µm.

In our material number of kiel punctae in 10 µm were less than the range given by Hustedt (1930) and Germain (1981) (1,2,3).

N. amphibia Grun. (Pl. 6, Fig. 115)
(Hustedt, 1930,414,Fig. 793; Foged, 1978,103,Pl. 46,Figs. 11-13).
L = 19.88-34.08 µm ; W = 4.26-5.68 µm ; kiel punctae = 8-10 in 10 µm ; striae = 15 in 10 µm (1,2,3).

N. apiculata (Greg.) Grun. (Pl. 6, Fig. 116)
(Hustedt , 1930 , 401 , Fig. 765).
L = 41.18-58.22 µm ; W = 5.68-7.1 µm ; kiel punctae and striae = 15-16 in 10 µm (1,2,3).

N. circumsuta (Bailey) Grun. (Pl. 6, Fig. 117)
(Hustedt, 1930,402,Fig. 761; Hadi et al.,1984,Pl. 7, Fig. 123).
L = 105.6 µm ; W = 48.3 µm ; kiel punctae = 5-6 in 10 µm (2).

N. closterium (Ehr.) W. Sm. (Pl. 6, Fig. 118)
(Germain, 1981, 362, Pl. 137, Figs. 10-11; Pl. 166, Figs. 5-6).
L = 58.22 µm , W = 2.48 µm ; kiel punctae = 14-15 in 10 µm (1).

N. filiformis (W. Sm.) Van Heurck (Pl. 6, Figs. 119-120)
(Hustedt , 1930 , 422 , Figs. 818 a-c).
L = 46.42-106.5 µm ; W = 4.26-4.64 µm ; kiel punctae = 8-9 in 10 µm (1,2,3).

N. gracilis Hantz. (Pl. 6, Fig. 121)
(Hustedt , 1930 , 416 , Fig. 794).
L=72.57-83.78 µm; W 2.9-3.55 µm; kiel punctae 11-12 in 10 µm (3).

N. granulata Grun. (Pl. 6, Figs. 122-123)
(Foged , 1980 , 656 , Pl. 12 , Figs. 7 & 9).
L = 25.98-29.26 µm ; W = 12.78-15 µm , kiel punctae and striae = 7 in 10 µm ; striae punctate ; punctae = 8-9 in 10 µm, Fig. 122. L = 25.71 µm ; W = 12.57 µm ; kiel punctae and striae = 8 in 10 µm ; striae punctate ; punctae = 11 in 10 µm , Fig. 123 (1).

N. hustediana Salah
(Foged , 1977 , 95 , Pl. 42 , Fig. 15).
L = 14.2-15.62 µm ; W = 5.68-7.1 µm ; kiel punctae and striae = 14-16 in 10 µm (1,2).

*N. ignorata Krasske (Pl. 7, Fig. 127)
(Hustedt , 1930 , 422 , Fig. 819).
L=77.14-110.76 μm; W=2.85-4.26 μm; kiel punctae=8-10 in 10 μm (3).

N. intermedia Hentz. (Pl. 7, Fig. 128)
(Foged , 1976 , 41 , Pl. 21 , Fig. 2 ; Germain , 1981 , 360 , Pl. 136 , Figs. 2-11).
L = 83.78-92.3 μm ; W = 6.39 μm ; kiel punctae = 10-12 in 10 μm ; striae dense (3).

N. kerguelensis (O. Meara) Halse (Pl. 6, Fig. 124)
(Hustedt , 1930 , 416 , Fig. 802 as *N. kützingiana*).
L = 25.71-32.66 μm ; W = 3.55-4.26 μm ; kiel punctae = 13-14 in 10 μm (1,2,3).

*N. littoralis Grun.
(Pankow , 1976 , 304 , Fig. 641 ; Germain , 1981 , 334 , Pl. 125, Figs. 3-5).
L = 48.28 μm; W = 15.62 μm; kiel punctae = 7-8 in 10 μm (2).

N. longissima (Bre'b.) Ralfs. (Pl. 7, Fig. 129)
(Germain , 1981 , Pl. 137 , Fig. 12).
L=79.52-92.3 μm;W=4.26-4.97 μm; kiel punctae=15 in 10 μm (1,2,3).

N. lorenziana Grun. (Pl. 7, Figs. 130-131)
(Germain , 1981 , 364 , Pl. 140 , Fig. 9).
L = 156.6-183.6 μm ; W = 4.26-5.68 μm ; kiel punctae = 7-8 in 10 μm ; striae = 15-16 in 10 μm (3).

N. obtusa W. Sm. (Pl. 7,Fig. 132)
(Hustedt, 1930,422, Fig. 817a; Foged, 1980,657, Pl. 13, Fig. 229).
L = 49.7 - 118.33 μm ; W = 7.1 - 8.33 μm ; kiel punctae = 6 - 8 in 10 μm (1,2,3).

N. palea (Kuetz.) W. Sm. (Pl. 6, Fig. 125)
(Hustedt, 1930, 416, Fig. 801; Foged, 1978, 108, Pl. 46, Fig. 22).
L = 25.56 - 63.9 μm ; W = 4.26 - 5.68 μm , kiel punctae =11 - 12 in 10 μm (1,2,3).

N. paleacea Grun. (Pl. 6, Fig. 126)
(Foged , 1978 , 108 , Pl. 45 , Fig. 16 ; Germain , 1981 , 349 , Pl. 132 , Figs. 23 - 25).
L=36.92-42.8 μm; W=3.3-4.26 μm; kiel punctae=14-16 in 10 μm (1).

N. punctata var. *coarctata* Grun.
(Foged , 1975 , 47 , Pl. 29 , Fig. 8 ; Hadi et al., 1984 , 539 , Pl. 6, Fig. 109).
L = 22.72 µm ; W = 11.36 µm ; kiel punctae = 11 - 12 in 10 µm ; striae = 18 - 19 in 10 µm (2).

N. scalaris (Ehr.) W. Sm. (Pl. 7, Figs. 135-137)
(Hustedt, 1930,409, Fig. 783; Germain, 1981,330, Pl. 123, Fig. 3).
L = 507.4 - 649 µm ; W = 21.3 - 22.72 µm ; kiel punctae = 3 - 4 in 10 µm ; striae = 10 in 10 µm (3).

N. sigma (Kuetz.) W. Sm. (Pl. 7, Figs. 133-134)
(Hustedt , 1930 , 420 , Fig. 813)
L=73.84-113.33 µm; W=5.68-7.85 µm; kiel punctae 9-10 in 10 µm (2).

N. sigmoidea (Ehr.) W. Sm. (Pl. 7, Figs. 138-140)
(Hustedt, 1930 , 419 , Fig. 810). L=454.3-500.5 µm; W=8.52-9.94 µm; kiel punctae=5-6 in 10 µm;striae about 21 in 10 µm (3).

N. tryblionella Hantz. (Pl.7, Figs. 141-142)
(Hustedt,1930,399,Fig.757;Germain,1981,334,Pl.125,Figs.1-2).
L=100.5-135 µm;W=20-24.14µm; kiel punctae=7-8 in 10 µm(3).

N. tryblionella var. *debilis* (Arnott.) A. Mayer
(Germain , 1981 , 334 , Pl. 126 , Figs. 7 - 10).
L=10.48 µm; W=3.52 µm; kiel punctae=8-9 in 10 µm (2).

N. tryblionella var. *levidensis* (W. Sm.) Grun. (Pl. 7, Fig. 143)
(Hustedt, 1930, 399, Fig. 760; Foged, 1976, 41, Pl. 20, Fig. 5).
L = 44.02 - 48.28 µm ; W = 8.5 µm ; kielpunctae = 12 in 10 µm ; striae = 10 in 10 µm (1,2,3).

Nitzschia sp. 1 (Pl. 7, Fig. 144)
L = 10.7 µm; W = 2.5 µm; kiel punctae = 11-12 in 10 µm (1,2,3).

Nitzschia sp. 2 (Pl. 7, Figs. 145-146)
L = 221.47 µm; W = 8.52 µm; kiel punctae = 6-7 in 10 µm (3).

Nitzschia sp. 3
L = 8.52-14.2 µm;W = 2.84 µm;kiel punctae = 13-14 in 10 µm (1,3).

Cymatopleura W. Smith

Cymatopleura elliptica (Bre'b.) W. Sm. (Pl. 8, Fig. 147)
(Hustedt, 1930,426,Fig. 825; Germain, 1981,374,Pl. 142,Figs.1-4).
L = 95.14 - 106.5 µm ; W = 49.7 - 53.96 µm (3).

C. solea (Bre'b.) W. Sm. (Pl. 8, Fig. 148)
(Hustedt , 1930 , 425 , Fig. 823 a ; Germain , 1981 ,374 ,Pl. 141, Figs.1-8).
L=71-109.34 μm ; W=21.3-25.56 μm ; kiel punctae=8-9 in 10 μm (1).

Surirella Turpin

Surirella angustata Kuetz.
(Hustedt, 1930 , 435 , Figs. 844-845 ; Hadi et al., 1984 , 541, Pl. 7 , Fig. 119).
L=53.96-68.16 μm ; W=7.81-14.2 μm ; costae=5-6 in 10 μm (3).

**S. ovata* var. *salina* (W. Sm.) Hust.
(Hustedt , 1930 , 442 , Fig. 866).
L = 15.62 μm ; W = 7.1 μm ; costae = 5 - 6 in 10 μm (2).

S. robusta var. *splendida* (Ehr.) Van Heurck (Pl. 8, Fig. 149)
(Hustedt , 1930, 437, Figs. 851-852 ; Germain, 1981 , 384 , Pl. 149 , Figs. 2 - 3).
L = 90-144 μm ; W = 35.5-54 μm ; costae = 2-3 in 10 μm (3).

S. striatula Turpin (Pl. 8, Fig. 150)
Hustedt , 1930 , 445 , Fig. 869 ; Czarnecki & Blinn , 1978 , 121 , Pl. 27 , Fig. 5).
L = 126-234 μm ; W = 76.6-140.4 μm ; striae = 17-18 in 10 μm (3).

Surirella sp. 1 (Pl. 8, Fig. 151)
L = 234.28 μm ; W = 71.42 μm ; costae = 1-2 in 10 μm (3).

Surirella sp. 2 (Pl. 8, Fig. 152)
L = 75-90.88 μm ; W = 51.3-62.48 μm ; costae = 3-5 in 10 μm ; striae = 15 in 10 μm (3).

Campylodiscus Ehrenberg

Campylodiscus clypeus Ehr. (Pl. 8, Fig. 153)
(Hustedt , 1930 , 448 , Fig. 873).
Dia = 112.1 - 140.4 μm; costae = 1 - 2.5 in 10 μm (1).

C. clypeus var. *bicostata* (W. Sm.)
(Hustedt, 1930, 448, Fig. 874; Cleve-Euler, 1952, 127, Fig. 1578).
Dia = 22.72 - 54 μm ; costae = 2 - 2.5 in 10 μm (1).

Plate (1)

Figures

1. *Melosira italica* (Ehr.) Kuetz.
2-3. *M. lineata* (Dillw.) Ag
4. *M. varians* Ag
5. *Thalassiosira fallax* Mereschk
6. *Cyclotella meneghiniana* Kuetz
7. *Cyclllotella* sp.
8-9. *Stephanodiscus* sp.
10. *Cosmiodiscus* sp.
11. *Chaetoceros* sp.
12. *Diatoma tenue* var. *elongatum* Lyngb.
13. *Fragilaria brevistriata* var. *inflata* (Pant.) Hust.
14. *F. pinnata* Ehr.
15. *Fragilaria* sp.
16-17. *Synedra acus* var. *radians* (Kuetz.) Hust
18-19. *S. capitata* Ehr.
20-21. *S. fasciculata* (Ag.) Kuetz.

Each scale represents 10 [illegible]

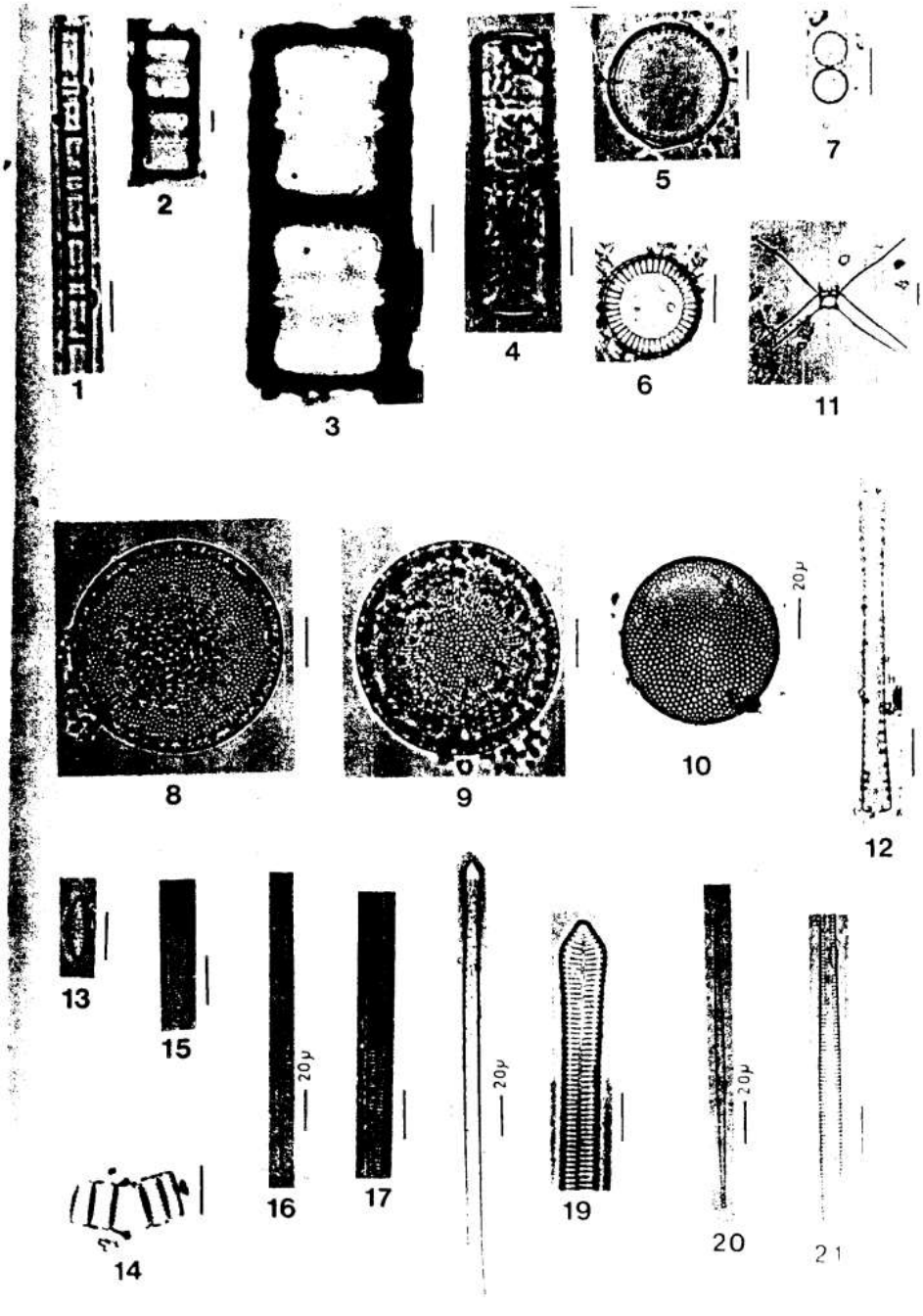
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Plate (2)

Figures

22-24. *Synedra* (Nitz.) Ehr.

25-26. *S. ulna* var ?

27. *E. lunaris* (Ehr.) Grun.

28. *Eunotia formica* Ehr.

29-30. *E. pectinalis* var. *undulata* (Ralfs)Rabh.

31. Eunotia sp

32. *E. pectinalis* var. *minor* (Kütz.) Cl.

33. *E. placentula* var. *lineata* (Ehr.) Cl.

34. *Achnanthes hungarica* Grun.

35. *A. lanceolata* var. *elliptico-lanceolata* (Schaar.) P. Rose comb. nov.

36. *Rhoicosphenia curvata* (Kuetz.) Grun

37. *Mastogloia braunii* Grun.

38. *M. elliptica* var. *danseii* (Thwa.) Cleve

39. *M. smithii* var. *amphicephala* Grun.

40-41. *M. smithii* var. *lacustris* Grun.

42. *Amphipleura pellucida* (Kuetz.) Kuetz.

43-44. *Gyrosigma acuminatum* (Kuetz.) Rabh.

Each scale represents 10 µm unless otherwise mentioned.

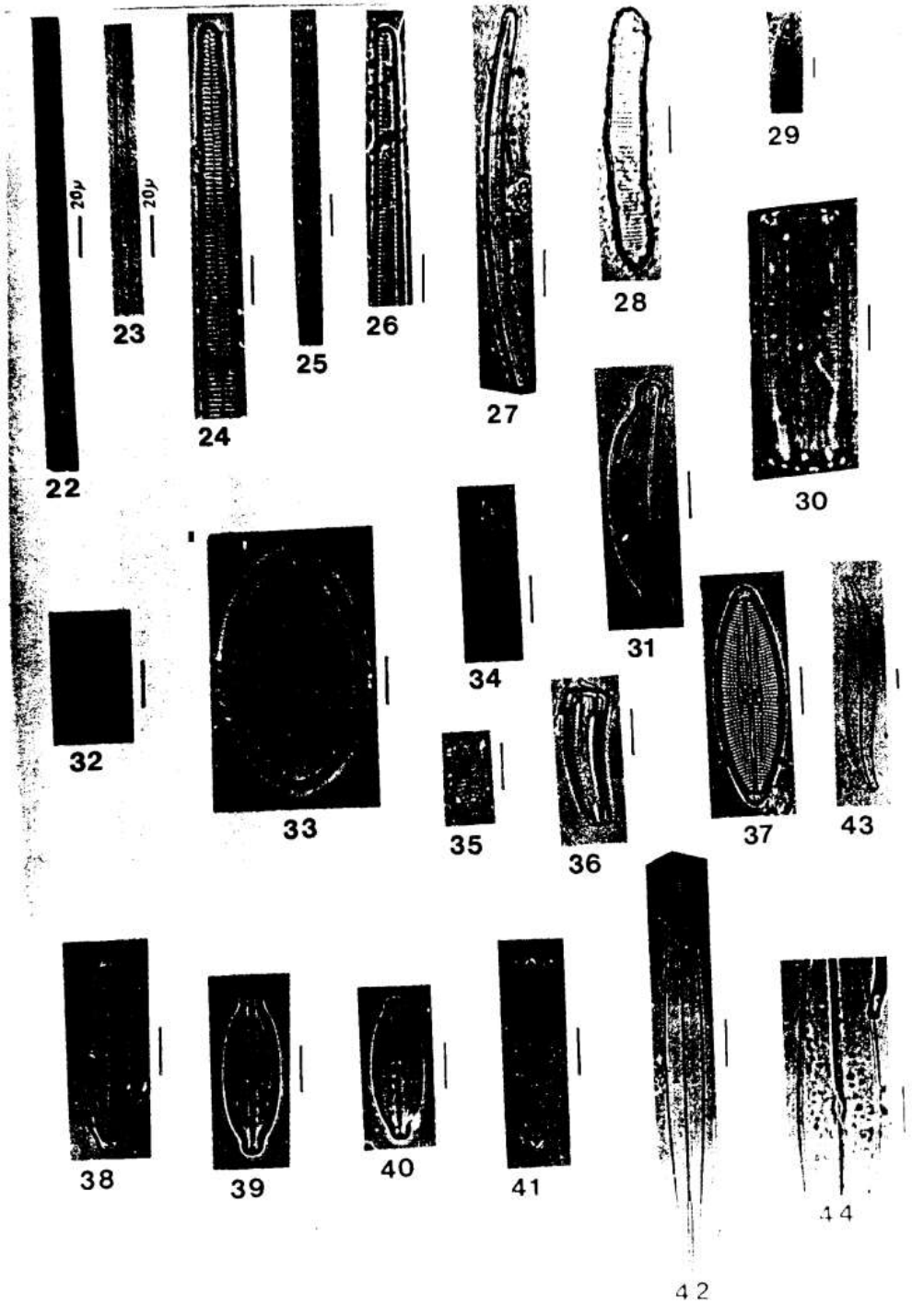
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Plate (3)

Figures

45-46. Gyrosigma distortum (W. Sm.) Griff. and Henfr.
47. G. tenuirostrum (Grun.) Cl.
48-49. Pleurosigma delicatulum W. Sm.
50-51. Gyrosigma strigile W. Sm.
52. Caloneis bacillum (Grun.) Cleve.
53-54. C. permagna (Bail.) Cl.
55. Neidium iridis (Ehr.) Cl.
56. Diploneis ovalis (Hilse) Cl.
57. D. ovalis var. oblongella (Naeg.) Cl.
58. Stauroneis phoenicenteron Ehr.
59. S. smithii Grun.
60. Anomoeoneis costata (Kuetz.) Hust.

Each scale represents 10 µm unless otherwise mentioned

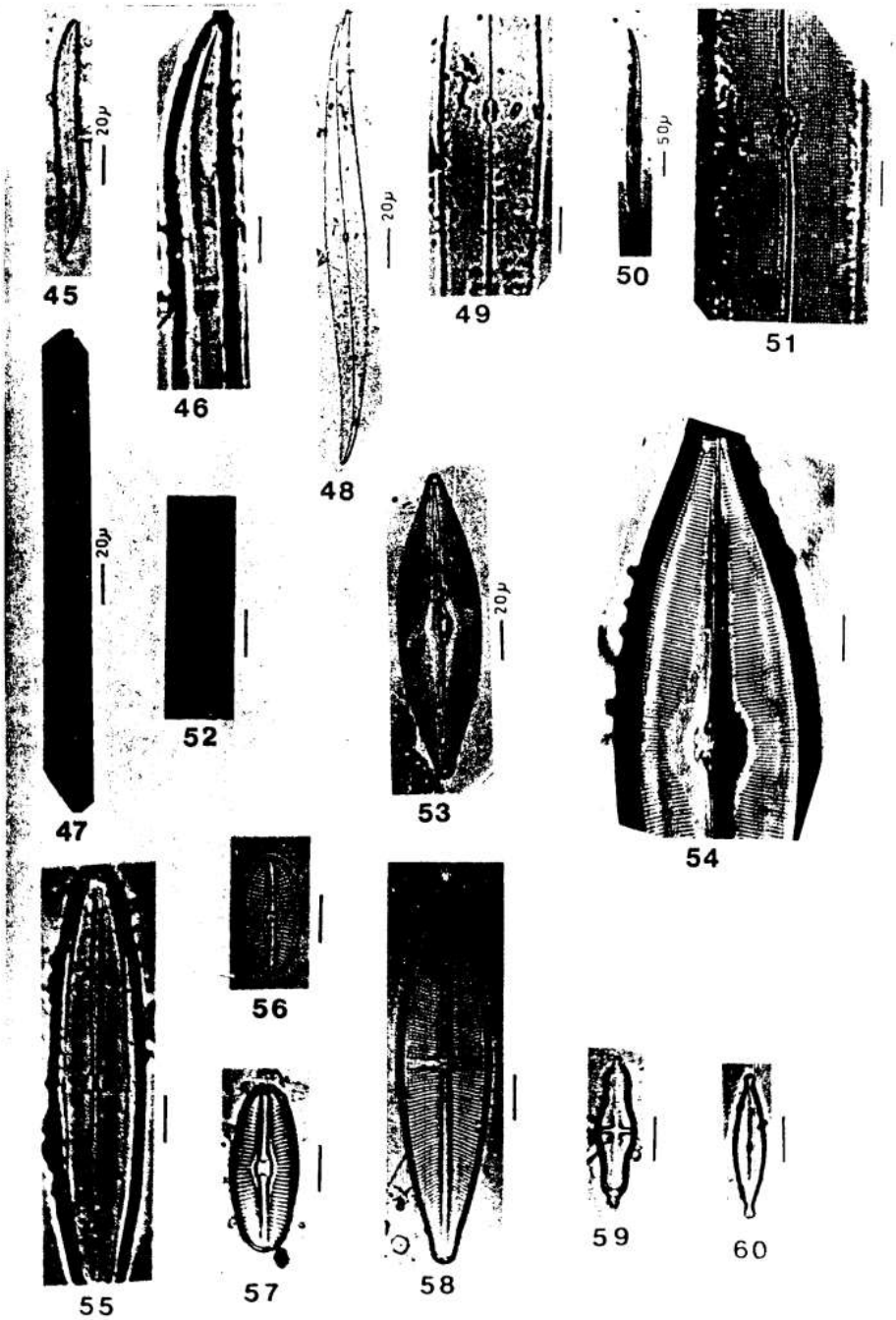
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Plate (4)

Figures

61. Navicula caterva Hohn et Hellerman.
62. N.cryptocephala Kuetz. fo. minuta Boy-P.
63. N. cuspidata var. heribaudi Perag.
64. N. halophila var. robusta fo. subcapitata Oestrup.
65. N. inexpectans J.B. Carter
66. N. oblonga Kuetz
67-68. N. peruteti[illegible] Grun.
69. N. placentula (Ehr.) Grun.
70. N. placentula (Ehr.)Grun.fo. rostrata A. Mayer (Hust.)
71. N. pupula var. rectangular[illegible] (Grun.) Grun.
72. N. radiosa Kuetz.
73. N. radiosa var. tenella (Bre'b.) Grun.
74. N. rhynchocephala Kuetz.
75. N. schroeteri Meister
76. N. spicula (Hickie) Cl.
77. N. viridula var. costellata (Kuetz.) Cl.
78. Pinnularia bre'bissonii (Kuetz.) Cl.
79. P. gentilis (Donk.) Cl.

Each scale represents 10 µm unless otherwise mentioned.

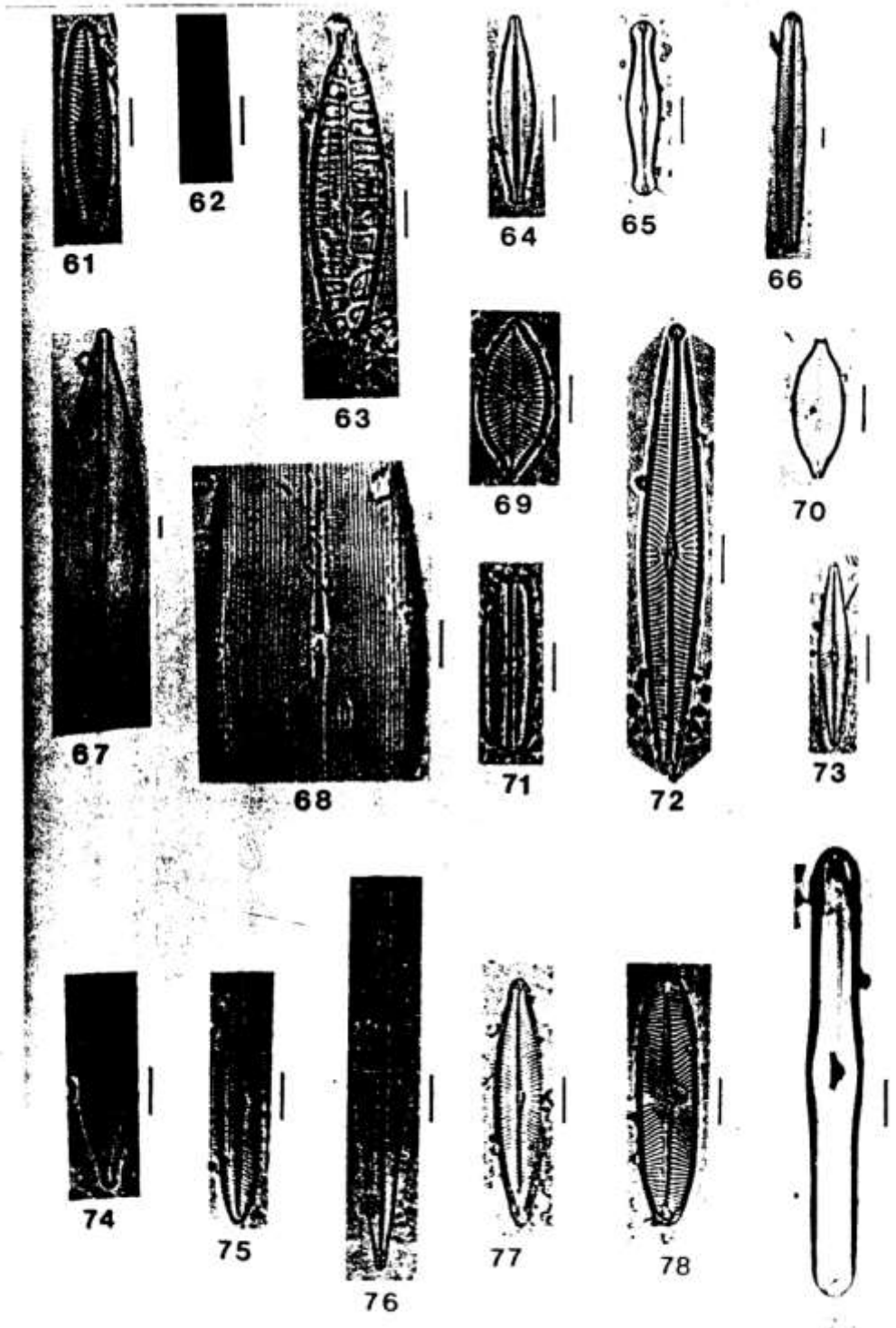
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Plate [illegible]

Figures

80. [illegible] alata Kütz.
81-82. Plagiotropis lepidoptera (Pfitz.) Cl.
83. A. ovalis var. libyca (Ehr.) Cl.
84. Cymbella affinis Kütz.
85. C. aspera (Ehr.) Cl.
86. C. caespitosa var. auerswaldii (Rabh.) [illegible]
87-88. C. cistula (Hemp.) Grun.
89. C. cymbiformis (Ag.) [illegible]
90. C. [illegible] (A. Cleve) Krieger
91. C. microcephala Grun.
92. C. sumatrensis Hust.
93-94. C. tumida (Bréb. ex Kütz.) Grun.
95. C. turgida Greg.
96. Cymbella sp.

Each scale represents 10 µm unless otherwise indicated.

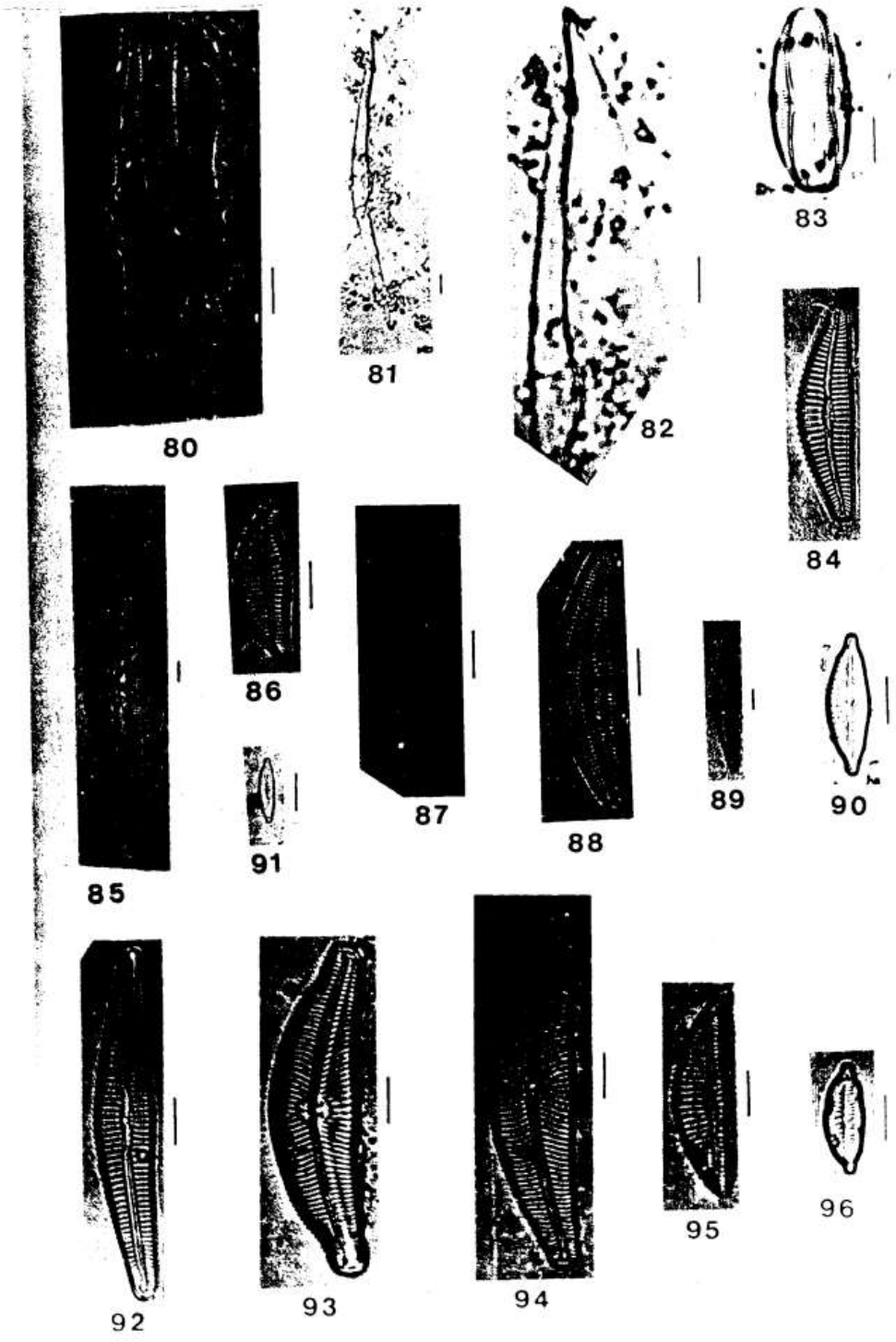
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Plate (6)

Figures

97. *G. constrictum* var. *capitata* (Ehr.) Cl.
98. *G. gracile* Ehr.
99. *G. intricatum* var. *lunatum* Germain.
100. *G. lanceolatum* Ehr.fo. *turris* (Ehr.e.p.) Must.
101. *G. montanum* (Schum.) Van Heurek.
102. *G. montanum* var. *acuminatum* Mayer.
103. *G. montanum* var. *turriforme* Cl.
104. *G. parvulum* (Näg.) Kuetz.
105. *Denticula rainierensis* Sov.
106. *Epithemia turgida* (Ehr.) Kuetz.
107. *E. zebra* (Ehr.) Kuetz.
108. *E. zebra* var. *proxellus* (Kuetz.) Grun.
109. *Rhopalodia gibba* (Ehr.) O. Mueller.
110. *R. parallela* (Grun.) O. Mueller.
111. *Cylindrotheca gracilis* (Bre'b.) Grun.
112-113. *Bacillaria paxillifer* (O.F. Muller) Hendey.
114. *Nitzschia acicularis* W. Sm.
115. *N. amphibia* Grun.
116. *N. apiculata* (Greg.) Grun.
117. *N. circumsuta* (Bailey) Grun.
118. *N. closterium* (Ehr.) W. Sm.
119-120. *N. filiformis* (W. Sm.) V. Heur.
121. *N. gracilis* Hantz.
122-123. *N. granulata* Grun.
124. *N. kerguelensis* (O. Meara) Hels.
125. *N. palea* (Kuetz.) W. Sm.
126. *N. paleacea* Grun.

Each scale represents 10 µm unless otherwise mentioned.

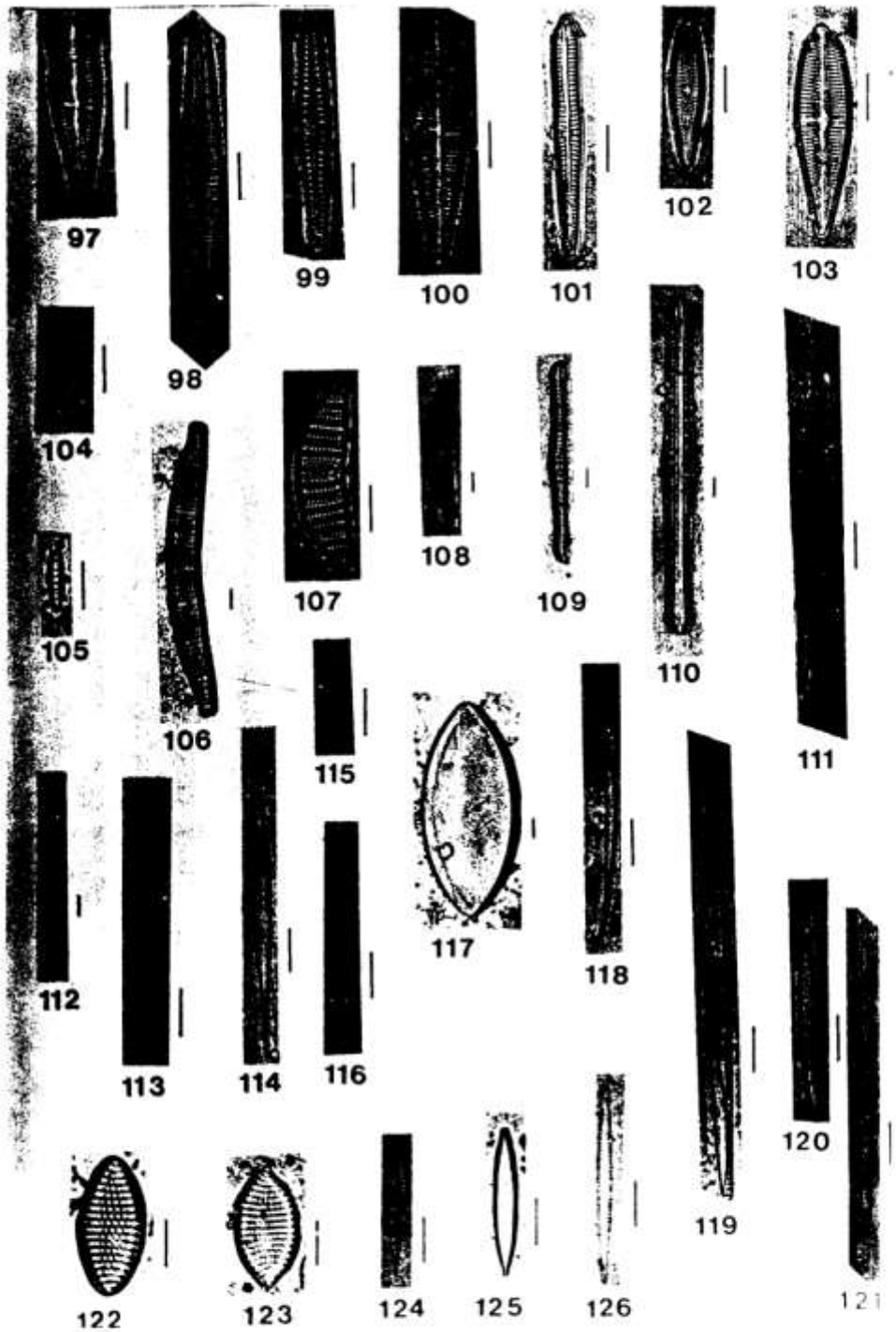
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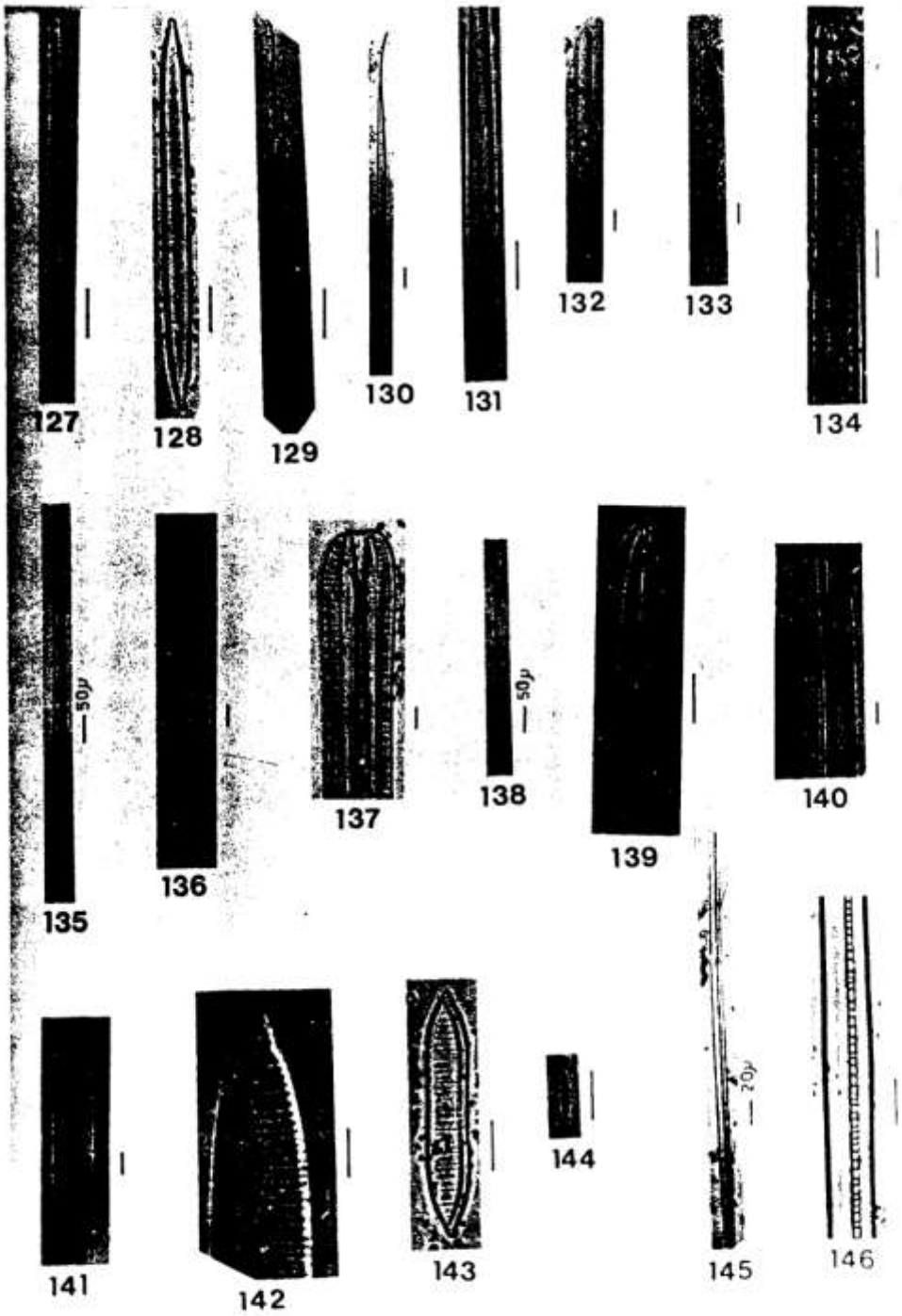
Plate [7]
Figures

127. N. ignota Krasske
128. N. intermedia Hust.
129. N. longissima (Breb.) Ralfs.
130-131. N. lorenziana Grun.
132. N. obtusa W. Sm.
133-134. N. sigma (Kuetz.) W. Sm.
135-137. N. scalaris (Ehr.) W. Sm.
138-140. N. sigmoidea (Ehr.) W. Sm.
140-142. N. tryblionella Hantz.
142. N. tryblionella var. levidensis (W. Sm.) Grun.
144. Nitzschia sp. 1
145-146. Nitzschia sp. 2

Each scale [illegible] mm unless otherwise mentioned.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20μ
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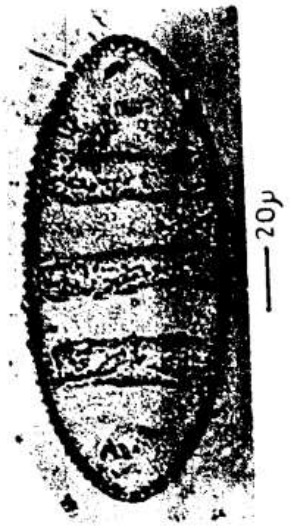
Plate (8)

Figures

147. Cymatopleura elliptica (Brèb.) W. Sm.
149. C. solea (Brèb.) W. Sm.
149. C. robusta var. splendida (Ehr.) Van Heurck.
150. C. striatula Turpin.
151. Surirella sp. ?
152. Surirella sp. ?
153. Campylodiscus clypeus Ehr.

Each scale represents 10 µm unless otherwise mentioned.



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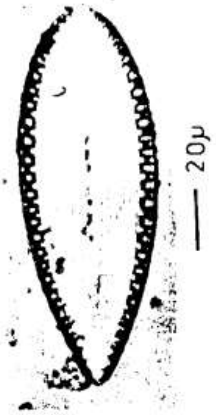

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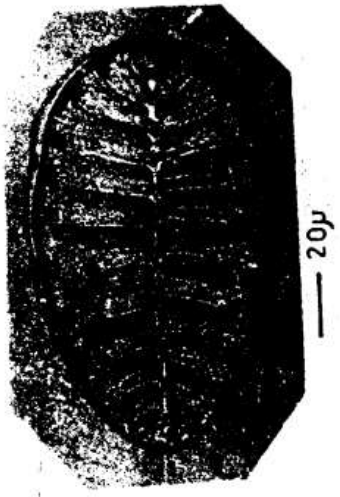

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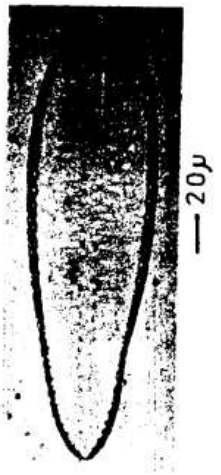

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ACKNOWLEDGMENTS

This work is a part of M.Sc. thesis given by the second author to the Department of [illegible], College of [illegible], University of Basrah. The authors are thankful to the Marine Science Centre for providing the facilities for this project and to Mr. Omar [illegible] Shaba [illegible] University of Basrah [illegible] photography.

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دراسة عن الدايتومات في الاهوار قرب القرنة ، جنوب العراق

المستخلص

تم تسجيل ١٥٦ نوع للدايتومات من منطقة الاهوار ـ جنوب العراق منها ٣٢ نوع سجل لاول مرة في العراق، تم اعطاء القياسات التصنيفية لمعظم الانواع المشخصة المعززة بالصور الفوتوغرافية.