Study of fresh water diatoms from Al-Salehiya river in Basrah, south of Iraq

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Abstract

The present study was carried out in Al-Salehiya river (abranch of shatt Al-Arab river) in Five stations from March 2014 - February 2015 to contribute the knowledge of fresh water diatoms in Iraq . A total of 56 taxa of diatom were identified belonging to 30 genera ,their all diatoms species were imaged by light microscope, as well as , their dimension was given in this study.

Keywords: Al-Salehiya river , diatom, fresh water, Shatt Al-Arab

Introduction

Diatoms are unicellular algae that occurring generally as single cells but some species constitute colonies. The especial features involve the siliceous cell wall (frustule), the owning of unique photosynthetic tincture and appointed storage products (oil and chrysolaminarin). Diatoms owing two parts(each parts are called valve) petri dish like construct joined jointly by girdle bands. In fresh water two groups of diatom were found general namely the centric diatom, that in general circular or discoid in form and adapted to survive in the water column as part of the phytoplankton, and the pennate diatoms that survive in benthic habitats but are often momentarily re-suspended in the water column (Mitbavkar, 2003; Wehr and Sheath, 2003; Taylor *et al*, 2007 b; Karthick *et al*,2010). Diatoms live in fresh, salt, and brackish water as well as ice, moist soil, and other damp places. Some species are epiphytic and live attached to other plants , often to the smaller seaweeds in the ocean,a few attach themselves to animals. Most species live as single cells, free in the water; many become attached to the substrate by agelatinous stalk; others form free or attached colonies of various

shapes; and still others live in gelatinous tubes or in irregular gelatinous masses(Cupp,1943). The first study on diatoms in Iraq was published by Klobe and Krieger (1942) , followed by a number of investigations in various parts of Iraq some of it in Shatt Al-Arab and the branches(Huq *etal .(1978*) Saad and Antoine 1982,1983,Hadi *etal.* (1984) ,Hadi and Al- Saboonchi(1989); Al-Mousawi *etal*.(1990) ,Hameed (2003), Al-Handal (2009),Al-Saboonchi and Al-Manshed (2012) ,Eassa (2012) , and marsh south of Iraq (Al-Zubaidi, 2000 , Hadi and Al-Zubaidi ,2001; Al-Zubaidi *etal* 2006 ; Hammadi *etal. (*2007) , Al-Handal and Sno (2010) ,Hassan *etal.(* 2012a), , Al-Handal *etal. (*2014) . The aim of the present work to study diatoms that found in Al-Salhia river among other many branches of the Shatt Al- Arab river and represent the first study in this site.

Materials and Methods

Planktonic sample was collected from five station in Al-Salehiya river(small Shatt Al-Arab)which is branched of Shatt Al-Arab river were located to the south of it and surrounds the Al-Salehiya island (Figure 1) from March 2014 to February 2015 by Phytoplankton net (mesh size 20 μm) and reserved by Formalin solution (4%) , or lougle's solution, The samples are cleaned with add 5 ml of a strong acid mixture (HNO**3** + H2SO4, 2**:**1) to beakers contain 2 ml of phytoplankton sample then heated by a hot plate ,beakers should be covered with a watch glass to prevent contamination , heat the samples at 90°C for 2-3 hours, depending on the amount of organic matter in the sample; When oxidation is complete, the samples are allowed to cool , then wash the diatoms with distilled water to remove the acids , prepare diatom slides and examined microscopically depended by (Taylor *etal* 2007a) . Identifications and imaging of diatom species were done by microscope digital Camera(SCMOS03000KPA) and measure the diameter, long and width of examined taxon.

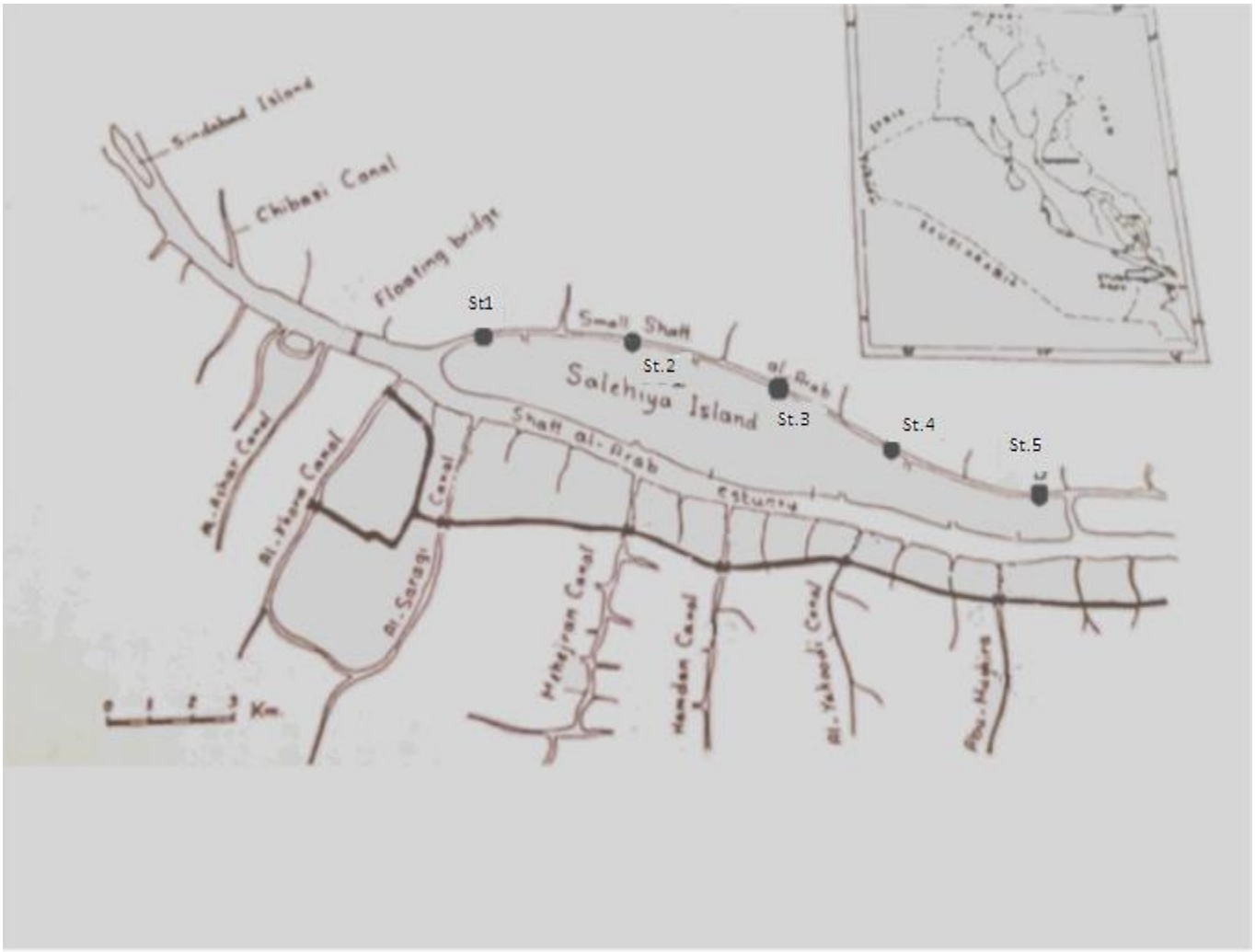

Figure 1: The map showing the sampling station in Al-Salehiya river (small shatt Al-Arab) south east of the Basrah city.

Results and discussion

A total of 56 diatom taxa belonging to 30 genera were recorded from 5 station of Al-Salhia river . Dimensions of each encounted diatom are provided in present study and the classification of the taxa was according to Round *et al.* (1990).

Division: Bacillariophyta

Class1: Coscinodiscophyceae

Order: Thalassiosirales

Family: Stephanodiscaceae

Genus: *Cyclotella*

Cyclotella meneghiniana Kützing (Pl. 1, Fig. 1).

Dimensions: Diameter: 15.45-32. 5 µm, striae: 7-10 in10 µm (Hustedt 1930, p.100, fig. 67,figs. 1-2 ,Jena *etal*.2006,P.*379* , Pl. 1, Fig.2-3).

Cyclotella stylorum Brightwell (Pl. 1, Fig.2).

Dimensions: Diameter: 27.32-44.92 µm, striae: 11-14 in10 µm, (Tomas 1996, p.34, , pl.1, fig. b).

Class2: Fragilariophyceae

Subclass: Fragilariophycidae

Order: Fragilariales

Family: Fragilariaceae

Genus: *Tabularia*

Tabularia fasciculata (C.Agardh) D.M.Williams & Round (Pl.4, Fig.54)

Synonym:, *Synedra fasciculata* (Agardh) Kützing

Dimensions: Apical axis: 92.1 - 125. 8 µm, transapical axis:3.53- 5.26 µm. (Patric and Riemer, 1966 ,P.141 ,Pl.5, Fig. 17,18)

***Tabularia* sp.** (Pl.4, Fig. 55)

Dimensions: Apical axis: 35- 121. 4µm, transapical axis: 3. 8-8.2µm, striae: 10-16 in 10 µm.

Class3: Bacillariophyceae

Subclass: Bacillariophycidae

Order1: Mastogloiales

Family: Mastogloiaceae

Genus: *Mastogloia*

Mastogloia braunii Grunow (Pl.2, Figs.21,24)

Dimensions: Apical axis: 20.39-62.51µm, transapical axis: 16.62-17.44µm, striae: 15-17 in 10 µm. (Patric and Riemer, 1966 ,P.302 ,Pl 20, Fig,18,19)

Mastogloia pumila (Pl.2, Fig.23)

Dimensions: Apical axis: 20.1 -30µm, transapical axis: 9-18µm, striae: 15-17 in 10 µm, (Patric and Riemer, 1966 ,P.301 ,Pl 20, Fig,16,17)

Mastogloia smithii Thwaites (Pl. 2 ,Fig.22,25)

Dimensions: Apical axis: 20.1 -50µm, transapical axis: 8-14 µm Striae 18-22 in10 µm , (Patric and Riemer, 1966 ,P.299 ,Pl 20, Fig,14,15).

Order: Cymbellales

Family: Gomphonemataceae

Genus: *Gomphonema*

Gomphonema lanceolatum fo. ***turris*** (Ehr. c.p.) Hust (Pl.2, fig. 26)
Apical axis:53- 78 µm, transapical axis: 11 -12.3µm, striae: 10 in 10 µm,(Gandhi, H.P. 1959, P. 325, Fig. 47; Hadi *et al*. 1984, P. 535, Pl. 5, Fig. 78; Pl. 12, Fig. 205, Rai,S.K. 2006, P. 16, Fig. 10)

Family: Cocconeidaceae

Genus: *Cocconeis*

Cocconeis placentula Ehrenberg (Pl.1, Figs.3,4)

Dimensions: apical axis: 32.95-47.55 µm, transapical axis: 19.19-27.85 µm, striae:14-20 in 10 µm , puncta: 14-20 in 10 µm. (Tiffany, L.H. & Britton, M.E. 1952,Pl.64, Fig. 735, P. 241, Prasad, B. N. and Srivastava, M. N. (1992), p.198, pl.27, Fig.6.)

Cocconeis placentula var. euglypta (Ehrenberg) Grunow (Pl. 1,Fig.5)

Dimensions: apical axis: 16.89-43.69 µm, transapical axis: 8.12-22.38 µm, striae: 16-22in 10 µm, puncta: 14-20 in 10 µm. (Hustedt, 1930, 190, fig. 261; Patrick & Reimer, 1966, 241, pl.15, figs. 8; pl. 9, fig. 158; Lawso & Rushforth, 1975, 21, pl.11, fig. 1)

Order: Cocconeidales
Family: Achnanthidiaceae

Genus*: Lemnicola*

Lemnicola hungarica (Grunow) F.E.Round & P.W.Basson (Pl.2, Fig.33 ,34)

Synonym:, *Achnanthes hungarica* (Grunow) Grunow,

Dimensions: Apical axis: 24.5-27.2 µm, transapical axis: 7.67-8.1 µm, striae: 20-23in 10 µm. (Patric and Riemer, 1966 ,P.259 ,Pl.16, Fig.27,28)

Order: Naviculales

Suborder: Neidiineae

Family: Amphipleuraceae

Genus: *Halamphora*

Halamphora ghanensis Levkov (Pl.2, Figs.30,31)

Dimensions: Apical axis: 26.69-29.37µm, transapical axis: 4.57-5.5 µm, striae: 13-17 in 10 µm, puncta: in 10 µm.(Cavalcante, KP.*etal*.,2014, Fig. 15-17, Levkov 2009, p. 194, pl. 105, figs 12-19, pl. 235, figs 1-7).

Halamphora veneta (Kütz.) Levkov, 2009 (Pl.2, Fig.27)

Basionym: *Amphora veneta* Kützing.

Dimensions: Apical axis: 33.88-35.98 µm, transapical axis: 4.81-5.68 µm, striae: 20-21 in 10 µm, puncta: in 10 µm. ((Carter & Denny, 1992, Taylor *et al*. 2007b.Pl.96

Order Thalassiophysales

Family Catenulaceae

Genus *Amphor*a

Amphora copulata(Kützing) Schoeman et Archibald (Pl.2, Fig.32).

Length 24-60.6 µm, valve width 4.6-10 µm, 14-16 striae in 10 µm. (Schoeman &Archibald,1986 , 429,Fig.11- 13,30-34)

Family: Berkeleyaceae

Genus: *Parlibellus*

Parlibellus crucicula (W.Smith) Witkowski, Lange-Bertalot & Metzeltin (Pl.3, Figs.38,39)

Basionym: *Stauroneis crucicula* W.Smith.

Dimensions: Apical axis: 45.32-80.48µm, transapical axis: 12.6-18.44µm, striae: 15-19 in 10 µm.(Lange-Bertalot&Metzeltin 2000,P.321, Pl.2, Fig.21, Joh,G.,2013 P. 384, Pl. 5, Figs.2)

Order: Naviculales

Family: Diadesmidaceae

Genus: *Luticola*

Luticola nivalis (Ehrenberg) D.G.Mann (Pl.3, Figs.42)

Synonym: *Navicula mutica var. nivalis* (Ehrenberg) Hustedt

Dimensions: Apical axis: 16.54- 18.98µm, transapical axis: 6.48- 7.45µm, striae: 14-20 in10 µm, puncta: 15-20in 10 µm. (Patric and Riemer,1966,P.456, pl.42 ,Fig.6-9).

Genus: *Caloneis*

Caloneis permagna (Bailey) Cleve (Pl.3, Fig.41)

Dimensions: Apical axis: 71.1-175.46 µm, transapical axis: 26.71-39.9 µm, striae: 12-15 in 10 µm. (Patric and Riemer, 1966,P.580, Pl.53, Fig.5).

Genus: *Pinnularia*

Pinnularia viridis (Nitzsch) Ehrenberg (Pl.3, Fig.40)

Dimensions:Apical axis:46-125 µm , transapical axis :14-21 µm Striae 7-9 in10 µm. Tiffany & Britton, 1952, pl. 70, Fig. 809; Prasad& Srivastava, 1992, pl. 30, Fig. 6]

Suborder: Diploneidineae

Family: Diploneidaceae

Genus: *Diploneis*

Diploneis smithii (Brébisson) Cleve (Pl.3, Fig.45)

Dimensions: Apical axis: 19.4-21.17 µm, transapical axis: 7.4-8.57 µm, striae: 13-15 in 10 µm.(Hustedt, 1930, p.250,fig. 395, Meeravali S.N,2015,P.6925, Pl.1, FIg.14).

Suborder: Naviculineae

Family: Naviculaceae

Genus: *Navicula*

Navicula radiosa Kuetz (Pl.3, Fig.36)

Dimensions: Apical axis: 41.55-70.9 µm, transapical axis: 7.82-10.88 µm, striae: 10-12 in 10 µm.(Tiffany, L.H. and M.E. Britton 1952, P. 255, Pl. 67, Fig. 780; Foged, N. 1983, P. 446, Pl 3, Fig. 18; Prasad, B.N. and M.N. Srivastava 1992, P. 212, Pl. 28, Fig. 4 , Meeravali S.N,2015,P.6926, Pl.2, FIg.2).

***Navicula viridula* Kütz** (Pl.3, Fig.44)

Dimensions: Valve length : 44-60 µm , Valve breadth 5.5-9 µm Striae 12-13 in 10µm(Hustedt, 1930, p.297, fig. 503,Rashmi Pareek *et al*., 2011, p. 112, fig.1k.)

Navicula sp1. (Pl.2, Fig.19)

Dimensions: Apical axis: 68.5-80µm, transapical axis: 5.61-8.77µm, striae: 4-5 in 10 µm.

Navicula sp2. (Pl.3, Fig.35)

Dimensions: Apical axis: 26.33-42µm, transapical axis: 9.37-11.22µm, striae: 5-8 in 10 µm.

Navicula salinarum Grunow (Pl.3, Fig.43)

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Dimensions: Apical axis: 23.94-31.17µm, transapical axis: 6.8-8.1µm, striae: 15-18in 10 µm.(Grunow 1880 (Pl. 1, Figs. 24, 25,Lange-Bertalot 2001, p 65, pl. 45: 1−8, Joh,G.,2013 P. 382, Pl.1, Figs.24,25).

Genus: *Seminavis*

Seminavis strigosa (Hustedt) Danieledis & Economou-Amilli (Pl.2, Fig.29)

Dimensions: Apical axis: 20.52- 26.62µm, transapical axis: 3.86-5.35 µm, dorsal striae: 16-20 in 10 µm, ventral striae: 16-18 in 10 µm.(Taylor *et al*. 2007b,Pl.99 , (Cavalcante, KP.*etal*.,2014, Fig.3-12).

Genus: *Haslea*

Haslea spicula (Hickie) L.Bukhtiyarova (Pl.3, Fig.37)

Synonym: *Navicula spicula* (Hickie) Cleve,

Dimensions: Apical axis: 62.26-101 µm, transapical axis: 9.14 µm. (Patric and Riemer, 1966; 1966,P.469, pl. 44 ,Fig.9 , Witkowski et al. 2000, p 231, pl. 97,Fig. 6).

Order: Naviculales

Suborder: Sellphorineae

Family: Sellphoraceae

Genus: *Fallacia*

Fallacia tenera (Hustedt) Mann (Pl. 3, Fig.46)

Basionym: *Navicula tenera* Hustedt

Dimensions: Apical axis: 12.42-14.43µm, transapical axis: 5.88-6.18µm, striae: (16)17-18 in 10 µm. Round et al. 1990 ,Pl. 7, Figs. 8−11,Witkowski et al. 2000, p 214, pl. 71: 52−56).

Suborder: Sellphorineae

Family: Sellphoraceae

Genus: *Sieminskia*

Sieminskia wohlenbergii (Brockmann) D.Metzeltin & Lange-Bertalot (Pl.4, Fig.51)

Basionym: *Navicula expansa* Hagelst

Dimensions: Apical axis: 68.44-106.81µm, transapical axis: 17.85-24.66µm, striae: 13-21in 10 µm, puncta:

12-18 in 10 µm. (Patric and Riemer, 1966,P.459, pl.43,Fig.1-3).

Suborder: Naviculineae

Family: Pleurosigmataceae

Genus: *Gyrosigma*

Gyrosigma acuminatum (Kützing) Rabenhorst (Pl. 5, Fig.63)

Dimensions: Apical axis: 159.9-187.03µm, transapical axis: 21.9-23.26µm, longitudinal striae: 17-18 in 10 µm, transverse striae: 13-16 in 10 µm. (Desikachary 1988, p. 10, pl. 592, figs. 14-16; Rath andAdhikary 2005, p. 89, pl. 13, fig. 87, Jena *etal.* 2006,P.384, Pl. 2, Fig. 5)

Gyrosigma attenuatum (Kützing) Rabenhorst (Pl. 5, Fig.64)

Dimensions: Apical axis: 141.76-296.37µm, transapical axis: 24.34-29.93µm, longitudinal striae: 10-12in 10 µm, transverse striae: 10-13in 10 µm. (Hustedt1930, p.224, fig. 330, Gupta, R.K. ,2005 p. 183, pl. 52. fig. 6.)

Gyrosigma scalproides (Rabenhorst) Cleve (Pl.5, Fig.62)

Dimensions: Apical axis: 76.38-104.99µm, transapical axis: 11.41-15.5µm, longitudinal striae: 26-28in 10 µm, transverse striae: 19-23in 10 µm. (Venkataraman 1939, p.319, fig.76., Jena *etal.* 2006,P.384, Pl. 2, Fig. 4)

Gyrosigma sinense (Ehrenberg) Desikachary (Pl.5, Fig.60) .

Dimensions: Apical axis: 116.15-208.23µm, transapical axis: 13.69-18.64µm, longitudinal striae: 16-18 in 10 µm, transverse striae: 13-16 in 10 µm.(Desikachary 1988, p. 11, pl. 592, figs. 1-11)

Genus: *Pleurosigma*

Pleurosigma delicatulum W.Sm. var. ***delicatulum*** (Pl.5, Figs.61)

Dimensions: Apical axis: 135.11-257.88µm, transapical axis: 14.32-26.73µm, transapical striae: 16-20in 10 µm, oblique striae: 18-22 in 10 µm, raphe angle: 5.07- 7.7, striae angle: 53- 66. (Patric and Riemer, 1966,P.336, pl.28,Fig.4a,b,Hadi *etal.*1984,531,Pl.4,Figs,71-72).

Family: Stauroneidaceae

Genus: *Craticula*

Craticula cuspidata (Kutzing) D.G.Mann (Pl.4, Figs.50)

Synonym: *Navicula cuspidata* (Kutzing) Kutzing,

Dimensions: Apical axis: 82.71- 93.9 µm, transapical axis: 17.4-20.43 µm, striae: 13-17 in 10 µm. (Patric and Riemer, 1966,P.464, pl.43,Fig.9-10, Taylor *et al*. 2007b,pl.46).

Order: Bacillariales

Family: Bacillariaceae

Genus: *Bacillaria*

Bacillaria paxillifera (O.F.Müller) T.Marsson (Pl.4, Figs.57)

Dimensions: Apical axis: 61.27-120.19 µm, Transapical axis: 4.5- 6.46 µm, Striae: 18 -24 in 10 µm, Fibulae: 4-9 in 10 µm. .(Taylor *et al*. 2007b,pl.136, Hadi *etal*.1984,537,Pl.6,Figs,111).

Genus: *Nitzschia*

***Nitzschia amphibia* Grunow** (Pl. 3, Fig.48)

Dimensions: Apical axis :17.26-30.1µm,Transapical axis: 4.06-5.1 µm; striae 16-19 in 10 µm, Margins fibulate. (Lawson and Rushforth, 1975, 53, pl. 38, figs. 3, 8-9; Czarnecki and Blinn,1977, 64, pl.16, fig. 4, Meeravali S.N,2015,P.6927, Pl.2, Fig11)

Nitzschia sp1(Pl.4, Fig.56)

Dimensions: Apical axis: 82.71-177.37µm, transapical axis: 5.12- 8.87 µm, striae: 16-20in 10 µm, fibulae: 9- 13 (15) in 10 µm.

Nitzschia clausii Hantzsch (Pl.4, Fig.53)

Dimensions: Apical axis: 39.83- 76 µm, transapical axis: 3.81- 6.77µm, fibulae: 6-11 in 10 µm.(Taylor *et al*. 2007b,pl.147)

Nitzschia sigma (Kützing) W.Smith (Pl.5, Fig.58)

Dimensions: Apical axis: 60.7- 142 µm, transapical axis: 5.15- 8.87µm, fibulae: 9-13in 10 µm.(Hustedt,1930,420, fig.813; Al-Zubaidi, 1985,124, pl.7, figs. 133-134, Hadi *etal*.1984,540,Pl.6,Figs,94-96).

Nitzschia sigmoidea (Nitzsch) W.Smith (Pl.5, Fig.59)

Dimensions: Apical axis: 301.84-334.44µm, transapical axis: 10.96-11.8µm, striae: 22-24 in 10 µm, fibulae: 5-8 in 10 µm. (Desikachary 1989, p. 4, pl. 663, fig. 3, Al-Zubaidi, 1985,124, pl.7, figs. 138-140)

Nitzschia sp2 (Pl.2, Fig.14)

Dimensions: Apical axis: 15.2-18 µm, transapical axis: 5.47- 7.14µm, striae: 15-18 in 10 µm, fibulae: 16-18 in 10 µm.

Nitzschia tryblionella Hantzsch (Pl.4, Fig.52)

Dimensions: Apical axis: 57.26- 137.9 µm, transapical axis: 13.48- 20.25µm, fibulae: 6-11in 10 µm, Transapical ridges: 5-12 in 10 µm.(Hustedt, 1930, 399, fig.757; Al-Zubaidi, 1985,124, pl.7, figs. 141-142)

Genus: *Hantzschia*

Hantzschia amphioxys (Ehrenberg) Grunow (Pl.3, Fig.49)
Dimensions: Apical axis 60-67 µm, transapical axis: 7-8 µm, keel punctae 7-8 in 10 µm,(Hustedt, 1930, p.394, fig. 747, Gupta, 2005 p.190. pl. 54. fig.15).

Genus: *Tryblionella*

Tryblionella* cf. *coarctata (Grunow) D.G.Mann (Pl.1, Fig. 11)
Dimensions: Apical axis: 24.57- 32.16 µm, transapical axis: 9.35- 9.71 µm, striae: 16-20in 10 µm, areolae: 14-16 in 10 µm.(Taylor *et al*. 2007b,pl.143)

Tryblionella compressa (Bailey) Poulin (Pl.1,Fig.13)
Dimensions: Apical axis: 20.33-37.12µm, transapical axis: 9.43-22 µm, striae: 10-11in 10 µm, fibulae: 10-11in 10 µm, puncta: 10-14 in 10 µm.(Poulin *et al*. (1990): 96, fig .98, Jiunn-Tzong Wu *et al*,(2011), p.76, pl. 96, figs. b-d.)

Tryblionella granulata (Grunow) D.G.Mann (Pl.1, Fig.12)
Basionym: *Nitzschia granulate* Grunow
Dimensions: Apical axis: 23.67- 37.30µm, transapical axis: 13.14- 17.57 µm, striae: 6-8 in 10 µm, areolae: 5-7 in 10 µm. (Foged,1980,656 , pl.12, figs. 7,9)

Tryblionella hungarica (Grunow) Frenguelli (Pl.3, Figs.47)

Basionym: *Nitzschia hungarica* Grunow

Dimensions: Apical axis: 40.01- 110.4µm, transapical axis: 5.4- 6.85 µm, striae: 17-21 in 10 µm, fibulae: 9-13in 10 µm.(Taylor *et al*. 2007b,pl.139)

Order: Rhopalodiales

Family: Rhopalodiaceae

Genus: *Epithemia*

Epithemia adnata (Kützing) Brébisson (Pl.2, Fig. 28)

Dimensions: Apical axis: 97.43 µm, transapical axis: 12.26 µm, striae: 11-12 in 10 µm, puncta: 5-6 in 10 µm (striae) between fibulae: 3-7.(Hofmann et al. (2011) Pl. 119,fig.5-9)

Genus: *Rhopalodia* Muller 1895

Rhopalodia gibba (Ehrenberg) Otto Müller (Pl. 2, Fig.17)

Dimensions: Apical axis: 123.74-192.66µm, transapical axis: 7.9-10.31µm, striae: 12-16in 10 µm.(Desikachary 1987, p. 3, pl. 231, fig. 10.)

Rhopalodia gibberula **(Ehrenberg) O Müller** (Pl. 2, Fig.15,16)

Dimensions: Apical axis: 25-100, transapical axis: 5-12 µm, Striae in15-19 /10 Fibulae :3-10 µm Costae :15-19 /10 µm. (Taylor *et al*., 2007b,Pl. 133).

Order: Surirellales

Family: Entomoneidaceae

Genus: *Entomoneis*

Entomoneis alata (Ehrenberg) Ehrenberg (Pl. 1, Figs.8 ,9)

Synonym: *Amphiprora alata* (Ehrenberg) Kuetzing

Dimensions: Apical axis: 65.71-71.13 µm, transapical axis (valve view): 5-7.9µm, transapical axis (girdle view): 12.53- 25.19 µm, striae: 18-20 in 10 µm. (Hustedt, 1930, 340, fig.625; Al-Zubaidi, 1985,114, pl.5, fig. 80)

Entomoneis paludosa (W.Smith) Reimer (Pl.1, Fig.10)

Synonym *:Amphiprora paludosa* W.Smith

Dimensions: Apical axis: 44.83- 110.6 µm, transapical axis (valve view): 4.1-7.2 µm, transapical axis (girdle view): 18.82-22.21

µm, striae: 18-20 in 10 µm.(Patrick and Reimer, 1975,P. 4, pl.1,Fig. 1)

Genus: *Surirella*

Surirella sp.(Pl. 2, Figs. Fig.18)

Dimensions: Apical axis: 33.5- 74.98µm, transapical axis: 17.66 – 42.59µm, striae: 20-25in 10 µm, fibulae: 2-3in 10 µm.

Surirella striatula Turpin (Pl. 2, Fig.20)

Dimensions: Apical axis:61.26-100.12µm, transapical axis: 34.2- 49µm, fibulae: 15-18 in 10 µm. (Hustedt, 1930, 445, fig.869; Al-Zubaidi, 1985,126 , pl.8, fig. 150).

Family: Surirellaceae

Genus: *Campylodiscus*

Campylodiscus* cf. *bicostatus W.Smith ex Roper (Pl. 1, Fig.6)

Synonym: *Campylodiscus clypeus var. bicostatus* (W.Smith ex Roper) Hustedt.

Dimensions: Diameter: 42.75-73.07 µm, striae: 8-20 in 10 µm, fibulae: 2-4 in 10 µm. (Hustedt, 1930, 448, fig.874; Al-Zubaidi, 1985,126 , pl.8, fig. 153)

***Campylodiscus* sp.** (Pl. 1, Fig. 7)

Dimensions: Diameter: 15.87-29.04 µm, striae: 8-18 in 10 µm, fibulae: 3-6 in 10 µm.

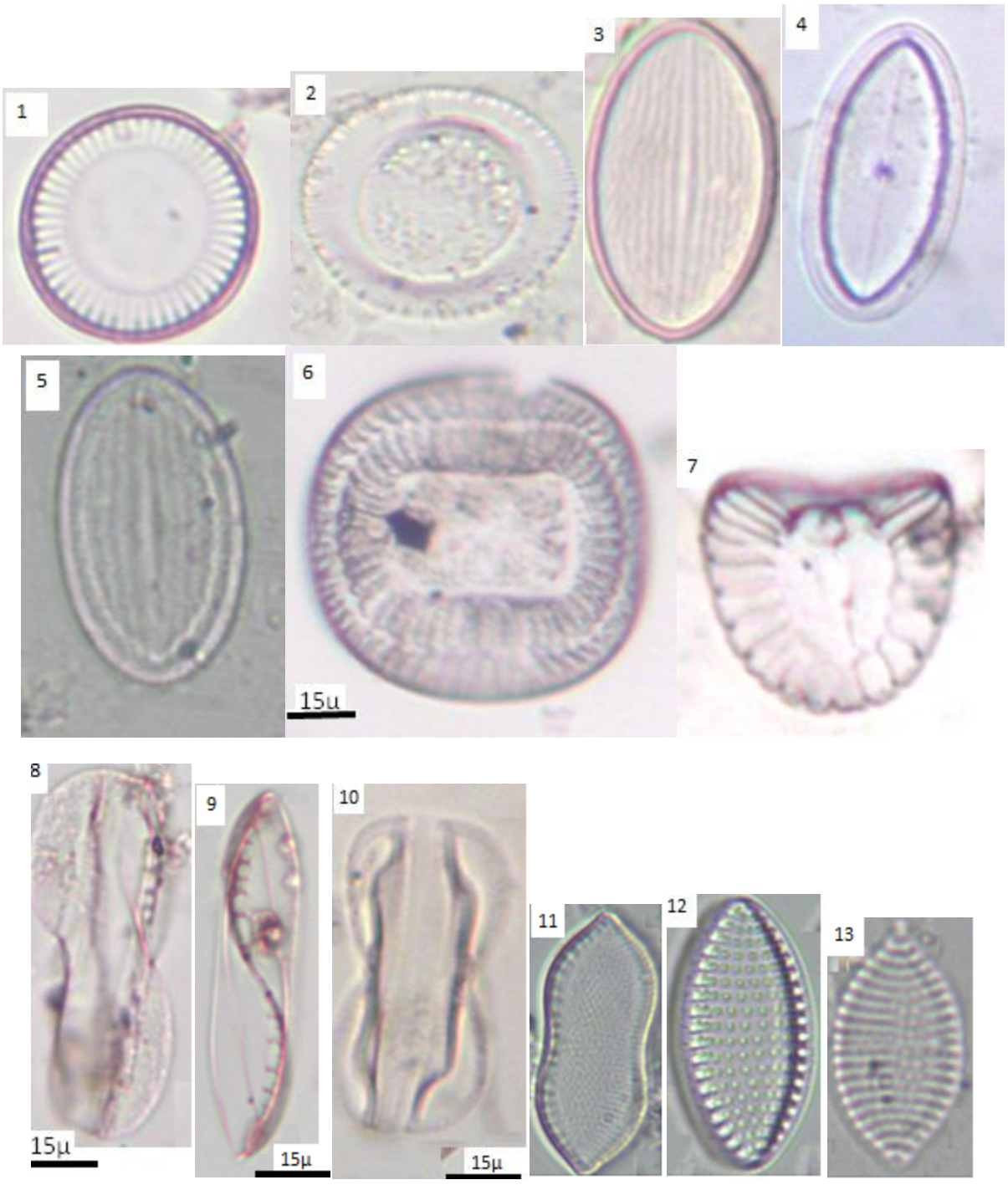

Plate1: 1-Cyclotella meneghiniana 2- Cyclotella stylorum 3,4- Cocconeis placentula . 5 *-Cocconeis placentula* var. *euglypta 6-Campylodiscus cf. bicostatus* 7 *-Campylodiscus* sp. 8,9- *Entomoneis alata 10- Entomoneis paladosa 11- Tryblionella* cf. *coarctata 12- Tryblionella granulate 13- Tryblionella compressa*

10µ

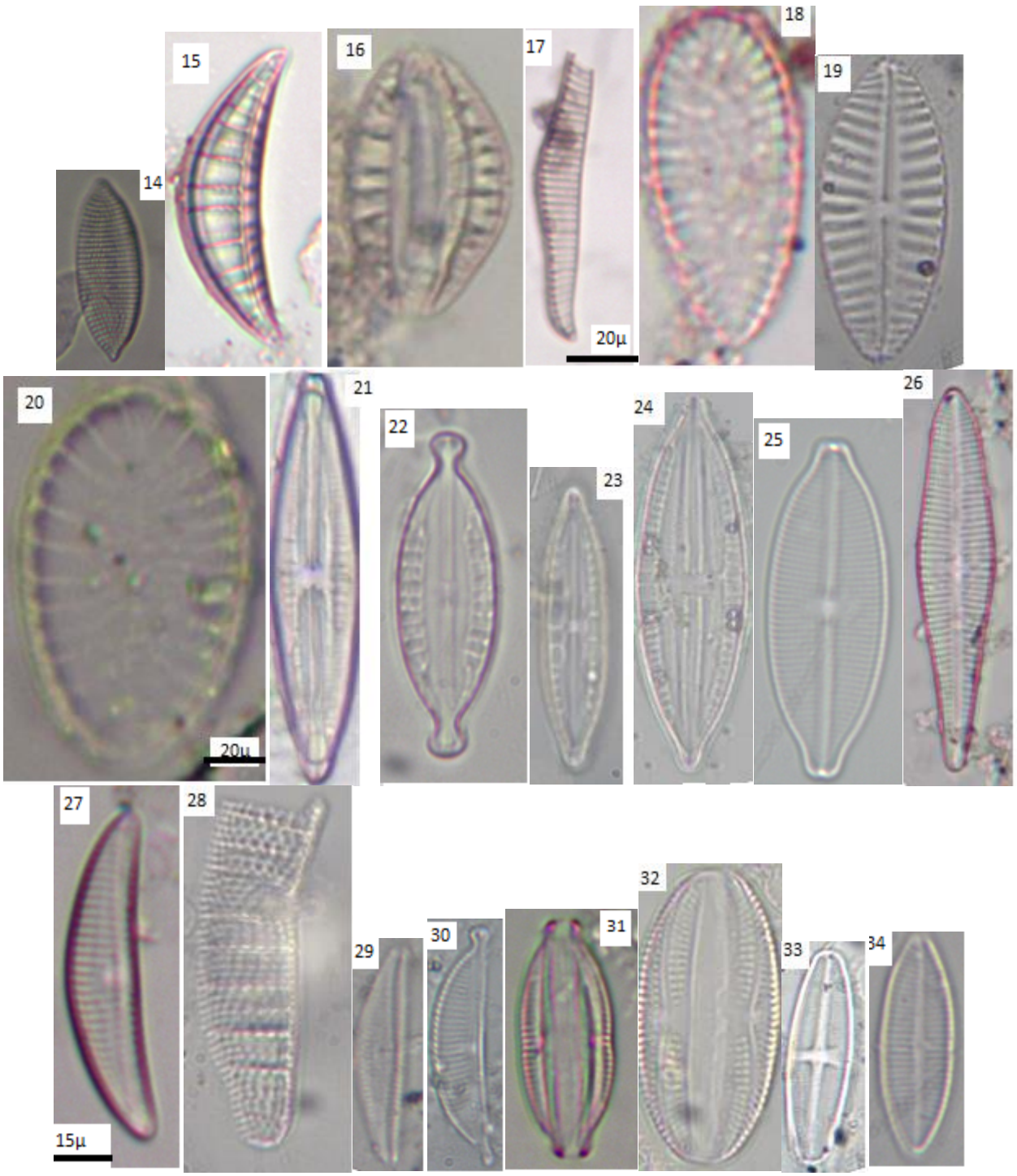

Plate2 :14-Nitzschia sp2 15,16- Rhopalodia gibberula 17-Rhopalodia gibba18- Surirella sp. 19- Navicula sp. 20- Surirella striatula 21,24- Mastogloia braunii 22,25- Mastogloia smithii 23- Mastogloia pumila 26- Gomphonema lanceolatum fo. *turris 27- Halamphora veneta 28- Epithemia adnata 29- Seminavis strigosa 30,31- Halamphora ghanensis 32- Amphora copulata 33,34- Lemnicola hungarica*

10µ

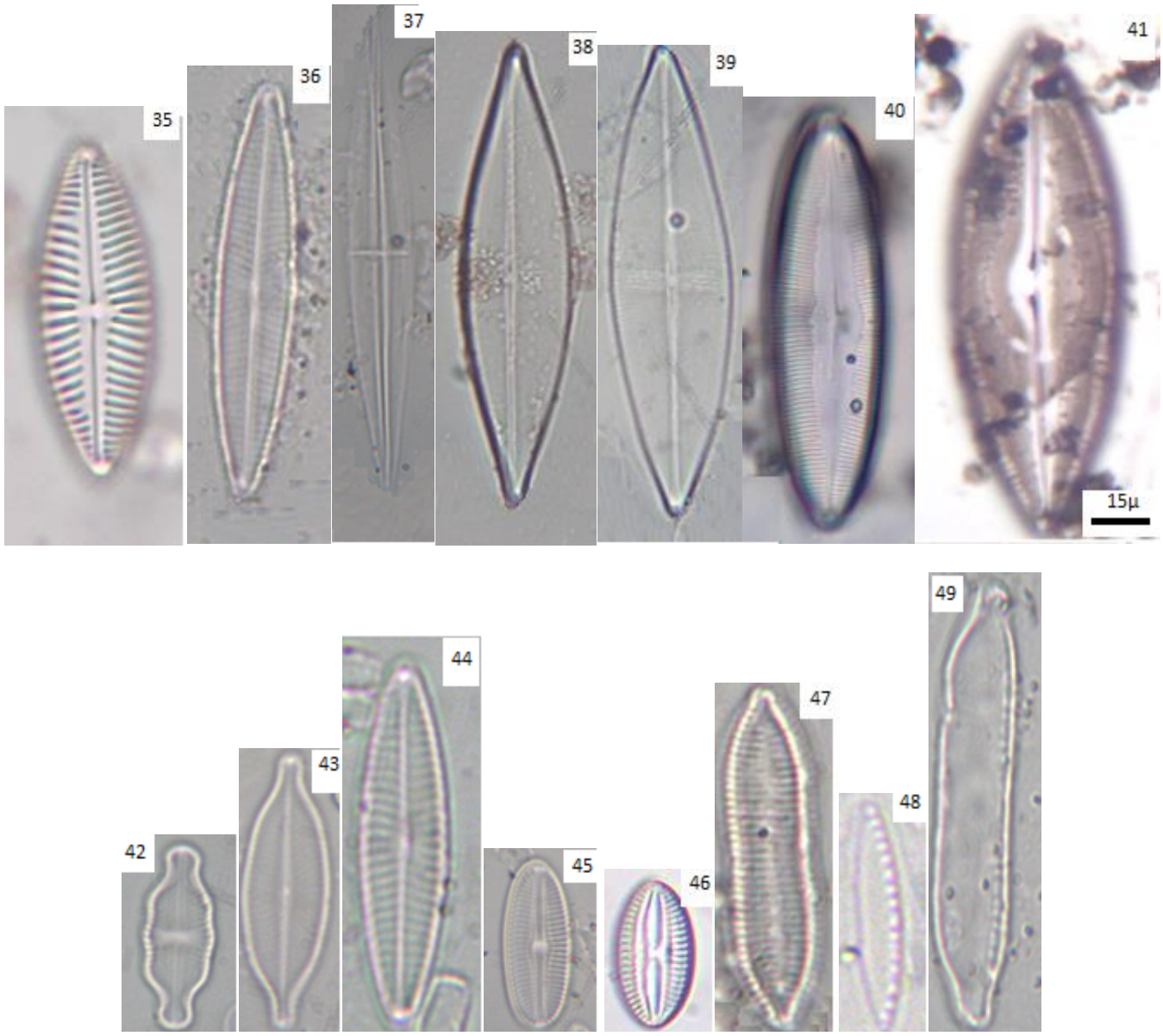

Plate3: 35- Navicula sp2 36- Navicula radiosa 37- Haslea spicula 38,39- Parlibellus crucicula40- Pinnularia viridis 41- Caloneis permagna42- Luticola nivalis 43- Navicula salinarum44- Navicula viridula 45- Diploneis smithii 46- Fallacia tenera47- Tryblionella hungarica48 -Nitzschia amphibia 49-Hantzschia amphioxy

10µ

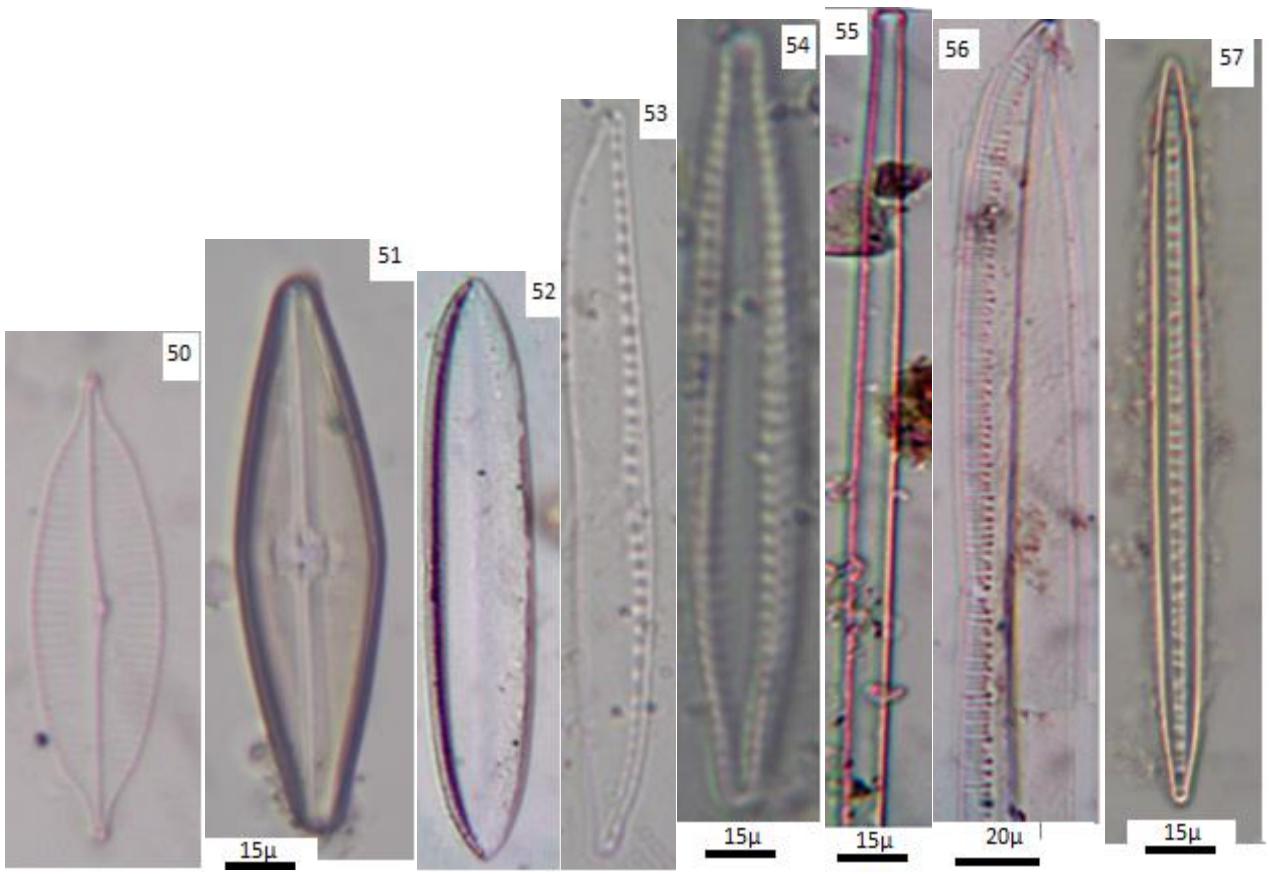

Plate4: 50 -Craticula cuspidate 51- Sieminskia wohlenbergii 52 -Nitzschia tryblionella 53 -Nitzschia clausii54 - Tabularia fasciculate 55- Tabularia sp. 56 -Nitzschia sp 57- Bacillaria paxillifera

10µ

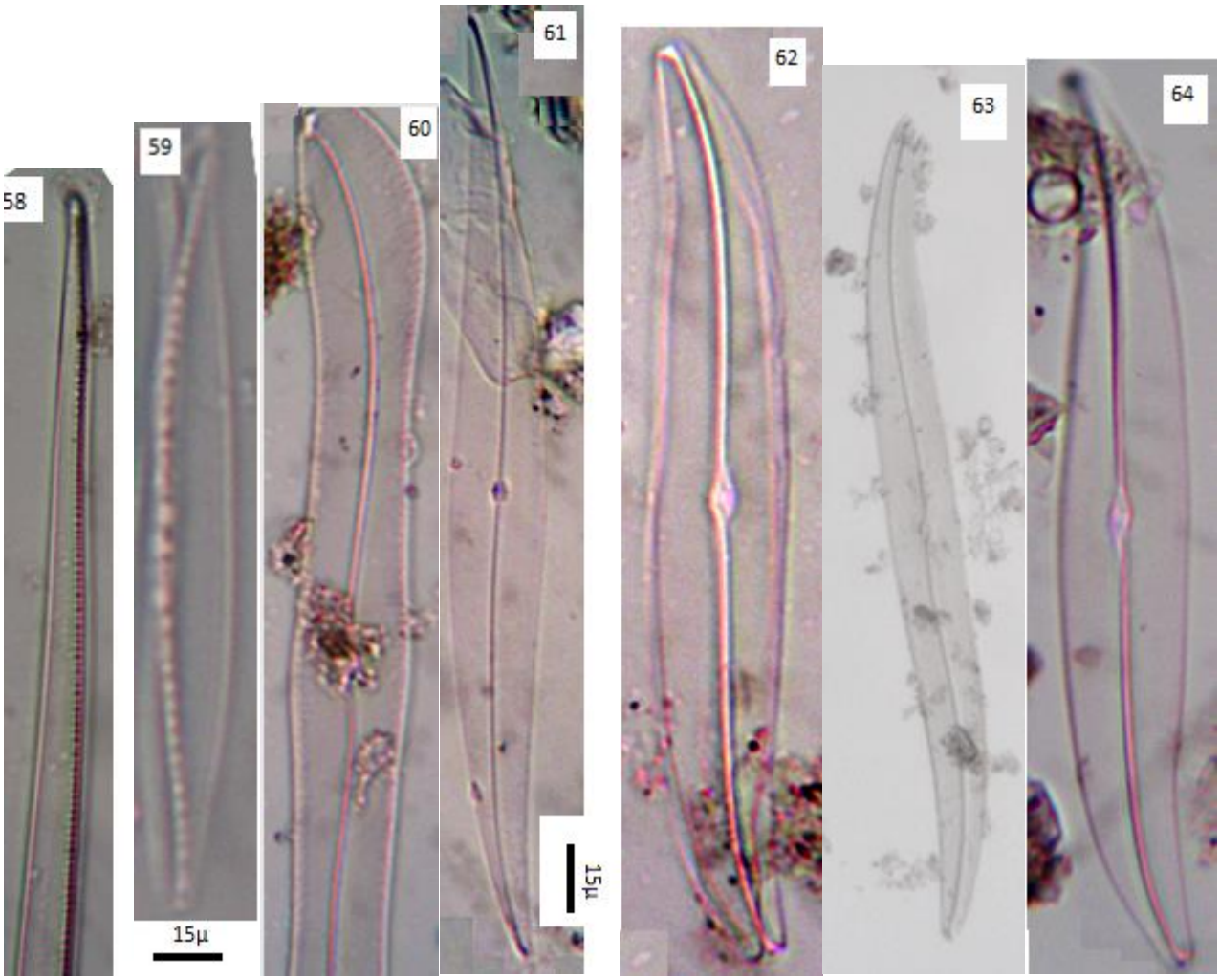

Plate5 :5*8 -Nitzschia sigma 59 -Nitzschia sigmoidea 60 -Gyrosigma sinense 61 -Pleurosigma delicatulum* W.Sm. var. *delicatulum 62 -Gyrosigma scalproides 63- Gyrosigma acuminatum64 -Gyrosigma atten* 20µ

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دراسة دياتومات المياه العذبة من نهر الصالحية في البصرة، جنوب العراق

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المستخلص

أجريت هذه الدراسة في نهر الصالحية (فرع من شط العرب) في خمس محطات للفمدة من اذار 2014 - شباط 2015 للمساهمة في معرفة دياتومات المياه العذبة في العراق. تم تحديد ما مجموعه 56 نوعا من الدياتومات تنتمي إلى 30 جنسا، تم تصويرها جميع أنواع الدياتومات المجهر الضوئي، وكذلك، أعطيت ابعدها في هذه الدراسة.

الكلمات الرئيسية: نهر الصالحية، دااتومات، المياه العذبة، شط العرب