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Check list of the algae from Shatt Al-Arab River, Iraq

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ABSTRACT

A total of 415 species and varieties of algae are recorded from Shatt Al-Arab River by different authors. Growth habit for each taxon is given. Most of the algae belong to three classes: Bacillariophyceae (308 taxa), Chlorophyceae (63 taxa), and Cyanophyceae (26 taxa).

INTRODUCTION

The algal communities of the Shatt Al-Arab River are well known, but most of the information regarding species composition is scattered throughout the literature. In this paper, most of the available information on species composition is brought together, so as to facilitate further studies on algal flora. Information on the specific habitats and growth habit for most of the taxa is also given.

Genera and species of the same family are arranged alphabetically. Available synonyms are also provided. Abbreviations for the habitats are as follows:

- b. = Benthos/Benthic.
- epil. = Epilithic (growing on stones or pebbles, floating steel pontoons of a floating bridge and cemented bank of the river).
- epip. = Epipellic (growing on shallower muddy bed of the river, often gets exposed during low tide).
- epiph. = Epiphytic (growing on aquatic higher plant and on filamentous algae).
- pl. = Planktonic.
- tychopl. = Tychoplankton/Tychoplanktonic.
- UD. = Unpublished data.

Arrangement of the references is as follows:

1. Al-Kaisi (1970).
2. Al-Kaisi (1974).
3. Al-Saadi *et al.* (1979).
4. Arndt & Al-Saadi (1975).
5. Brewer *et al.* (1978).
6. Hadi *et al.* (1984).
7. Hameed (1977).
8. Hinton & Maulood (1980).

9. Huq *et al.* (1978).
10. Kell & Saad (1975).
11. Saad & Kell (1975).

Most of the listed algae found in the Shatt Al-Arab are of fresh water origin except those found mainly in the lower parts of the river which are marine species.

The classes of algae and the number of taxa in each class recorded in the Shatt Al-Arab River are as follows: CYANOPHYCEAE (26), CHLOROPHYCEAE (63), EUGLENOPHYCEAE (5), XANTHOPHYCEAE (2), CHRYSOPHYCEAE (3), DINOPHYCEAE (10), BACILLARIOPHYCEAE (308), and BANGIOPHYCEAE (1).

DESCRIPTION OF THE SHATT AL-ARAB RIVER

The Shatt Al-Arab River originates from the junction of the Tigris and Euphrates rivers at Qurna. The length of this river is about 175 km; its width varies from 0.4 km at Basrah City to 1.5 km at the river mouth. Its depth ranges from 7.5 m to 12.5 m. The Karun River joins the eastern bank of the Shatt Al-Arab south of Basrah City (Fig. 1). Water level in the Shatt Al-Arab River is under the influence of the tide. The tidal amplitude varies from 3 m near the mouth to 0.5 m at Basrah. Shatt Al-Arab water is characterized by being well mixed with limited temperature (Saad & Kell 1975) and chlorinity stratification (Arndt & Al-Saadi 1975). Although Saad (1978) has reported that the water of the Shatt Al-Arab mouth may be traced to 5 km into the Arabian

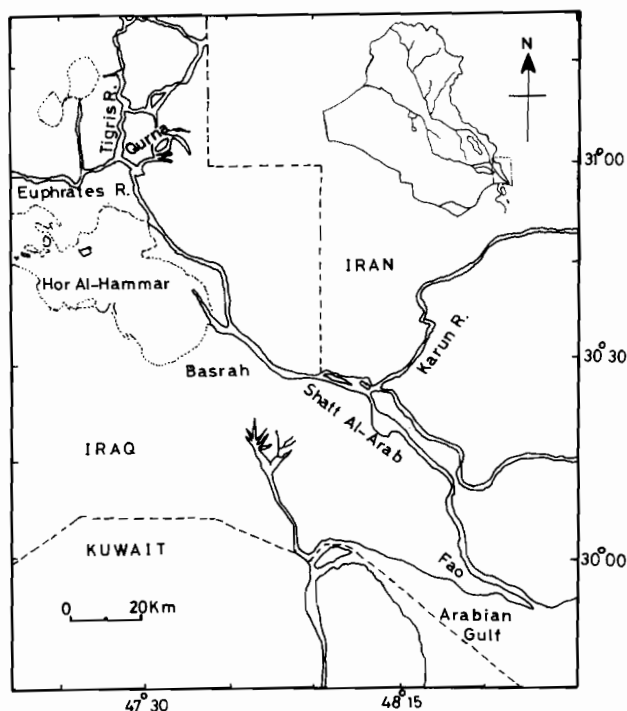


Fig. 1. Map of the Shatt Al-Arab River.

Gulf, yet Brewer *et al.* (1978) have shown that the discharge of this river reaches the water off Kuwait Bay during the flood season.

CHECK LIST

CYANOPHYCEAE

Order 1. NOSTOCALES

Family 1. OSCILLATORIACEAE

Numbers in parentheses refer to published works in which the species are reported (see pp. 79–80).

- Katagnymene pelagica* Lemm. (10, 11) pl.
- K. spiralis* Lemm. (10, 11) pl.
- Lyngbya aestuarii* Leibm. (7) pl.
- L. majuscula* Harvey (7) pl.
- L. martensiana* Menegh (7) pl.
- L. putealis* Mont. (7) pl.
- Oscillatoria agardhii* Gom. (10, 11) b.
- O. anguina* (Bory) Gom. (7) pl.
- O. laete-virens* (Crouan) Gom. (7) pl.
- O. limosa* Ag. (9, 10, 11).
- O. nigro-viridis* Thwaites (7, 9, 10, 11) pl.
- O. okeni* Ag. (7) tycho-pl.
- O. princeps* Vauch. (7, 9, 10, 11).
- O. sancta* (Ktz.) Gom. (10, 11) tycho-pl.
- O. tenuis* Ag. (10, 11) b. and tycho-pl.
- O. tenuis* fo. *tergestina* (Ktz.) Elenkin. (10, 11) pl.
- Spirulina major* Ktz. (10, 11) tycho-pl.
- Trichodesmium hildenbrandtii* Gom. (10) pl.
- T. thebautii* Gom. (10) pl.

Family 2. NOSTOCACEAE

- Anabaena bergii* Ostenf. (10, 11) pl.
- A. inaequalis* (Ktz.) Borne & Flah. (10, 11) pl.
- A. planctonica* Brunnthaler (10, 11) pl.
- A. torulosa* (Carm.) Lagerh. (10, 11) pl.
- A. variabilis* Ktz. (10, 11) pl.
- Aphanizomenon flos-aquae* (L.) Ralfs. (10, 11) pl.

Family 3. RIVULARIACEAE

- Rivularia hansgirgii* Schmidle (3) epiph.

CHLOROPHYCEAE**Order 1. VOLVOCALES****Family 1. CHLAMYDOMONADACEAE**

Chlamydomonas snowiae Printz. (10, 11) pl.

Chlorogonium elongatum (Dangeard) Dangeard (syn. *C. acus* Nayal) (10, 11) pl.

Family 2. VOLVOCACEAE

Eudorina elegans Ehr. (10, 11) pl.

Pandorina morum (Muell.) Bory (11) pl.

Volvox africanus G.S. West (10, 11) pl.

V. globator (L.) Ehr. (10, 11) pl.

Order 2. ULOTRICHALES**Family 1. ULOTRICHACEAE**

Geminella minor (Naeg.) Heer. (10, 11) tychopl.

Ulothrix tenuissima Ktz. (7).

U. zonate (Weber & Mohr) Kts. (10) b. and tychopl.

Order 3. ULVALES**Family 1. ULVACEAE**

Enteromorpha intestinalis (L.) Link (1) b. and ep.

Order 4. OEDOGONIALES**Family 1. OEDOGONIACEAE**

Bulbochaete borealis Wittr. (1) epiph.

B. crassa Pringsh. (1) epiph.

Oedogonium Link

Members of this large and widely distributed genus are common in Iraq, including the Shatt Al-Arab River, but are mainly non-fruiting. They grow in diverse habitats, mainly fresh or slightly brackish water. It may also be found on other filamentous algae such as *Cladophora*, and on the leaves or stems of submerged aquatic plants. Al-Kaisi (1970) recorded various species which belong to this genus, some of which are found on river banks outside Basrah and in Basrah City.

Order 5. CLADOPHORALES**Family 1. CLADOPHORACEAE**

Cladophora Ktz.

This filamentous genus was recorded by Al-Kaisi (1970) in various places in Iraq

including the Shatt Al-Arab River. It is found also free-floating among other algae, or epilithic.

Cladophora aegagropila (L.) Rabenh. (syn. *C. profunda* Brand) (1).

C. glomerata (L.) Ktz. (1, UD.).

C. rivularis (L.) Hock (syn. *C. crispata* (Roth) Ktz.) (1, UD.).

C. secunda Ktz. (UD.).

Rhizoclonium hieroglyphicum (Ag.) Ktz. (UD.).

Order 6. CHLOROCOCCALES

Family 1. CHARIACEAE

Characium A. Braun

Species of this genus were recorded by Al-Kaisi (1970) in various parts of Iraq including the Shatt Al-Arab River. It is epiphytic on filamentous algae such as *Cladophora* and *Oedogonium*. Four species were identified:

Characium ensiforme Hermann (as *C. ambiguum* Hermann).

C. rostratum Rabenh. ex. Printz.

Korshikoviella limnetica (Lemm.) Silva (as *Characium limneticum* Lemm.).

Pseudocharacium obtusum (A. Braun) Pet. (as *Characium obtusum* A. Braun).

Family 2. HYDRODICTYACEAE

Pediastrum boryanum (Turp.) Menegh. (10, 11, UD.) pl.

P. duplex Meyen (10, 11).

P. simplex Meyen (10) pl.

P. simplex var. *sturmii* (Reinsch) Wolle (as *P. sturmii* Reinsch) (3) pl.

Family 3. OOCYSTACEAE

Ankistrodesmus Corda

Three species were recorded by Al-Kaisi (1970) in central and southern Iraq, including the Shatt Al-Arab River.

Ankistrodesmus falcatus (Corda) Ralfs (1).

A. gracilis (Reinsch) Korsch. (syn. *Selenastrum gracile* Reinsch) (10) pl.

A. spiralis (Turner) Lemm. (1).

Monoraphidium griffithii (Berk.) Kom. Legn. (as *Ankistrodesmus falcatus* var. *acicularis* (A. Braun) G.S. West) (1) pl.

Chlorella Beijerinck

This unicellular alga was recorded by Al-Kaisi (1970) at various stations including the Shatt Al-Arab River bank at Basrah, and fish-traps in the Shatt Al-Arab water. Two species are so far recorded in this region:

Chlorella ellipsoidea Gern. (syn. *C. saccharophila* (Kruger) Migula var. *ellipsoidea* (Gerneck) Fott & Novakova).

C. vulgaris Beijerinck.

Oocystis Naegeli

This genus was recorded by Al-Kaisi (1970) from various places including the Shatt Al-Arab River banks at Basrah. The following species were identified by Al-Kaisi:

Eremosphaera gigas (Arch.) Fott & Kaline (as *Oocystis gigas* Arch.).
Oocystis borgei Snow.
O. elliptica W. West.
O. lacustris Chodat.
O. natans (Lemm.) Lemm.
O. solitaria Wittr.

Family 4. SCENEDESMACEAE

Crucigenia Morren

Only one species of this genus was recorded by Al-Kaisi (1970) from several stations in central and southern Iraq including the Shatt Al-Arab River.

Crucigenia tetrapedia (Kirchn.) W. West and G.S. West (1) pl. and tychopt.

Scenedesmus acuminatus (Lagerh) Chodat (1, 10, 11) pl.

S. acutus Meyen (syn. *S. obliquus* (Turp.) Ktz.) (11).

S. armatus Chodat (1).

S. denticulatus Lagerh (1) pl.

S. intermedius Chodat (7) pl.

S. linearis Kom. (as *S. bijuga* (Turp.) Lagerh) (1) pl.

S. longispina Chod. (as *S. quadricauda* var. *longispina* (Chodat) G.M. Smith) (1) pl. and tychopt.

S. obtusus Meyen f. *obtusius* (as *S. arcuatus* (Lemm.) Lemm.) (1).

S. ovalternus Chod. var. *ovalternus* (as *S. bijuga* var. *alternans* (Reinsch) Borge) (7) pl. and tychopt.

S. quadricauda (Turp.) Breb. sensu Chod. (1, 7, 10, 11) pl. and tychopt.

S. quadrispina Chod. (as *S. quadricauda* var. *quadrispina* (Chodat) G.M. Smith) (1) pl. and tychopt.

The species of *Scenedesmus* were recorded by Al-Kaisi (1970) from various places in Iraq, including stations along the Shatt Al-Arab River.

Order 7. ZYGNEMATALES

Family 1. ZYGNEMATACEAE

Mougeotia (Ag.) Wittr.

This unbranched filamentous genus was recorded by Al-Kaisi (1970) from various habitats, including banks of the Shatt Al-Arab River. Four species were identified:
Mougeotia parvula Hassall (1).

M. scalaris Hassall (1).

M. virescens (Hassall) Borge (1).

M. viridis (Ktz.) Wittr. (7, 10, 11) tychopt.

Spirogyra Link

This filamentous genus is very wide spread in b. and tychopt. in several parts of Iraq. Al-Kaisi (1970) recorded four species only from central and southern Iraq which included stations in the Shatt Al-Arab River.

Spirogyra affinis (Hassall) Petit (1).

S. porticalis (Muell.) Cleve (1).

S. subsalina Cedercreutz (1).

S. varians (Hassall) Ktz. (1).

Zygnema Ag.

This genus was recorded by Al-Kaisi (1970) from central and southern parts of Iraq. Four species were identified from various stations in plankton samples taken from the Shatt Al-Arab River.

Zygnema cruciatum (Vauch.) Ag. (1).

Z. cyanosporum Cleve (1).

Z. stagnale (Hassall) Ktz. (1).

Z. sterile Transeau (1).

Family 2. DESMIDIACEAE

Staurostrum tetracerum (Ktz.) Ralfs (10, 11) pl.

EUGLENOPHYCEAE

Order 1. EUGLENALES

Family 1. EUGLENACEAE

Trachelomonas acanthostoma (Stokes) Defl. (1) pl.

T. crebea (Kellicott) Defl. (1) pl.

T. hispida (Perty) Stein. (1) pl.

T. pulchella Drez. (1) pl.

T. volvocina Ehr. (1) pl.

XANTHOPHYCEAE

Order 1. HETEROTRICHAELES

Family 1. TRIBONEMATACEAE

Tribonema affine (G.S. West) G.S. West (1) b.

Order 2. HETEROSIPHONALES

Family 1. BOTRYDIACEAE

Botrydium granulatum Greville (1) b.

CHRYSTOPHYCEAE

Order 1. CHRYSOMONADALES

Family 1. OCHROMONADACEAE

Dinobryon balticum (Schuett) Lemm. (7) pl.

D. divergens Imhof. (7) pl.

Order 2. RHIZOCHRYSIDALES

Family 1. RHIZOCHRYSIDACEAE

Chrysamoeba radians Klebs (1) pl.

DINOPHYCEAE

Order 1. PERIDINIALES

Family 1. GLENODINIACEAE

Glenodinium armatum Levander (1) pl.

G. borgei (Lemm.) Schiller (as *Peridinium borgei* Lemm.) (1) pl.

G. gymnodinium Penard (1) pl.

Family 2. GONYAULACEAE

Gonyaulax orientalis Lindem (10) pl.

Family 3. PERIDINIACEAE

Peridinium cinctum (Muell.) Ehr. (1) pl.

P. diabolus Cleve (10) pl.

P. leonis Pavil. (10) pl.

P. retiferum Matz. (10) pl.

P. willei Huitfeldt-Kaas (1) pl.

Family 4. CERATIACEAE

Ceratium hirundinella (Muell.) Dujardin (1) pl.

BACILLARIOPHYCEAE

Order 1. EUPODISCALES

Family 1. COSCINODISCACEAE

Actinocyclus subtilis (Gerg.) Ralfs (10) pl.

Aulacoseira granulata (Ehr.) Simonsen (as *Melosira granulata* (Ehr.) Ralfs) (6, 7) pl.,
epiph.

Aulacoseira granulata var. *angustissima* (Muell.) Simonsen (as *Melosira granulata* var.
angustissima Muell.) (3, 7) pl.

Coscinodiscus asteromphalus Ehr. (6) pl.

C. centralis Ehr. (10) pl.

C. curvatulus Grun. (10) pl.

C. eccentricus Ehr. (10) pl.

C. eccentricus var. *fasciculata* Hust. (7) pl.

C. granii Gough (10) pl.

C. oculus-iridis Ehr. (10) pl.
C. radiatus Ehr. (10) pl.
C. rothii (Ehr.) Grun. (10) pl.
Cyclotella kuetzingiana Thwaites (7).
C. kuetzingiana var. *crucifera* Al-Kaisi (2) pl.
C. kuetzingiana var. *planetophora* Fricke (2) pl.
C. kuetzingiana var. *radiosa* Fricke (2).
C. meneghiniana Ktz. (2, 3, 6, 7, 8, 9, 11) pl.
C. ocellata Pant. (2) pl.
C. operculata var. *unipunctata* Hust. (2) pl.
C. planctonica Brunnth. (2).
C. stelligera (Cleve & Grun.) Van Heurck (2).
C. striata (Ktz.) Grun. (3, 6, 7).
C. striata var. *bipunctata* Fricke (8) pl.
C. stylorum Brightw. (10) pl.
Melosira varians Ag. (3, 6, 7, 9, 10, 11) b. and pl.
Podosira stelliger (J.W. Bail.) A. Mann (10) pl.
Skeletonema costatum (Grev.) Cleve (10) pl.
Stephanodiscus rotula (Ktz.) Hendey (as *S. astraea* (Ehr.) Grun) (10, 11) pl.
Thalassiosira gravida Cleve (10) pl.

Order 2. RHIZOSOLENIALES

Family 1. RHIZOSOLENIACEAE

Rhizosolenia alata Brightw. f. *indica* (H. Perag.) Hust. (10) pl.
R. calcar-avis Schultze (7, 10) pl.
R. firma Karsten (10) pl.
R. hebetata Bail. f. *semispina* (Hensen) Gran (10) pl.
R. imbricata Brightw. (10) pl.
R. longiseta Zacharias (10, 11) pl.
R. stolterfothii H. Perag. (10) pl.
R. styliformis Brightw. (10) pl.
R. temperei H. Perag. (10) pl.

Family 2. LEPTOCYLINDRACEAE

Leptocylindricus danicus Cleve (10) pl.
Schroederella delicatula (H. Perag.) Pav. (10) pl.

Order 3. BIDDULPHIALES

Family 1. CHAETOCERACEAE

Chaetoceros curvisetus Cleve (10) pl.
C. diadema (Ehr.) Gran (as *C. decipiens* Cleve) (10) pl.
C. peruvianus Brightw. (10) pl.
C. subtilis Cleve (10) pl.

Family 2. BIDDULPHIACEAE

- Biddulphia alternans* (Bail.) Van Heurck (10) pl.
Ceratulina pelagica (Cleve) Hendey (10) pl.
Ceratulus turgidus (Ehr.) Ehr. (10) pl.
Ditylum brightwellii (T. West) Grun. (10) pl.
Eucampia zodiacus Ehr. (10) pl.
Hemiaulus sinensis Grev. (10) pl.
Odontella mobiliensis (Bail.) Grun. (as *Biddulphia mobiliensis* (Bail.) Grun.) (10) pl.
Odontella sinensis (Grev.) Grun. (as *Biddulphia sinensis* Grev.) (10) pl.
Pleurosira laevis (Ehr.) Compere (as *Biddulphia laevis* Ehr.) (3) pl.
Triceratium broeckii Leudiger-Fortmorel (10) pl.
T. dibium Brightw. (10) pl.
T. pentacrinus (Ehr.) G. Wall. (10) pl.
T. reticulum Ehr. (10) pl.
T. spinosum J.W. Bail. (10) pl.

Family 3. ANAULACEAE

- Anaulus mediterraneus* Grun. (10) pl.
Terpinosoe americana (Bail.) Ralfs (10, 11) pl.
T. musica Ehr. (10, 11) pl.

Order 4. FRAGILARIALES

Family 1. FRAGILARIACEAE

- Asterionella glacialis* Castr. (as *Asterionella japonica* Cleve & Muell. ex Gran (10) pl.
Climacosphaenia moniligera Ehr. (10) pl.
Cyclophora tenuis Castr. (10) pl.
Diatoma tenue Ag. (10, 11) pl.
D. tenue var. *elongatum* Lyngb. (6, 10, 11) pl.
D. vulgare Bory (6, 8, 9, 10, 11) pl.
D. vulgare var. *producta* Grun. (3) pl.
Fragilaria construens (Ehr.) Grun. (10, 11) pl.
F. construens var. *subsalina* Hust. (10, 11) pl.
F. crotonensis Kitt. (7, 10, 11) pl.
F. pinnata Ehr. (10, 11) pl.
F. vaucheriae (Ktz.) Petersen (6) epil.
F. virescens Ralfs (10, 11) pl.
Grammatophora hamulifera Ktz. (10) pl.
G. marina (Lyngb.) Ktz. (10) pl.
G. undulata Ehr. (10) pl.
Rhabdonema adriaticum Ktz. (10) pl.
Synedra acus Ktz. (7, 10, 11) pl.
S. amphicephala Ktz. (10, 11) pl.
S. bacillaris (Grun.) Hust. (10) pl.
S. capitata Ehr. (3, 6, 7, 10, 11) pl.

- S. delicatissima* W. Sm. var. *angustissima* Grun. (as *S. acus* var. *angustissima* (Grun.) Van Heurck (10, 11) pl.
S. fasciculata (Ag.) Ktz. (6) epiph.
S. formosa Hantzsch ex Rabenh. (10) pl.
S. gaillonii (Bory) Ehr. (10) pl.
S. hennedyana Greg. (10) pl.
S. provincialis Grun. (10) pl.
S. pulchella Ralfs ex Ktz. (6, 10, 11) pl.
S. robusta Ralfs (10) pl.
S. tabulata (Ag.) Ktz. (3, 7, 10, 11) pl.
S. tabulata var. *fasciculata* (Ag.) Hust. (3, 7) pl.
S. tabulata var. *obtusa* Pant. (8) epiph.
S. tenuissima (Ktz.) Ktz. (syn. *S. acus* var. *radians* (Ktz.) Hust.; *S. radians* Ktz.) (10, 11) pl.
S. ulna (Nitzsch.) Ehr. (3, 6, 7, 8, 9, 10, 11) b. and pl.
S. ulna var. *balatonis* f. *rostrata* (Pant.) (6) epil. and pl.
S. ulna var. *longissima* (W. Sm.) Brun. (syn. *S. ulna* var. *biceps* (Ktz.) Schoenf.) (3, 7, 9)
S. ulna var. *longissima* (W. Sm.) Brun. (8) pl.
S. ulna var. *oxyrhynchus* (Ktz.) Van Heurck (6, 7, 10, 11) pl.
S. ulna var. *spathulifera* (Grun.) Van Heurck (7, 10) pl.
Tabellaria fenestrata (Lyngb.) Ktz. (7) pl.
T. flocculosa (Roth) Ktz. (?) (7) pl.
Thalassionema nitzschioides (Grun.) Grun. ex Hust. (10) pl.
Thalassiothrix frauenfeldii (Grun.) Grun. (10) pl.

Order 5. EUNOTIALES

Family 1. EUNOTIACEAE

- Eunotia nodosa* Ehr. (as *E. formica* Ehr.) (6) epip.
E. praerupta Ehr. (6) epil.

Order 6. ACHNANTHALES

Family 1. ACHNANTHACEAE

- Achnanthes brevipes* Ag. (3, 10)
A. brevipes var. *intermedia* (Ktz.) Cleve (7, 10) pl.
A. delicatula (Ktz.) Grun. (10, 11) pl.
A. hauckiana Grun. (10, 11) pl.
A. minutissima Ktz. var. *minutissima* (as *A. affinis* Grun.) (10, 11) pl.
A. rostrata Oestrup (as *A. lanceolata* var. *rostrata* (Oestrup) Hust.) (6) epil. and epiph.
Cocconeis hetroidea Hantzsch (10) pl.
C. pediculus Ehr. (6, 7, 10, 11) pl.
C. pellucida Hantzsch (10) pl.
C. placentula Ehr. (7, 9, 10, 11)
C. placentula var. *euglypta* (Ehr.) Cleve (3, 6, 7, 8, 10, 11) epiph.

- C. placentula* var. *intermedia* (Herib & Perag.) Cleve (10, 11) pl.
C. placentula var. *klinoraphis* Geitler (7) pl.
C. placentula var. *lineata* (Ehr.) Cleve (6) epiph.
C. pseudomarginata Greg. (10) pl.
Rhoicosphenia curvata (Ktz.) Grun. (3, 6, 7, 8, 9, 10, 11) b. and pl.
R. curvata var. *marina* (W. Smith) Grun. (8) pl.

Order 7. NAVICULALES

Family 1. AMPHIPRORACEAE

- Amphiprora alata* (Ehr.) Ktz. (7, 10, 11) pl.
A. paludosa W. Smith (10, 11) pl.

Family 2. NAVICULACEAE

- Amphipleura rutilans* (Trent.) Cleve (10) pl.
Caloneis amphisbaena (Bory) Cleve (7, 10, 11) pl.
C. amphisbaena var. *subsalina* (Donkin) Cl. (7) pl.
C. clevei (Lagerst.) Cl. (7, 8) pl.
C. formosa (Greg.) Cleve (10, 11) pl.
C. permagna (J.W. Bail.) Cleve (6) epiph. and epil.
C. schumanniana (Grun.) Cleve var. *biconstricta* (Grun.) Reich. (3).
C. ventricosa (Ehr.) Meist. (6) epil. and epiph.
Diploneis dalmatica (Grun.) Cl. (10) pl.
D. didyma (Ehr.) Cleve (10, 11) pl.
D. diplosticta (Grun.) Hust. (10) pl.
D. domblittensis (Grun.) Cleve (10, 11) pl.
D. gemmata (Grev.) Cl. (10) pl.
D. interrupta (Ktz.) Cleve (10, 11) pl.
D. mediterranea (Grun.) Cleve (10) pl.
D. oblongella (Naeg.) Ross (as *D. ovalis* (Hilse) Cleve) (3, 7, 10, 11) pl.
D. papula (Schum.) Cleve (10) pl.
D. placida (Schmidt) Hust. (10) pl.
D. quinardiana (Brun) Cleve (10) pl.
D. serratula (Grun.) Hust. (10) pl.
D. smithii (Bréb.) Cleve (10) pl.
D. smithii var. *pumila* (Grun.) Hust. (3) pl.
D. suborbicularis (Greg.) Cleve (10) pl.
D. subovalis Cleve (10, 11) pl.
Frustulia vulgaris (Thwaites) De Toni (7) pl.
Gyrosigma acuminatum (Ktz.) Rabenh. (10, 11) pl.
G. attenuatum (Ktz.) Rabenh. (3, 6) epiph. and pl.
G. balticum (Ehr.) Rabenh. (6) pl.
G. distortum var. *parkeri* Harrison (6) epil. and epiph.
G. fasciola (Ehr.) Cleve (10, 11) pl.
G. macrum (W. Sm.) Griff. & Henfr. (8) pl.

- G. nodiferum* (Grun.) Reim. (3, 7, 8) pl.
G. rectum (Donk.) Cleve var. *minutum* (Donk.) Cleve (syn. *Pleurosigma minutum* Donk.) (7) pl.
G. scalproides (Rabenh.) Cleve (7) pl.
G. spencerii (W. Sm.) var. *nodiferum* Grun. (as *G. nodiferum* (Grun.) Reim. var. *nodiferum*) (6) pl.
G. tenuirostrum (Grun.) Cleve-Euler (3, 6, 7, 9) pl.
Mastogloia apiculata W. Sm. (10) pl.
M. braunii Grun. (3, 6, 7, 10, 11) pl.
M. cocconeiformis Grun. (10) pl.
M. corsicana Grun. (10) pl.
M. elliptica (Ag.) Cleve (3, 10, 11) pl.
M. elliptica var. *dansei* (Thwaites) Cleve (as *M. dansei* Thwaites) (3, 6) pl.
M. fimbriata (Brightw.) Cleve (10) pl.
M. gilbertii A. Schmidt (10) pl.
M. grunowii A. Schmidt (10) pl.
M. laminaris (Ehr.) Grun. (10) pl.
M. pumila (Grun.) Cleve (3, 7) pl.
M. quinquecostata Grun. (10) pl.
M. smithii Thwaites ex W. Sm. (6, 10, 11) pl.
M. smithii var. *amphicephala* Grun. (3, 6) b. and pl.
M. smithii var. *lacustris* Grun. (3, 6, 7) b. and pl.
M. splendida (Greg.) Cleve (10) pl.
M. undulata Grun. (10) pl.
Navicula atomus (Ktz.) Grun. (6) epil.
N. bacillum Ehr. (10, 11) pl.
N. cari Ehr. (3) pl.
N. confervacea (Ktz.) Grun. (10) pl.
N. crucicula (W. Sm.) Donk. (3).
N. crucigera (W. Smith) Cleve (syn. *Haslea crucigera* (W. Sm.) Simonsen) (10, 11) pl.
N. cryptocephala Ktz. (7, 10, 11) pl.
N. cryptocephala Ktz. f. *minuta* Boy-P. (6) epil.
N. cryptocephala var. *veneta* (Ktz.) Grun. (3) pl.
N. cuspidata (Ktz.) Ktz. (6) epil.
N. cuspidata var. *ambigua* (Ehr.) Cleve (7) pl.
N. halophila (Grun. ex Van Heurck) Cleve (7, 10, 11) pl.
N. heufleri Grun. (8) pl.
N. humerosa Bréb. ex W. Sm. (10) pl.
N. mutica Ktz. (3) pl.
N. mutica fo. *undulata* (Hilse) Grun. (6) epil.
N. mutica var. *ventricosa* (Ktz.) Cleve (syn. *N. neoventricosa* Hust.) (3, 7) pl.
N. parva (Menegh) Cleve-Euler (6) epil.
N. perrotettii Grun. (6) pl.
N. pygmaea Ktz. (3, 10, 11) pl.
N. radiosa Ktz. (6, 7, 10, 11) epiph. and pl.
N. radiosa var. *tenella* (Bréb.) Grun. (3) pl.
N. rhynchocephala Ktz. (6, 10, 11) epiph. and pl.
N. salinarum Grun. (10, 11) pl.

- N. salinarum* Grun. var. *intermedia* (Grun.) Cleve (syn. *N. cryptocephala* var. *intermedia* Grun.) (6) epil.
N. stroesei (Oestrup) Cleve-Euler (syn. *N. pseudotuscula* Hust.) (6) epil. and epiph.
N. viridula Ktz. (10, 11) pl.
Pinnularia brebissonii (Ktz.) Rabenh. (6) epil.
P. interrupta W. Sm. (10).
P. major (Ktz.) W. Sm. (10, 11) pl.
P. undulata Greg. (10, 11) pl.
P. viridis (Nitzsch) Ehr. (10, 11) pl.
Pleurosigma angulatum (Queckett) W. Sm. (10) pl.
P. delicatulum W. Sm. (6) epil. and epiph.
P. elongatum W. Sm. (7, 10, 11) pl.
P. salinarum Grun. (7, 10, 11) pl.
Stauroneis parvula (10, 11) pl.

Family 3. GOMPHONEMACEAE

- Gomphoneis olivaceum* (Horne) P. Dawson ex Ross & Sims (6) epil. and epiph.
Gomphonema acuminatum Ehr. (10, 11) pl.
G. angustatum (Ktz.) Rabenh. (3, 7) pl.
G. angustatum var. *productum* Grun. (3) pl.
G. augur Ehr. (7) pl.
G. gracile Ehr. (6, 7) pl.
G. gracile f. *turris* (Ehr. c.p.?) Hust. (6) epiph.
G. lanceolatum Ehr. (7, 10, 11) b.
G. lanceolatum f. *turris* (Ehr. c.p.) Hust. (6) epil.
G. montanum Schum var. *medium* Grun. (6) epil.
G. parvulum (Ktz.) Grun. (6) pl.
G. parvulum var. *micropus* (Ktz.) Cleve (6) epil.
G. truncatum Ehr. (as *G. constrictum* Ehr. ex Ktz.) (7) pl.
G. truncatum Ehr. var. *capitatum* (Ehr.) Patr. (as *G. constrictum* var. *capitatum* (Ehr.) Van Heurck) (3, 6, 7) epil. and pl.
G. turris Ehr. (as *G. acuminatum* var. *turris* (Ehr.) Cleve) (6) pl.
G. vibrio Ehr. var. *pumilum* (Grun.) Ross (as *G. intricatum* Ktz. var. *pumilum* Grun.) (6) epil.

Family 4. CYMBELLACEAE

- Amphora coffeaeformis* (Ag.) Ktz. (10, 11) pl.
A. commutata Grun. (10, 11) pl.
A. lineolata Ehr. (11) pl.
A. ovalis (Ktz.) Ktz. (3, 7, 10, 11) b. and pl.
Cymbella affinis Ktz. (3, 6, 7, 8).
C. aspera (Ehr.) Cleve (6) epil. and pl.
C. cistula (Hemprich) Grun. (3, 6) epil., epiph. and pl.
C. cymbiformis (Ag.? Ktz.) Van Heurck (10, 11) pl.
C. cymbiformis var. *nonpunctata* Font. (6) epil.
C. microcephala Grun. (10, 11) pl.
C. parva (W. Sm.) Cleve (syn. *C. cymbiformis* (Ag.? Ktz.) Van Heurck) (10) pl.

- C. pusilla* Grun. ex A. Schmidt (10, 11) pl.
C. tumida (Bréb.) Van Heurck (3, 6) epil. and pl.
C. turgida (Greg.) Cleve (6, 10, 11) epil. and pl.
C. ventricosa Ktz. (6, 7) b., epil. and pl.

Order 8. EPITHEMIALES

Family 1. EPITHEMIACEAE

- Denticula rainierensis* Sov. (6) epil.
D. subtilis Grun. (3) pl.
Epithemia adnata (Ktz.) Rabenh. (syn. *E. zebra* (Ehr.) Ktz.) (6) epil.
E. adnata var. *porcellus* (Ktz.) Grun. (syn. *E. zebra* var. *porcellus* (Ktz.) Grun.) (6) epiph.
E. adnata var. *saxonica* (Ktz.) Patr. (syn. *E. zebra* var. *saxonica* (Ktz.) Grun.) (6) epil.
E. sorex Ktz. (3, 6) epil., epiph. and pl.
E. sorex var. *perundulata* (Ktz.) Cleve (6) epil. and pl.
E. turgida var. *granulata* (Ehr.) Brun. (7) pl.
Rhopalodia gibba (Ehr.) O. Muell. (3, 6, 7) epil. and pl.
R. gibba var. *ventricosa* (Ktz.) H. & M. Perag. (3, 6) epil. and pl.
R. gibberula (Ehr.) O. Muell. (3, 6) epil.

Order 9. BACILLARIALES

Family 1. NITZSCHIACEAE

- Cylindrotheca closterium* (Ehr.) Reim. & Lew. (10, 11) pl.
Bacillaria paxillifer (Muell.) Hendey (syn. *B. paradoxa* Gmel.) (3, 6, 7, 9, 10, 11) pl.
Hantzschia amphioxys (Ehr.) Grun. (8, 10, 11) b. and pl.
H. spectabilis (Ehr.) Hust. (7) pl.
Nitzschia acicularis (Ktz.) W. Sm. (8) pl.
N. acuta Hantzsch (10, 11) pl.
N. amphibia Grun. (3, 6) b. and epiph.
N. apiculata (Greg.) Grun. (3, 6, 10, 11) b. and pl.
N. circumscuta (J.W. Bail.) Grun. (6) epil. and epiph.
N. dissipata (Ktz.) Grun. (6) epiph. and pl.
N. fasciculata Grun. (3, 6, 7) pl.
N. filiformis (W. Sm.) Hust. (6, 8) epil., epiph. and pl.
N. fonticola Grun. (6) epil. and epiph.
N. frustulum (Ktz.) Grun. var. *perminuta* Grun. (6) epil. and epiph.
N. frustulum var. *perpusilla* (Rabenh.) Grun. (6) epiph. and pl.
N. granulata Grun. (6) epil. and epiph.
N. hamburgi Lange-Bert. (syn. *N. thermalis* Ktz.) (3, 7) pl.
N. hungarica Grun. (3, 6) epiph. and pl.
N. incurva Grun. var. *subtilis* (Grun.) Ros. (syn. *N. lorenziana* Grun. var. *subtilis* Grun. (6) epil. and pl.
N. kuetzingiana Hilse (7) pl.
N. microcephala Grun. (6) epil. and epiph.

- N. obtusa* W. Sm. (3, 6) pl.
N. obtusa var. *scalpelliformis* Grun. (3) pl.
N. palea (Ktz.) W. Sm. (3, 6) b. and pl.
N. paleacea Grun. (3) pl.
N. panduriformis Greg. (3) pl.
N. punctata (W. Sm.) Grun. (3) pl.
N. punctata var. *coarctata* Grun. (6) epiph. and pl.
N. pusilla (Ktz.) Grun. (3)
N. sigma (Ktz.) W. Sm. (3, 6, 10, 11) epiph. and pl.
N. sigma var. *rigidula* Grun. (6) epiph. and pl.
N. sigmoidea (Ehr.) W. Sm. (3, 6, 7, 10, 11) pl.
N. spectabilis (Ehr.) Ralfs (10, 11) pl.
N. tryblionella Hantzsch (3, 6, 8, 10, 11) epiph. and pl.
N. tryblionella var. *victoriae* (Grun.) Grun. (3, 6) epiph. and pl.
N. umbonata (Ehr.) Lange-Bert. (syn. *N. stagnorum* Rabenh.) (3) pl.

Order 10. SURIRELLALES

Family 1. SURIRELLACEAE

- Campylodiscus clypeus* Ehr. (6, 10, 11) epil. and pl.
C. clypeus var. *bicostatus* (W. Sm.) Hust. (10, 11) pl.
C. echeneis Ehr. (3, 7, 10) pl.
Cymatopleura elliptica (Bréb.) W. Sm. (3, 6, 10, 11) epil. and pl.
C. librite (Ehr.) Pant. (syn. *C. solea* (Bréb. & Godey) W. Sm.) (3, 6, 7, 8, 10)b. and epil.
Surirella angustata Ktz. (3, 6) b. and pl.
S. capronii Bréb. (6, 7) pl.
S. gemma (Ehr.) Ktz. (10, 11) pl.
S. ovalis Bréb. (3, 6, 7) epiph. and pl.
S. ovalis var. *maxima* Grun. (syn. *S. peisonis* Pant.) (3) pl.
S. ovata Ktz. (3, 6, 7, 10, 11) epiph. and pl.
S. robusta Ehr. var. *splendida* (Ehr.) Van Heurck (6) epil. and pl.
S. striatula Turpin (3, 7)
S. tenera Greg. (7, 10, 11) pl.
S. tenera var. *nervosa* A. Schmidt (7) pl.

BANGIOPHYCEAE

Order 1. COMPSOPOGONALES

Family 1. COMPSOPOGONACEAE

- Compsopogon coeruleus* (Balb.) Mont. (3, 7).

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قائمة بأنواع الطحالب التي تعيش في نهر شط العرب ، العراق

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خلاصة

تم تسجيل ٤١٥ نوعا وصنفا من الطحالب التي تعيش في مياه شط العرب . وقد زودت كل وحدة تصنيفية بوصف يبين طبيعة معيشتها . وأغلب الطحالب تنتمي إلى ثلاث طوائف هي الداياتومات (٣٠٨ وحدة تصنيفية) ، والطحالب الخضراء (٦٣ وحدة تصنيفية) ، والطحالب الزرقاء (٢٦ وحدة تصنيفية) .