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Estudo das diatomáceas bênticas em sistemas lóticos de Portugal Continental

Benthic diatoms in Portuguese watercourses

Volume 2

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Preface

This volume constitutes the second part of the thesis entitled “Benthic diatoms in Portuguese watercourses”. This volume comprises the last part of the chapter 3 (Diatoms in Portuguese freshwaters: an iconographic atlas) and includes the characterization of the taxa illustrated and the light (LM) and Scanning Electron Microscopic (SEM) plates with the micrographs of the taxa with abundance above 5% in at least one inventory or that were considered interesting.

Chapter 3

DIATOMS IN PORTUGUESE FRESHWATERS: AN ICONOGRAPHIC ATLAS

3 Diatoms in Portuguese freshwaters: an iconographic atlas

Taxa characterization

For the 294 taxa illustrated in the atlas a brief characterization has been performed. It consists in the name of the taxon with reference to the most updated bibliography, its basionym, the morphometric measurements of the populations presented (n indicates the number of valves measured), the ecological preferences for the taxa that constitute new records for the Iberian Peninsula and are present with abundance above 1% in at least one inventory, and the Specific Pollution sensitivity Index (SPI) values of pollution sensitivity (S) and stenoecy degree (V) from OMNIDIA v. 5.3. The plates and figures where each taxon is illustrated by means of light and scanning electron microscopy are also provided.

Division **Bacillariophyta** Haeckel 1878
Subdivision **Coscinodiscophytina** Medlin & Kaczmarska 2004
Class **Coscinodiscophyceae** Round & R.M. Crawford,
emend. Medlin & Kaczmarska 2004
Order **Coscinodiscales** Round & R.M. Crawford in Round et al. 1990
Family **Hemidiscaceae** Hendey 1937
Genus ***Actinocyclus*** Ehrenberg 1837

***Actinocyclus normanii* (W. Gregory ex Greville) Hustedt 1957**, p. 218; pl. 1, figs 5-6, 10 **[ANMN]**
Plate 1, Figs 1-14; Plate 2, Figs 1-4
Basionym: *Coscinodiscus normanii* W. Gregory ex Greville 1859
Morphometry (Belver Reservoir, Tagus River) (n = 3): Diameter = 18.0-22.6 μm; height = 3.3 μm
Morphometry (Fratel Reservoir, Tagus River) (n = 6): Diameter = 16.9-29.7 μm
SPI: S = 2.0; V = 2.0

Order **Melosirales** R.M. Crawford in Round et al. 1990
Family **Melosiraceae** Kützing 1844
Genus ***Melosira*** C. Agardh 1824

***Melosira varians* C. Agardh 1827**, p. 628 **[MVAR]**
Plate 3, Figs 1-21
Morphometry (Monte Novo Reservoir, Degebe River) (n=13): Diameter = 9.9-15.5 μm; height = 8.3-12.7 μm
Morphometry (Pereira, Arão Stream) (n=8): Diameter = 16.9-22.6 μm; height = 14.1-18.3 μm
SPI: S = 4.0; V = 1.0

Order **Aulacoseirales** R.M. Crawford in Round et al.1990
Family **Aulacoseiraceae** R.M. Crawford in Round et al.1990
Genus ***Aulacoseira*** Thwaites 1848

***Aulacoseira ambigua* (Grunow) Simonsen 1979**, p. 56 **[AAMB]**
Plate 6, Figs 45-70; Plate 9, Figs 1-5
Basionym: *Melosira crenulata* var. *ambigua* Grunow in Van Heurck 1882

Morphometry (Meimoa Reservoir, Meimoa Stream) (n=7): Diameter = 4.3-4.7 μm; height = 10.3-12.3 μm
Morphometry (Caia, Guadiana River) (n=10): Diameter = 4.7-6.0 μm; height = 7.1-9.3 μm
SPI: S = 3.0; V = 1.0

***Aulacoseira ambigua* f. *japonica* Tuji & D.M. Williams 2007**, p. 69

Plate 4, Figs 16-29

Morphometry (Fratel Reservoir, Tagus River) (n=8): Diameter = 4.7-5.8 μm; height = 7.3-8.2 μm
SPI: S = - ; V: = -
Ecological preferences WA (min-max): Current velocity (m s^{-1}): 0.37. Conductivity (μS cm^{-1}): 682 (650-733). pH: 8.2 (7.4-9.3). DO (% sat.): 98. DO (mg L^{-1}): 12.9 (5.6-15.6). Alkalinity (mg HCO_3 L^{-1}): 94 (80-110). N-NH_4^+ (μg N L^{-1}): 44 (39-80). Ca^{2+} (mg Ca^{2+} L^{-1}): 51.0. BOD_5 (mg O_2 L^{-1}): 1.1 (0.8-1.9). Cl^- (mg Cl^- L^{-1}): 83.9. TOC (mg C L^{-1}): 19.0. Total hardness (mg $CaCO_3$ L^{-1}): 208.3 (205.0-226.0). P-PO_4^{3-} (μg P L^{-1}): 139 (6-223). Total phosphorus (μg P L^{-1}): 809 (2-1200). Soluble reactive phosphorus (SRP) (μg P L^{-1}): 2. N-NO_3^- (μg N L^{-1}): 911 (480-1084). N-NO_2^- (μg N L^{-1}): 31 (5-120). Na^+ (mg Na^+ L^{-1}): 13.1. SO_4^{2-} (mg SO_4^{2-} L^{-1}): 158.4.

***Aulacoseira granulata* (Ehrenberg) Simonsen 1979**, p. 58 **[AUGR]**

Plate 4, Figs 33-38, 39-40 (?)

Basionym: *Gaillonella granulata* Ehrenberg 1843
Morphometry (Marateca Reservoir, Ocreza River) (n=5): Diameter = 7.3-9.7 μm; height = 6.9-10.5 μm
Morphometry (Belver Reservoir, Tagus River) (n=1): Diameter = 10.0 μm; height = 5.3 μm
SPI: S = 2.9; V = 1.0

***Aulacoseira granulata* var. *angustissima* (O. Müller) Simonsen 1979**, p. 58 **[AUGA]**

Plate 4, Figs 30-32

Basionym: *Melosira granulata* var. *angustissima* O. Müller 1900
Morphometry (Marateca Reservoir, Ocreza River) (n=2): Diameter = 2.7-3.3 μm; height = 14.1-15.7 μm
SPI: S = 2.8; V = 1.0

***Aulacoseira pusilla* (F. Meister) Tuji & Houki 2004**, p. 38 **[AUPU]**

Plate 4, Figs 8-15; Plate 5, Figs 4-6; Plate 6, Figs 1-22

Basionym: *Melosira pusilla* F. Meister 1913
Morphometry (Senra, Lima River) (n=7): Diameter = 4.8-5.7 μm
Morphometry (Casal Rei, Zêzere River) (n=14): Diameter = 4.3-5.8 μm; height = 2.1-2.7 μm
SPI: S = - ; V = -
Ecological preferences WA (min-max): Current velocity (m s^{-1}): 0.36 (0.33-0.40). Conductivity (μS cm^{-1}): 290 (45-745). pH: 7.4 (6.6-8.8). DO (% sat.): 92 (84-103). DO (mg L^{-1}): 9.1 (3.5-14.0). Alkalinity (HCO_3 L^{-1}): 51 (16-117). N-NH_4^+ (μg N L^{-1}): 34 (2-109). Ca^{2+} (mg Ca^{2+} L^{-1}): 6.6 (2.0-12.0). BOD_5 (mg O_2 L^{-1}): 2.2 (0-5.0). Cl^- (mg Cl^- L^{-1}): 6.6 (5.0-8.4). TOC (mg C L^{-1}): 2.7 (2.3-3.0). Total hardness (mg $CaCO_3$ L^{-1}): 81.7 (5.0-228.0). P-PO_4^{3-} (μg P L^{-1}): 84 (0-242). Total phosphorus (μg P L^{-1}): 367 (3-1200). Soluble reactive phosphorus (SRP) (μg P L^{-1}): 9 (0-20). N-NO_3^- (μg N L^{-1}): 867 (5-1106). N-NO_2^- (μg N L^{-1}): 12 (1-21). Na^+ (mg Na^+ L^{-1}): 3.1 (2.7-3.4). SO_4^{2-} (mg SO_4^{2-} L^{-1}): 7.1 (2.2-12.7).

***Aulacoseira subarctica* (O. Müller) Haworth 1990**, p. 195 **[AUSU]**

Plate 4, Figs 1-7; Plate 5, Figs 1-3

Basionym: *Melosira italica* subsp. *subarctica* O. Müller 1906
Morphometry (Senra, Lima River) (n=7): Diameter = 4.0-4.7 μm; height = 7.7-12.6 μm
SPI: S = 4.0; V = 1.0

***Aulacoseira tenella* (Nygaard) Simonsen 1979**, p. 63 **[AUTL]**

Plate 6, Figs 23-44; Plate 7, Figs 1-6; Plate 8, Figs 1-4

Basionym: *Melosira tenella* Nygaard 1956
Morphometry (Meimoa Reservoir, Meimoa Stream) (n=7): Diameter = 7.7-8.0 μm; height = 1.5-1.7 μm
Morphometry (Santa Luzia Reservoir, Unhais River) (n=12): Diameter = 6.0-8.3 μm; height = 1.0-1.3 μm

SPI: S = 4.8; V = 1.0

Subdivision **Bacillariophytina** Medlin & Kaczmarska 2004
Class **Mediophyceae** (Jousé & Proshkina-Lavrenko) Medlin & Kaczmarska 2004
Order **Thalassiosirales** Glezer & I.V. Makarova 1986
Family **Stephanodiscaceae** Glezer & I.V. Makarova 1986
Genus ***Cyclostephanos*** Round ex
Theriot, Håkansson, Kociolek, Round & Stoermer 1987

***Cyclostephanos delicatus* (Genkal) Kling & Håkansson in Håkansson & Kling 1990**, p. 280; figs 16-21 **[CSDE]**

Plate 12, Figs 57-65

Basionym: *Stephanodiscus delicatus* Genkal 1985
Morphometry (Valverde, São Brissos Stream) (n=7): Diameter = 4.5-9.1 µm
SPI: S = 3.0; V = 1.0

***Cyclostephanos dubius* (Fricke) Round validated by E.C. Theriot et al. 1987**, v. 22 (4): p. 346 **[CDUB]**

Plate 12, Figs 43-56

Basionym: *Cyclotella dubia* Fricke in Schmidt 1900
Morphometry (Alcáçovas Stream) (n=14): Diameter = 9.1-15.5 µm
SPI: S = 3.0; V = 2.0

***Cyclostephanos invisitatus* (M.H. Hohn & Hellerman) E.C. Theriot, Stoermer & Håkansson 1987**, p. 256-257; figs 18-24 **[CINV]**

Plate 12, Figs 66-80

Basionym: *Stephanodiscus invisitatus* M.H. Hohn & Hellerman 1963
Morphometry (Valverde, São Brissos Stream) (n=7): Diameter = 7.1-9.1 µm
Morphometry (Alcáçovas Stream) (n=8): Diameter = 8.5-11.1 µm
SPI: S = 2.6; V = 1.0

Genus ***Cyclotella*** (Kützing) Brébisson 1838

***Cyclotella atomus* Hustedt 1937**, p. 143; pl. 9, figs 1-4 **[CATO]**

Plate 10, Figs 42-62

Morphometry (Sabor River) (n=21): Diameter = 5.5-6.7 µm
SPI: S = 2.0; V = 1.0

***Cyclotella distinguenda* Hustedt 1927**, p. 320; fig. 4 **[CDTG]**

Plate 10, Figs 23-30

Morphometry (Assamaça, Valmar Stream) (n=8): Diameter = 7.6-15.5 µm
SPI: S = 4.0; V = 2.0

***Cyclotella meneghiniana* Kützing 1844**, p. 50; pl. 30, fig. 68 **[CMEN]**

Plate 10, Figs 7-22

Morphometry (Peramanca Stream) (n=8): Diameter = 10.3-14.9 µm
SPI: S = 2.0; V = 1.0

***Cyclotella ocellata* Pantocsek 1902**, p. 104; pl. 15, fig. 318 **[COCE]**

Plate 10, Figs 31-41; Plate 11, Figs 1-5

Basionym: *Discoplea comta* Ehrenberg 1844
Morphometry (Odeleite Reservoir, Odeleite Stream) (n=11): Diameter = 6.2-11.0 µm
SPI: S = 3.0; V = 1.0

***Cyclotella radiosa* (Grunow in Van Heurck) Lemmermann 1900**, p. 30 **[CRAD]**

Plate 10, Figs 1-6

Basionym: *Discoplea comta* Ehrenberg 1844
Morphometry (Bemposta, Douro River) (n=6): Diameter = 10.4-20.5 µm

SPI: S = 5.0; V = 1.0

Genus ***Discostella*** Houk & Klee 2004

***Discostella stelligera* (Cleve & Grunow) Houk & Klee 2004**, p. 208 **[DSTE]**
Plate 12, Figs 1-18; Plate 13, Figs 1-6
Basionym: *Cyclotella meneghiniana* var. *stelligera* Cleve & Grunow in Cleve 1881
Morphometry (Meimoa Reservoir, Meimoa Stream) (n=8): Diameter = 7.9-12.7µm
Morphometry (Santa Luzia Reservoir, Pampilhosa Stream) (n=10): Diameter = 6.3-9.9 µm
SPI: S = 4.2; V = 1.0

***Discostella* sp.**
Plate 12, Figs 19-42
Morphometry (Alcáçovas Stream) (n=22): Diameter = 4.1-4.4 µm
SPI: S = 4.2; V = 1.0

Genus ***Stephanodiscus*** Ehrenberg 1845

***Stephanodiscus hantzschii* Grunow in Cleve & Grunow 1880**, p. 115; pl. 7, fig. 131 **[SHAN]**
Plate 14, Figs 14-20
Morphometry (Bemposta, Douro River) (n=8): Diameter = 6.5-12.7 µm
SPI: S = 1.8; V = 1.0

***Stephanodiscus neoastraea* Håkansson & Hickel 1986**, p. 41; figs 1-11 **[SNEO]**
Plate 14, Figs 1-13
Morphometry (Bemposta, Douro River) (n=13): Diameter = 13.7-19.7 µm
SPI: S = 2.0; V = 2.0

***Stephanodiscus vestibulis* Håkansson, Theriot & Stoermer 1986**, p. 504; figs 1-12 **[SVES]**
Plate 14, Figs 21-30
Morphometry (Alcáçovas Stream) (n=10): Diameter = 5.3-8.5 µm
SPI: S = 2.5; V = 1.0

Order **Triceratiales** Round & R.M. Crawford in Round et al.1990
Family **Triceratiaceae** (Schütt) Lemmermann 1899
Genus ***Pleurosira*** (Meneghini) V.B.A. Trevisan di San Leon 1848

***Pleurosira laevis* (Ehrenberg) Compère 1982**, p. 177-178; figs 1-17, 20, 39 **[PLEV]**
Plate 15, Figs 1, 2
Basionym: *Biddulphia laevis* Ehrenberg 1843a [PLEV]
Morphometry (Fratel Reservoir) (n=1): Diameter = 40 µm
SPI: S = 2.0; V = 3.0

Class **Bacillariophyceae** Haeckel, emend. Medlin & Kaczmarska 2004
Order **Fragilariales** P.C. Silva 1962
Family **Fragilariaceae** Greville 1833
Genus ***Asterionella*** Hassall 1850

***Asterionella formosa* Hassall 1850**, p. 10; pl. 2/lower figure, fig. 5 **[AFOR]**
Plate 33, Figs 34-43
Morphometry (Fratel Reservoir, Tagus River) (n=10): Length = 26.5-57.9 µm; width = 2.5-3.0 µm; 23-25 striae/10 µm
SPI: S = 4.0; V = 1.0

Genus ***Diatoma*** Bory 1824

***Diatoma hyemale* (Lyngbye) Heiberg 1863**, p. 58 **[DHIE]**

Plate 16, Figs 31-37; Plate 18, Figs 1-4

Basionym: *Fragilaria hiemalis* Lyngbye 1819
Morphometry (Sabugueiro, Fervença Stream) (n=7): Length = 24.9-55.1 μm; width = 6.5-9.7 μm; 2-4 costae/10 μm
SPI: S = 5.0; V = 3.0

***Diatoma mesodon* Kützing 1844**, p. 47; pl. 17, fig. 13 **[DMES]**

Plate 16, Figs 1-30; Plate 17, Figs 1-3

Morphometry (Sabugueiro, Fervença Stream) (n=17): Length = 12.7-25.4 μm; width = 5.9-8.5 μm; 4-5 costae/10 μm
Morphometry (Redonda, Águeda River) (n=10): Length = 12.5-16.9 μm; width = 5.7-8.1 μm; 3-4 costae/10 μm
SPI: S = 5.0; V = 3.0

Genus ***Fragilaria*** Lyngbye 1819

***Fragilaria acidoclinata* Lange-Bertalot & Hofmann in Lange-Bertalot 1993**, p. 41-42; pl. 14, figs 8-13, + Bacill. 2/4, fig. 82: 11-13 **[FACD]**

Plate 28, Figs 18-21

Morphometry (Oleiros, Seca Stream) (n=4): Length = 24.1-35.3 μm; width = 2.7-3.2 μm; 12-14 striae/10 μm
SPI: S = 4.0; V = 1.0

***Fragilaria arcus* (Ehrenberg) Cleve 1898**, p. 9 **[FARC]**

Plate 19, Figs 1-15; Plate 20, Figs 1-16

Basionym: *Navicula arcus* Ehrenberg 1836
Morphometry (São João do Monte, Águeda River) (n=15): Length = 28.1-66.7 μm; width = 6.0-6.7 μm; 16-17 striae/10 μm
Morphometry (Redonda, Águeda River) (n=16): Length = 26.0-72.0 μm; width = 6.0-6.5 μm; 16-17 striae/10 μm
SPI: S = 5.0; V = 2.0

***Fragilaria canariensis* Lange-Bertalot 1993**, p. 43-44; pl. 14, figs 1-6 **[FCAN]**

Plate 41, Figs 94-124; Plate 43, Figs 1-3

Morphometry (Campinho, Aravil River) (n=29): Length = 5.6-9.8 μm; width = 2.6-4.1 μm; 14-16 striae/10 μm
SPI: S = - ; V = -

***Fragilaria* aff. *capitellata* (Grunow in Van Heurck) J.B. Petersen 1946**, p. 54

Plate 32, Figs 31-67

Basionym: *Synedra capitellata* Grunow in Van Heurck 1881
Morphometry (Pomar, Alvito Stream) (n=20): Length = 10.7-30.7 μm; width = 3.2-4.3 μm; 14-16 striae/10 μm
Morphometry (Santa Luzia Reservoir, Unhais River) (n=14): Length = 13.9-26.8 μm; width = 3.0-3.9 μm; 14-16 striae/10 μm
SPI: S = - ; V = -

***Fragilaria crotonensis* Kitton 1869 sensu Krammer & Lange-Bertalot 1991a**, p. 462; pl. 116, figs 3, 4 **[FCRO]**

Plate 21, Figs 1-23; Plate 22, Figs 1-6; Plate 23, Figs 1-19

Morphometry (Belver Reservoir, Tagus River) (n=3): Length = 46.6-48.0 μm; width = 2.6-2.9 μm; 16-17 striae/10 μm
Morphometry (Fratel Reservoir, Tagus River) (n=8): Length = 46.7-54.7 μm; width = 2.0-2.7 μm; 17-18 striae/10 μm
Morphometry (Belver, Tagus River) (n=16): Length = 43.7-76.7 μm; width = 2.5-3.1 μm; 16-17 striae/10 μm

SPI: S = 4.0; V = 1.0

***Fragilaria gracilis* Østrup 1910**, p. 190; pl. 5, fig. 117 **[FGRA]**

Plate 24, Figs 1-42; Plate 25, Figs 1-5

Nomenclatural synonym: *Fragilaria capucina* var. *gracilis* (Østrup) Hustedt 1950

Morphometry (Oleiros, Seca Stream) (n=19): Length = 11.1-33.7 μm; width = 2.3-3.0 μm; 18-19 striae/10 μm

Morphometry (Foz do Carvalhoso, Seixe Stream) (n=19): Length = 16.9-30.0 μm; width = 2.3-3.1 μm; 18-20 striae/10 μm

SPI: S = 4.8; V = 1.0

***Fragilaria mesolepta* Rabenhorst 1861**, no. 1041 **[FMES]**

Plate 27, Figs 29-42; Plate 28, Figs 34-45

Basionym: *Fragilaria capucina* var. *mesolepta* (Rabenhorst) Rabenhorst 1864

Morphometry (Meimoa Reservoir, Meimoa Stream) (n=14): Length = 18.7-41.6 μm; width = 2.8-3.5 μm; 16-18 striae/10 μm

Morphometry (Monte Novo Reservoir, Degebe River) (n=11): Length = 20.0-37.4 μm; width = 3.0-3.3 μm; 16-18 striae/10 μm

SPI: S = 4.5; V = 1.0

***Fragilaria nitzschioides* Grunow in Van Heurck 1881**, pl. 44, fig. 10 **[FNIT]**

Plate 38, Figs 36-59

Morphometry (Cinco Vilas, Côa River) (n=22): Length = 7.5-16.5 μm; width = 3.5-4.5 μm; 17-18 striae/10 μm

SPI: S = 5.0; V = 2.0

Ecological preferences WA (min-max): Current velocity (m s^{-1}): 0.7 (0.1-1.4). Conductivity (μS cm^{-1}): 120 (31-723). pH: 8.1 (6.2-8.8). DO (% sat.): 80 (73-93). DO (mg L^{-1}): 6.9 (6.5-9.1). Alkalinity (mg HCO_3 L^{-1}): 36.9 (9.0-94.0). N-NH_4^+ (μg N L^{-1}): 26 (2-70). Ca^{2+} (mg Ca^{2+} L^{-1}): 9.6 (2.0-61.0). BOD_5 (mg O_2 L^{-1}): 2.8 (1.0-3.0). Cl^- (mg Cl^- L^{-1}): 12.0 (0.5-92.8). TOC (mg C L^{-1}): 4.2 (1.4-5.0). Total hardness (mg $CaCO_3$ L^{-1}): 46.2 (5.0-209.0). P-PO_4^{3-} (μg P L^{-1}): 26 (2-33). Total phosphorus (μg P L^{-1}): 11 (2-16). Soluble reactive phosphorus (SRP) (μg P L^{-1}): 10 (2-11). N-NO_3^- (μg N L^{-1}): 1334 (7-1640). N-NO_2^- (μg N L^{-1}): 103 (4-1120). Na^+ (mg Na^+ L^{-1}): 11.4 (3.9-13.7). SO_4^{2-} (mg SO_4^{2-} L^{-1}): 8.5 (0.3-158.3).

***Fragilaria parva* Tuji & D.M. Williams 2008**, p. 29; figs 13-28

Plate 28, Figs 1-17, Figs 22-33

Basionym: *Synedra familiaris* f. *parva* Grunow 1881

Morphometry (Alcafache, Dão River) (n=17): Length = 27.3-40.9 μm; width = 2.7-3.1 μm; 18-20 striae/10 μm

Morphometry (Barbaído, Tripeiro River) (n=11): Length = 31.0-50.2 μm; width = 2.5-3.3 μm; 16-18 striae/10 μm

SPI: S = ; V:=

***Fragilaria pectinalis* (O.F. Müller) Lyngbye 1819**, p. 184; pl. 63, fig. D **[FPEC]**

Plate 33, Figs 1-33; Plate 34, Figs 1, 2

Morphometry (Belver, Tagus River) (n=16): Length = 21.5-38.4 μm; width = 3.6-5.3 μm; 10-16 striae/10 μm

Morphometry (Monte Novo Reservoir, Degebe River) (n=16): Length = 21.3-33.3 μm; width = 3.3-4.4 μm; 12-16 striae/10 μm

SPI: S = - ; V:= -

***Fragilaria* aff. *pectinalis* (O.F. Müller) Lyngbye 1819**, p. 184; pl. 63, fig. D

Plate 30, Figs 1-16

Morphometry (Casal Rei, Zêzere River) (n=10): Length = 11.3-23.1 μm; width = 3.7-4.9 μm; 14-16 striae/10 μm

SPI: S = - ; V = -

***Fragilaria radians* (Kützing) D.M. Williams & Round 1987**, p. 269 **[FRAD]**

Plate 29, Figs 1-26

Basionym: *Synedra radians* Kützing 1844
Morphometry (Barranco, Vascão Stream) (n=13): Length = 29.5-46.5 μm; width = 2.7-4.2 μm; 10 striae/10 μm
Morphometry (Oleiros, Seca Stream) (n=13): Length = 33.7-51.2 μm; width = 2.8-3.7 μm; 10 striae/10 μm
SPI: S = 5.0; V = 2.0

***Fragilaria* aff. *rumpens* (Kützing) Carlson 1913**, p. 29

Plate 32, Figs 1-30

Basionym: *Synedra rumpens* Kützing 1844
Nomenclatural synonym: *Fragilaria capucina* var. *rumpens* (Kützing) Lange-Bertalot ex Bukhtiyarova 1995
Morphometry (Redonda, Águeda River) (n=18): Length = 13.5-26.9 μm; width = 3.5-4.2 μm; 16-18 striae/10 μm
Morphometry (São João do Monte, Águeda River) (n=12): Length = 14.5-27.0 μm; width = 3.6-3.9 μm; 16 striae/10 μm
SPI: S = - ; V = -

***Fragilaria socia* (J.H. Wallace) Lange-Bertalot 1980**, v. 33: p. 749 **[FSOC]**

Plate 30, Figs 17-32

Basionym: *Synedra socia* J.H. Wallace 1955
Morphometry (Peramanca Stream) (n=14): Length = 11.1-39.5 μm; width = 3.7-4.3 μm; 14-16 striae/10 μm
SPI: S = - ; V = -

***Fragilaria* cf. *tenera* (W. Smith) Lange-Bertalot 1980**, p. 746

Plate 24, Figs 43-62; Plate 26, Figs 1-6

Basionym: *Synedra tenera* W. Smith 1856
Morphometry (Santa Luzia Reservoir, Unhais River) (n=19): Length = 28.0-72.0 μm; width = 1.9-2.3 μm; 20-22 striae/10 μm
SPI: S = - ; V = -

***Fragilaria vaucheriae* (Kützing) J.B. Petersen 1938**, p. 167; figs 1 a-g **[FVAU]**

Plate 29, Figs 27-42

Basionym: *Exilaria vaucheriae* Kützing 1833
Morphometry (Azinhal de Mouros, Vascão Stream) (n=15): Length = 11.3-33.9 μm; width = 4.0-4.7 μm; 8-12 striae/10 μm
SPI: S = 3.4; V = 1.0

***Fragilaria* sp.1**

Plate 23, Figs 20-43

Morphometry (Bazágueda River) (n=23): Length = 30.8-45.4 μm; width = 2.1-2.7 μm; 16-17 striae/10 μm
SPI: S = - ; V = -

***Fragilaria* sp.2**

Plate 27, Figs 1-17

Morphometry (São Pedro de Muel, São Pedro Stream) (n=16): Length = 15.5-29.2 μm; width = 3.0-4.0 μm; 10-14 striae/10 μm
SPI: S = - ; V = -

***Fragilaria* sp.3**

Plate 27, Figs 18-28

Morphometry (Valeira Reservoir, Douro River) (n=11): Length = 32.0-53.2 μm; width = 1.9-2.9 μm; 18-20 striae/10 μm
SPI: S = - ; V = -

***Fragilaria* sp.4**

Plate 30, Figs 33-63; Plate 31, Figs 1-6

Morphometry (Espargal, Algibre Stream) (n=16): Length = 12.2-28.2 μm; width = 4.1-4.8 μm; 12-14 striae/10 μm

Morphometry (Foz do Carvalhoso, Seixe Stream) (n=13): Length = 12.5-22.6 μm; width = 4.0-5.1 μm; 10-14 striae/10 μm

SPI: S = 4.0; V = 1.0

Genus ***Pseudostaurosira*** D.M. Williams & Round 1988

***Pseudostaurosira alvareziae* Cejudo-Figueiras, E. Morales & Ector 2010**, figs 34-73, 100-105, 106, 108, 110

Plate 35, Figs 1-70; Plate 36, Figs 1-4

Morphometry (Amieira, Tagus River) (n=17): Length = 11.0-21.0 μm; width = 4.0-4.5 μm; 14-15 striae/10 μm

Morphometry (Barquinha, Tagus River) (n=18): Length = 11.5-21.5 μm; width = 4.0-4.5 μm; 14-15 striae/10 μm

Morphometry (Monte Novo Reservoir, Degebe River) (n=5): Length = 10.5-17.0 μm; width = 4.0 μm; 14 striae/10 μm

Morphometry (Fratel Reservoir, Tagus River, 27-04-2006) (n=11): Length = 12.0-21.0 μm; width = 4.0-4.5 μm; 14 striae/10 μm

Morphometry (Fratel Reservoir, Tagus River, 12-07-2006) (n=8): Length = 9.5-20.5 μm; width = 3.5-4.5 μm; 14-15 striae/10 μm

***Pseudostaurosira brevistriata* (Grunow in Van Heurck) D.M. Williams & Round 1987**, p. 276; figs 28-31 **[PSBR]**

Plate 35, Figs 81-89

Basionym: *Fragilaria brevistriata* Grunow in Van Heurck 1885

Morphometry (Saucelle, Douro River) (n=6): Length = 9.3-17.7 μm; width = 4.0-4.5 μm; 14-15 striae/10 μm

SPI: S = 3.0; V = 1.0

***Pseudostaurosira brevistriata* var. *capitata* (Héribaud) N.A. Andresen Stoermer & Kreis 2000**, p. 416 **[PBCA]**

Plate 38, Figs 1-35; Plate 39, Figs 1, 2

Morphometry (Monte dos Irmãos, Sôr Stream) (n=17): Length = 12.0-19.5 μm; width = 3.5-4.5 μm; 13-14 striae/10 μm

Morphometry (Penha de Águia, Guadiana River) (n=15): Length = 7.5-14.5 μm; width = 3.5-4.5 μm; 13-15 striae/10 μm

SPI: S = - ; V = -

Ecological preferences (n=1): Current velocity (m s^{-1}): 0.5. Conductivity (μS cm^{-1}): 368. pH: 6.7. DO (% sat.): 105. DO (mg L^{-1}): 8.7. Alkalinity (HCO_3 L^{-1}): 122.0. N-NH_4^+ (μg N L^{-1}): 2. Ca^{2+} (mg Ca^{2+} L^{-1}): 22.4. BOD_5 (mg O_2 L^{-1}): 2.0. Cl^- (mg Cl^- L^{-1}): 54.1. TOC (mg C L^{-1}): 3.4. Total hardness (mg $CaCO_3$ L^{-1}): 87.0. P-PO_4^{3-} (μg P L^{-1}): 25. Total phosphorus (μg P L^{-1}): 52. Soluble reactive phosphorus (SRP) (μg P L^{-1}): 17. N-NO_3^- (μg N L^{-1}): 460. Na^+ (mg Na^+ L^{-1}): 2.3. SO_4^{2-} (mg SO_4^{2-} L^{-1}): 7.8.

***Pseudostaurosira* aff. *polonica* (Witak & Lange-Bertalot) E. Morales & Edlund 2003**, p. 235

Plate 35, Figs 71-80; Plate 37, Figs 1-4

Morphometry (Saucelle, Douro River) (n=10): Length = 19.9-23.0 μm; width = 3.1-3.8 μm; 14-15 striae/10 μm

SPI: S = - ; V = -

***Pseudostaurosira* sp. [PDTS]**

Plate 41, Figs 69-93; Plate 42, Figs 1-5

Morphometry (Campinho, Aravil River) (n=22): Length = 3.8-9.2 μm; width = 3.4-4.5 μm; 14-18 striae/10 μm

SPI: S = - ; V = -

Genus ***Punctastriata*** D.M. Williams & Round 1988

***Punctastriata* sp. [PUCS]**

Plate 38, Figs 60-120; Plate 40, Figs 1-6

Morphometry (Gorazes, Oeiras Stream) (n=17): Length = 5.0-8.0 μm; width = 3.5-4.5 μm; 10-11 striae/10 μm

Morphometry (Junqueira, Maçãs River) (n=15): Length = 5.5-8.5 μm; width = 3.5-4.5 μm; 10-12 striae/10 μm

Morphometry (Poldras Stream) (n=27): Length = 4.5-14.5 μm; width = 2.5-7.5 μm; 9-11 striae/10 μm

Genus ***Staurosira*** Ehrenberg 1843

***Staurosira construens* var. *binodis* (Ehrenberg) Hamilton in Hamilton, Poulin, Charles & Aangell 1992**, p. 29 **[SCBI]**

Plate 44, Figs 1-90; Plate 45, Figs 1-4

Basionym: *Fragilaria binodis* Ehrenberg

Morphometry (Poldras Stream) (n=34): Length = 7.3-16.0 μm; width = 3.9-4.1 μm; 14-16 striae/10 μm

Morphometry (Chamusca, Tagus River) (n=12): Length = 14.7-19.3 μm; width = 4.1-4.3 μm; 14-16 striae/10 μm

Morphometry (Saucelle, Douro River) (n=15): Length = 10.7-17.7 μm; width = 4.2-4.8 μm; 14-16 striae/10 μm

Morphometry (Junqueira, Maçãs River) (n=24): Length = 6.7-12.7 μm; width = 3.3-4.5 μm; 14-16 striae/10 μm

SPI: S = 4.0; V = 1.0

***Staurosira venter* (Ehrenberg) H. Kobayasi in Mayama, Idei, Osada & Nagumo 2002**, p. 90 **[SSVE]**

Plate 41, Figs 1-68

Basionym: *Fragilaria venter* Ehrenberg 1854a

Nomenclatural synonym: *Fragilaria construens* var. *venter* (Ehrenberg) Grunow in Van Heurck 1881

Morphometry (Barquinha, Tagus River) (n=22): Length = 4.3-8.1 μm; width = 3.7-4.8 μm; 16-20 striae/10 μm

Morphometry (Pulo do Lobo, Limas Stream) (n=15): Length = 4.1-8.3 μm; width = 3.2-4.6 μm; 14-18 striae/10 μm

Morphometry (Safara Stream (Guadiana basin) (n=10): Length = 4.2-6.2 μm; width = 3.8-4.9 μm; 16-18 striae/10 μm

Morphometry (Peramanca Stream (Sado basin) (n=4): Length = 4.4-6.8 μm; width = 3.8-4.1 μm; 16-18 striae/10 μm

SPI: S = 4.0; V = 1.0

Genus ***Tabularia*** (Kützing) D.M. Williams & Round 1986

***Tabularia* sp. [TBSP]**

Plate 46, Figs 1-11

Morphometry (Gomes Aires, Mira River) (n=11): Length = 73.3-94.7 μm; width = 3.0-4.0 μm; 12-13 striae/10 μm

SPI: S = 2.0; V = 3.0

Genus ***Ulnaria*** (Kützing) Compère 2001

***Ulnaria biceps* (Kützing) Compère 2001**, p. 100 **[UBIC]**

Plate 48, Figs 1-18; Plate 49, Figs 1-5

Basionym: *Synedra biceps* Kützing 1844

Nomenclatural synonym: *Fragilaria biceps* (Kützing) Lange-Bertalot 1993

Morphometry (Lezíria, Zêzere River) (n = 8): Length = 158-358 μm; width = 7.0-9.0 μm; 8-9 striae/10 μm

SPI: S = 3.0; V = 1.0

***Ulnaria delicatissima* (Grunow) M. Aboal & P.C. Silva 2004**, p. 361 **[UDEA]**

Plate 47, Figs 1-10

Basionym: *Synedra delicatissima* var. *angustissima* Grunow in Van Heurck 1881
Nomenclatural synonym: *Fragilaria delicatissima* var. *angustissima* (Grunow) Lange-Bertalot 1980
Morphometry (Bravura, Odiáxere Stream) (n=10): Length = 105.7-134.5 µm; width = 3.1-4.0 µm; 13-14 striae/10 µm
SPI: S = 4.0; V = 1.0

***Ulnaria ulna* (Nitzsch) Compère 2001**, p. 100 **[UULN]**

Plate 50, Figs 1-9

Basionym: *Bacillaria ulna* Nitzsch 1817
Nomenclatural synonym: *Fragilaria ulna* (Nitzsch) Lange-Bertalot 1980a
Morphometry (Escusa, Sorraia River) (n=9): Length = 104.5-175.7 µm; width = 6.7-11.7 µm; 10-11 striae/10 µm
SPI: S = 3.0; V = 1.0

Order **Tabellariales** Round in Round et al. 1990
Family **Tabellariaceae** Kützing 1844
Genus ***Tabellaria*** Ehrenberg ex Kützing 1844

***Tabellaria flocculosa* (Roth) Knudson 1952**, p. 436 **[TFLO]**

Plate 51, Figs 1-17; Plate 52, Figs 1-3

Basionym: *Conferva flocculosa* Roth 1797
Morphometry (Torno River, Douro basin) (n=14): Length = 16.0-53.3 µm; width (in the middle) = 6.7-8.0 µm; 17-19 striae/10 µm
SPI: S = 5.0; V = 1.0

***Tabellaria pseudoflocculosa* H. Kobayasi ex Mayama 2007**, p. 92; pl. 112 **[TPFL]**

Plate 51, Figs 18-30; Plate 53, Figs 1-5; Plate 54, Figs 1-6

Morphometry (Meimoa Reservoir, Meimoa Stream) (n=9): Length = 30.3-46.0 µm; width (in the middle) = 4.8-5.1 µm; 16-17 striae/10 µm
SPI: S = 5.0; V = 1.0
Ecological preferences WA (min-max): Conductivity (µS cm^{-1}): 40 (35-41). pH: 7.9 (7.4-8.2). DO (mg L^{-1}): 10.5 (8.2-11.2). Alkalinity (HCO_3 L^{-1}): 25.0. N-NH_4^+ (µg N L^{-1}): 62. BOD_5 (mg O_2 L^{-1}): 3.0. Total hardness (mg $CaCO_3$ L^{-1}): 10.5 (9.2-11.0). P-PO_4^{3-} (µg P L^{-1}): 22. Total phosphorus (µg P L^{-1}): 62 (60-70). N-NO_3^- (µg N L^{-1}): 362 (226-406). N-NO_2^- (µg N-NO_2^- L^{-1}): 15.

Family **Peroniaceae** (Karsten) Topachevs'kyj & Oksiyuk 1960
Genus ***Peronia*** Brébisson & Arnott ex Kitton 1868

***Peronia fibula* (Brébisson in Kützing) Ross 1956**, p. 78 **[PFIB]**

Plate 55, Figs 1-50; Plate 56, Figs 1-5

Basionym: *Gomphonema fibula* Brébisson ex Kützing 1849
Nomenclatural synonym: *Peronia erinacea* Brébisson & Arnott ex Kitton 1868
Morphometry (Abelheira, Abelheira Stream) (n=17): Length = 18.7-42.7 µm; width = 2.7-3.7 µm; 15-16 striae/10 µm
Morphometry (Lamas de Mouro, Mouro River) (n=31): Length = 15.3-42.3 µm; width = 2.9-3.7 µm; 14-18 striae/10 µm
SPI: S = 5.0; V = 3.0

Order **Eunotiales** P.C. Silva 1962
Family **Eunotiaceae** Kützing 1844
Genus ***Eunotia*** Ehrenberg 1837

***Eunotia bilunaris* (Ehrenberg) Schaarschmidt 1881**, p. 159 **[EBIL]**

Plate 58, Figs 17-28

Basionym: *Synedra bilunaris* Ehrenberg 1832
Morphometry (Bravura, Odeáxere Stream) (n=12): Length = 38.7-70.7 µm; width = 3.3-4.0 µm; 17-20 striae/10 µm
SPI: S = 5.0; V = 2.0

***Eunotia* cf. *botuliformis* Wild, Nörpel & Lange-Bertalot in Lange-Bertalot 1993**, p. 29; pl. 33, figs 2-15

Plate 58, Figs 8-15; Plate 59, Figs 1-4

Morphometry (Brunhais, Ave River) (n=8): Length = 10.7-12.0 µm; width = 3.33 µm; 18-25-striae/10 µm
SPI: S = - ; V = -

***Eunotia implicata* Nörpel, Alles & Lange-Bertalot in Alles, Nörpel & Lange-Bertalot 1991**, v. 53 (1-2): p. 206; pl. 7, figs 19-32 **[EIMP]**

Plate 57, Figs 1-40; Plate 58, Figs 1-7

Morphometry (Monte da Fazenda, Era Stream) (n=27): Length = 22.7-34.7 µm; width = 2.7-4.0 µm; 16-20 striae/10 µm
Morphometry (Bravura, Odeáxere Stream) (n=11): Length = 20.0-28.3 µm; width = 2.7-4.0 µm; 17-18 striae/10 µm
Morphometry (Senra, Lima River) (n=6): Length = 21.3-28.0 µm; width = 2.7-4.0 µm; 16-17
SPI: S = 5.0; V = 2.0

***Eunotia minor* (Kützing) Grunow in Van Heurck 1881**, pl. 33, figs 20-21 **[EMIN]**

Plate 60, Figs 1-32; Plate 61, Figs 1-5; Plate 62, Figs 1-23

Basionym: *Himantidium minus* Kützing 1844
Morphometry (Monte da Fazenda, Era Stream) (n=23): Length = 16.0-53.9 µm; width = 3.7-6.0 µm; 11-17 striae/10 µm
Morphometry (Senra, Lima River) (n=7): Length = 14.0-30.0 µm; width = 3.3-4.3 µm; 13-17 striae/10 µm
Morphometry (Sabugueiro, Fervença Stream) (n=23): Length = 18.7-38.7 µm; width = 4.3-5.7 µm; 13-15 striae/10 µm
SPI: S = 4.6; V = 1.0

***Eunotia pectinalis* (Kützing) Rabenhorst 1864**, p. 73 **[EPEC]**

Plate 66, Figs 1-8; Plate 67, Figs 1-5

Basionym: *Himantidium pectinale* Kützing 1844
Morphometry (Brunhais, Ave River) (n=4): Length = 37.3-60.0 µm; width = 6.7 µm; 12-13 striae/10 µm
Morphometry (Mata da Rainha, Taveiró Stream) (n=2): Length = 93.3-94.7 µm; width = 8.0 µm; 10-11 striae/10 µm
SPI: S = 5.0; V = 2.0

***Eunotia soleirolii* (Kützing) Rabenhorst 1864**, p. 74 **[ESOL]**

Plate 62, Figs 24-30; Plate 63, Figs 1-16

Basionym: *Himantidium soleirolii* Kützing 1844
Morphometry (Mata da Rainha, Taveiró Stream) (n=7): Length = 44.0-52.0 µm; width = 7.3 µm; 11-13 striae/10 µm
Morphometry (Monte da Fazenda, Era Stream) (n=16): Length = 21.3-80.0 µm; width = 5.3-8.0 µm; 12-13 striae/10 µm
SPI: S = - ; V = -

***Eunotia subarcuatoides* Alles, Nörpel & Lange-Bertalot 1991**, v. 53 (1-2): p. 188; pl. 4, figs 1-36 **[ESUB]**

Plate 68, Figs 41-83; Plate 71, Figs 1-5

Morphometry (Outeiro das Cabras, Âncora River) (n = 46): Length = 7.7-29.3 µm; width = 2.7-4.0 µm; 18-21 striae/10 µm
SPI: S = 5.0; V = 2.0

***Eunotia valida* Hustedt 1930**, p. 178; fig. 229 **[EVAL]**

Plate 58, Fig. 16
Morphometry (Senra, Lima River) (n = 1): Length = 41.3 µm; width = 4.0 µm; 12 striae/10 µm
SPI: S = 5.0; V = 2.0

***Eunotia* sp.1**

Plate 64, Figs 1-22; Plate 65, Figs 1-4
Morphometry (Outeiro das Cabras, Âncora River) (n = 19): Length = 12.0-57.0 µm; width = 3.8-5.3 µm; 13-17 striae/10 µm
SPI: S = - ; V = -

***Eunotia* sp.2**

Plate 64, Figs 23-39
Morphometry (Monte da Fazenda, Era Stream) (n=17): Length = 22.7-45.3 µm; width = 4.7-5.7 µm; 11-14 striae/10 µm
SPI: S = - ; V = -

***Eunotia* sp.3**

Plate 68, Figs 1, 2
Morphometry (Ponte do Pingue, Moreira Stream) (n=2): Length = 66.0-66.7 µm; width = 13.3 µm; 6-7 striae/10 µm
SPI: S = - ; V = -

***Eunotia* sp.4**

Plate 68, Figs 3-15; Plate 69, Figs 1-5
Morphometry (Outeiro das Cabras, Âncora River) (n = 13): Length = 8.7-25.0 µm; width = 2.7-3.2 µm; 20-23 striae/10 µm
SPI: S = - ; V = -

***Eunotia* sp.5**

Plate 68, Figs 16-20
Morphometry (Outeiro das Cabras, Âncora River) (n=5): Length = 12.7-18.0 µm; width = 2.8-3.7 µm; 18-24 striae/10 µm
SPI: S = - ; V = -

***Eunotia* sp.6**

Plate 68, Figs 21-40; Plate 70, Figs 1-5
Morphometry (Senra, Lima River) (n=18): Length = 8.0-22.7 µm; width = 2.7-3.7 µm; 15-17 striae/10 µm
SPI: S = - ; V = -

Order **Mastogloiales** D.G. Mann in Round et al. 1990
Family **Mastogloiaceae** Mereschkowsky 1903
Genus ***Aneumastus*** D.G. Mann & A.J. Stickle in Round et al. 1990

***Aneumastus minor* var. *densistriatus* Levkov & Krstic in Levkov, Krstic, Metzeltin & Nakov 2007**, p. 226; pl. 80, figs 1-16 **[ANMD]**

Plate 72, Figs 1-17
Morphometry (Constância, Tagus River) (n=17): Length = 13.7-26.0 µm; width = 7.3-10.1 µm; 11-13 striae/10 µm
SPI: S = 5.0; V = 1.0

Order **Cymbellales** D.G. Mann in Round et al. 1990
Family **Rhoiscospheniaceae** Chen & Zhu 1983
Genus ***Rhoicosphenia*** Grunow 1860

***Rhoicosphenia abbreviata* (C. Agardh) Lange-Bertalot 1980d**, p. 586; figs 1A, 3C-D, 5A **[RABB]**

Plate 74, Figs 28-43
Basionym: *Gomphonema abbreviatum* C. Agardh 1831

Morphometry (Vale da Arca, Vale da Ursa Stream) (n=10): Length = 18.7-29 µm; width = 4.3-5.7 µm; 10-12 striae/10 µm
SPI: S = 4.0; V = 1.0

***Rhoicosphenia adriatica* Caput Mihalić & Levkov 2010**, p. 163; figs Figs 31a–aj, 32a–h

Plate 74, Figs 1-27

Morphometry (Odemira, Mira River) (n=17): Length = 11.1-37.7 µm; width = 3.7-4.9 µm; 16-21 striae/10 µm
SPI: S = - ; V = -
Ecological preferences (n=1): Current velocity (m s^{-1}): 0. Conductivity (µS cm^{-1}): 637. pH: 7.4. DO (% sat.): 67. DO (mg L^{-1}): 6.2. Alkalinity (HCO_3 L^{-1}): 63.0. N-NH_4^+ (µg N L^{-1}): 10. Ca^{2+} (mg Ca^{2+} L^{-1}): 22.0. BOD_5 (mg O_2 L^{-1}): 8.0. Cl^- (mg Cl^- L^{-1}): 129. TOC (mg C L^{-1}): 3.6. Total hardness (mg $CaCO_3$ L^{-1}): 160.0. P-PO_4^{3-} (µg P L^{-1}): 31. Total phosphorus (µg P L^{-1}): 38. Soluble reactive phosphorus (SRP) (µg P L^{-1}): 10. N-NO_3^- (µg N L^{-1}): 669. Na^+ (mg Na^+ L^{-1}): 6.7. SO_4^{2-} (mg SO_4^{2-} L^{-1}): 70.0.

Family **Cymbellaceae** Greville 1833
Genus ***Cymbella*** C. Agardh 1830

***Cymbella affinis* Kützing 1844**, p. 80; pl. 6, fig. 15 **[CAFF]**

Plate 83, Figs 1-26

Morphometry (Tôr, Algibre Stream) (n=9): Length = 19.7-41.3 µm; width = 8.0-10.3 µm; 12-14 striae/10 µm
Morphometry (Morenos, Corte Creek) (n=8): Length = 25.2-41.3 µm; width = 8.1-9.9 µm; 12-13 striae/10 µm
Morphometry (Algibre, Algibre Stream) (n=8): Length = 22.8-43.7 µm; width = 7.9-9.7 µm; 12-15 striae/10 µm
SPI: S = 4.0; V = 2.0

***Cymbella aspera* (Ehrenberg) Cleve 1894**, p. 175 **[CASP]**

Plate 84, Figs 1-4

Basionym: *Cocconema asperum* Ehrenberg 1840
Morphometry (Monte da Fazenda, Era Stream) (n=2): Length = 154.4-154.6 µm; width = 25.6-26.3 µm; 11-12 striae/10 µm
Morphometry (Mata da Rainha, Taveiró Stream) (n=2): Length = 118.6-136.3 µm; width = 23.1-24.8 µm; 12 striae/10 µm
SPI: S = 4.0; V = 3.0

***Cymbella excisa* Kützing 1844**, p. 80; pl. 6, fig. 17 **[CAEX]**

Plate 75, Figs 1-28; Plate 76, Figs 1, 2; Plate 77, Figs 1-8

Morphometry (Espargal, Algibre Stream) (n=17): Length = 20.5-33.2 µm; width = 8.1-8.5 µm; 10 striae/10 µm
Morphometry (Tôr, Algibre Stream) (n=8): Length = 23.2-32.7 µm; width = 8.4-8.9 µm; 9-11 striae/10 µm
Morphometry (Algibre, Algibre Stream) (n=8): Length = 24.9-28.9 µm; width = 7.8-8.2 µm; 10-11 striae/10 µm
SPI: S = 4.0; V = 2.0

***Cymbella neoleptoceros* Krammer 2002**, p. 134, 173; pl. 156, figs 1-8, pl. 157, figs 1-19 **[CNLP]**

Plate 85, Figs 1-9; Plate 86, Figs 1-5

Morphometry (Valeira Reservoir, Douro River) (n=9): Length = 22.8-36.2 µm; width = 8.2-9.3 µm; 11-13 striae/10 µm
SPI: S = 4.0; V = 2.0
Ecological preferences (n=1): Conductivity (µS cm^{-1}): 305. pH: 8.8. DO (mg L^{-1}): 10.78. Alkalinity (HCO_3 L^{-1}): 100.0. N-NH_4^+ (µg N L^{-1}): 39. BOD_5 (mg O_2 L^{-1}): 1.4. Total hardness (mg $CaCO_3$ L^{-1}): 124.0. P-PO_4^{3-} (µg P L^{-1}): 2. Total phosphorus (µg P L^{-1}): 121. N-NO_3^- (µg N L^{-1}): 587. N-NO_2^- (µg N L^{-1}): 41.

***Cymbella perparva* Krammer 2002**, p. 38, 160; pl. 18, figs 1-15, pl. 53, figs 1-19 **[CPPV]**

Plate 77, Figs 9-26; Plate 78, Figs 1-5; Plate 79, Figs 15-17
Morphometry (Junqueira, Maçãs Stream) (n=9): Length = 30.9-38.1 µm; width = 8.5-9.2 µm; 10-11 striae/10 µm
Morphometry (Odeleite Reservoir, Odeleite Stream) (n=9): Length = 32.4-42.1 µm; width = 7.3-7.9 µm; 10-11 striae/10 µm
Morphometry (Azinhal de Mouros, Vascão Stream) (n=3): Length = 34.9-36.7 µm; width = 8.7-8.8 µm; 9-13 striae/10 µm
SPI: S = 5.0; V = 3.0
Ecological preferences WA (min-max): Current velocity (m s^{-1}): 0.6 (0.5-0.8). Conductivity (µS cm^{-1}): 178 (125-282). pH: 8.7 (7.5-9.3). DO (% sat.): 91 (82-98). DO (mg L^{-1}): 9.7 (6.3-11.8). Alkalinity (HCO_3 L^{-1}): 42.6 (5.0-82.0). N-NH_4^+ (µg N L^{-1}): 49 (1-109). Ca^{2+} (mg Ca^{2+} L^{-1}): 15.6 (10.0-18.0). BOD_5 (mg O_2 L^{-1}): 2.5 (1.0-3.0). Cl^- (mg Cl^- L^{-1}): 15.1 (6.0-29.8). TOC (mg C L^{-1}): 4.6 (1.8-12.6). Total hardness (mg $CaCO_3$ L^{-1}): 57.7 (40.0-116.0). P-PO_4^{3-} (µg P L^{-1}): 14 (1-21). Total phosphorus (µg P L^{-1}): 76 (2-132). Soluble reactive phosphorus (SRP) (µg P L^{-1}): 2 (1-6). N-NO_3^- (µg N L^{-1}): 489 (60-948). N-NO_2^- (µg N L^{-1}): 17 (1-25). Na^+ (mg Na^+ L^{-1}): 2.3 (0.5-6.9). SO_4^{2-} (mg SO_4^{2-} L^{-1}): 10.2 (4.5-15.4).

***Cymbella* cf. *tropica* Krammer 2002**, p. 61, 164; pl. 44, figs 1-10
Plate 79, Figs 1-11; Plate 80, Figs 1-6
Morphometry (Malhadais, Mosteiró River) (n=11): Length = 30.9-37.7 µm; width = 9.5-10.2 µm; 9-10 striae/10 µm
SPI: S = - ; V = -

***Cymbella tumida* (Brébisson in Kützing) Van Heurck 1882-1885**, p. 64; pl. 2, fig. 10 **[CTUM]**
Plate 79, Figs 12-14; Plate 82, Figs 1-8
Basionym: *Cocconema tumidum* Brébisson in Kützing 1849
Morphometry (Junqueira, Maçãs Stream) (n=3): Length = 53.3-63.3 µm; width = 15.5-16.5 µm; 9-10 striae/10 µm
Morphometry (Ficalho, Vidigão Stream) (n=8): Length = 43.0-59.3 µm; width = 15.3-16.1 µm; 9-10 striae/10 µm
SPI: S = 3.0; V = 3.0

***Cymbella turgidula* Grunow in Schmidt 1875**, pl. 9, figs 23-26 **[CTGL]**
Plate 81, Figs 1-12
Morphometry (Junqueira, Maçãs Stream) (n=12): Length = 38.6-42.7 µm; width = 11.8-2.7 µm; 9-10 striae/10 µm
SPI: S = 4.0; V = 2.0

Genus ***Cymbopleura*** (Krammer) Krammer 1999

***Cymbopleura naviculiformis* (Auerswald ex Heiberg) Krammer 2003**, p. 56 **[CBNA]**
Plate 85, Figs 10-24
Basionym: *Cymbella naviculiformis* Auerswald ex Heiberg 1863
Morphometry (Mata da Rainha, Taveiró Stream) (n=15): Length = 35.7-43.6 µm; width = 9.3-9.7 µm; 12-13 striae/10 µm
SPI: S = 3.8; V = 3.0

Genus ***Encyonema*** Kützing 1833

***Encyonema* cf. *minutiforme* Krammer 1997**, p. 159-160; pl. 18, figs 11-15
Plate 90, Figs 32-43; Plate 91, Figs 1, 2; Plate 92, Figs 1-4
Morphometry (Bravura, Odiáxere Stream) (n=12): Length = 19.9-31.9 µm; width = 5.3-6.7 µm; 10-11 striae/10 µm
SPI: S = - ; V = -

***Encyonema neogracile* Krammer 1997**, v.36: p.177-178; pl.82, figs1-13, pl.83, figs1-3, pl.85, figs 7-10, pl. 86, figs 9-12, pl. 90, fig. 6, pl. 91, figs1-2 **[ENNG]**
Plate 93, Figs 1-35; Plate 94, Figs 1-5; Plate 95, Figs 1-5; Plate 96, Figs 1-11

Morphometry (Portela do Homem, Homem River) (n=11): Length = 30.1-40.2 µm; width = 6.1-6.5 µm; 12-14 striae/10 µm
Morphometry (Brunhais, Ave River) (n=12): Length = 23.8-34.2 µm; width = 5.7-6.3 µm; 12-13 striae/10 µm
Morphometry (Torno River) (n=12): Length = 28.1-39.7 µm; width = 5.5-6.1 µm; 12-13 striae/10 µm
Morphometry (Redonda, Águeda River) (n=11): Length = 23.6-46.7 µm; width = 6.3-8.2 µm; 11-13 striae/10 µm
SPI: S = 5.0; V = 2.0

***Encyonema neomesianum* Krammer 1997**, v. 36: p. 84-85; pl. 40, figs 6-9, pl. 54, figs 6-7, pl. 99, figs 1-7 **[ENMS]**

Plate 96, Figs 12-23

Morphometry (Monte da Fazenda, Era Stream) (n=3): Length = 39.8-44.5 µm; width = 9.3-10.7 µm; 8-9 striae/10 µm
Morphometry (Coutada, Zêzere River) (n=9): Length = 24.3-38.1 µm; width = 9.2-9.9 µm; 8-9 striae/10 µm
SPI: S = 5.0; V = 2.0

***Encyonema prostratum* (Berkeley) Ralfs 1845**, p. 182; pl. 18, fig. 3 **[EPRO]**

Plate 97, Figs 1-8

Basionym: *Monema prostratum* Berkeley 1833
Nomenclatural synonym: *Cymbella prostrata* (Berkeley) Cleve 1894
Morphometry (Machadinho, Guadiana River) (n=8): Length = 49.4-57.7 µm; width = 18.3-20.0 µm; 8-9 striae/10 µm
SPI: S = 4.0; V = 3.0

***Encyonema rostratum* Krammer 1997**, v. 37: p. 190-191; pl. 126, figs 1-14 **[ENRO]**

Plate 89, Figs 50-64

Morphometry (Vilarinho das Furnas Reservoir, Homem River) (n=15): Length = 18.0-25.4 µm; width = 4.5-4.8 µm; 11-12 striae/10 µm
SPI: S = - ; V = -

***Encyonema* cf. *silesiacum* (Bleisch in Rabenhorst) D.G. Mann in Round, Crawford & Mann 1990**, p. 667

Plate 90, Figs 1-31

Morphometry (Gomes Aires, Mira River) (n=11): Length = 17.9-23.3 µm; width = 6.7-7.3 µm; 9-10 striae/10 µm
Morphometry (Gorazes, Oeiras Stream) (n=20): Length = 15.5-31.5 µm; width = 6.2-7.2 µm; 8-10 striae/10 µm
SPI: S = - ; V = -

***Encyonema ventricosum* (Kützing) Grunow in Schmidt 1875**, pl. 10, fig. 59 **[ENVE]**

Plate 87, Figs 1-53

Basionym: *Cymbella ventricosa* Kützing 1844
Morphometry (Santa Clara, Luzianes Stream) (n=11): Length = 18.3-24.0 µm; width = 6.7-7.3 µm; 11-13 striae/10 µm
Morphometry (Marmelar Stream) (n=10): Length = 18.3-22.3 µm; width = 7.1-7.5 µm; 10-12 striae/10 µm
Morphometry (Casal Rei, Zêzere River) (n=11): Length = 14.1-29.8 µm; width = 5.7-8.0 µm; 11-12 striae/10 µm
Morphometry (Malhada, Almuro Stream) (n=19): Length = 15.7-21.5 µm; width = 6.5-7.3 µm; 10-14 striae/10 µm
SPI: S = 4.8; V = 1.0

***Encyonema* sp. [ENSP]**

Plate 88, Figs 1-58; Plate 89, Figs 1-49

Morphometry (Aldeia de Freiras, Pêra Stream) (n=13): Length = 11.1-24.0 µm; width = 5.4-6.3 µm; 11-12 striae/10 µm

Morphometry (Azinhal de Mouros, Guadiana River) (n=10): Length = 18.3-19.9 µm; width = 6.0-6.3 µm; 11-14 striae/10 µm
Morphometry (Belmonte) (n=22): Length = 12.1-21.6 µm; width = 4.9-6.3 µm; 11-14 striae/10 µm
Morphometry (Barco) (n=13): Length = 14.1-23.5 µm; width = 5.7-6.5 µm; 12 striae/10 µm
Morphometry (Coutada, Zêzere River) (n=26): Length = 12.7-25.6 µm; width = 5.1-6.3 µm; 10-11 striae/10 µm
Morphometry (Valmaior, Caima River) (n=23): Length = 10.3-23.1 µm; width = 5.2-6.4 µm; 10-12 striae/10 µm
SPI: S = - ; V = -

Genus ***Encyonopsis*** Krammer 1997

***Encyonopsis aequalis* (W. Smith) Krammer 1997**, v. 37: p. 133-134; pl. 165, figs 1-11, 15-16, pl. 167, figs 7-10 **[EAQL]**

Plate 98, Figs 1-20; Plate 99, Figs 1-4

Basionym: *Cymbella aequalis* W. Smith in Greville 1855
Morphometry (Covas, Coura River) (n=10): Length = 30.5-38.7 µm; width = 7.1-8.2 µm; 12-13 striae/10 µm
Morphometry (Outeiro das Cabras, Âncora River) (n=10): Length = 31.4-45.2 µm; width = 7.1-8.0 µm; 12-14 striae/10 µm
SPI: S = 5.0; V = 2.0

***Encyonopsis horticola* Van de Vijver & Compère 2009**, p. 199; figs 21-44

Plate 100, Figs 58-78; Plate 103, Figs 1-4

Morphometry (Odeleite Reservoir, Odeleite Stream) (n=21): Length = 13.1-14.7 µm; width = 3.1-3.3 µm; 24 striae/10 µm
SPI: S = - ; V = -
Ecological preferences (n=1): Conductivity (µS cm^{-1}): 154. pH: 8.5. DO (mg L^{-1}): 8.8. Alkalinity (HCO_3 L^{-1}): 42.0. N-NH_4^+ (µg N L^{-1}): 62. BOD_5 (mg O_2 L^{-1}): 3.0. Total hardness (mg $CaCO_3$ L^{-1}): 42.0. P-PO_4^{3-} (µg P L^{-1}): 22. Total phosphorus (µg P L^{-1}): 60. N-NO_3^- (µg N L^{-1}): 226. N-NO_2^- (µg N L^{-1}): 15.

***Encyonopsis* cf. *microcephala* (Grunow) Krammer 1997**, v.37: p. 91-92; pl.143, figs 1, 4, 5, 8-26, pl.146, figs 1-5, pl. 147, figs 1-3, pl.148, figs 4, 7 **[ENCM]**

Plate 100, Figs 22-34

Basionym: *Cymbella microcephala* Grunow in Van Heurck 1885
Morphometry (Tôr, Algibre Stream) (n=13): Length = 13.0-16.5 µm; width = 3.6-4.3 µm; 20-24 striae/10 µm
SPI: S = 4.0; V = 2.0

***Encyonopsis minuta* Krammer & E. Reichardt in Krammer 1997**, v. 37: p.195; pl.143, figs 2-3, 6-7, pl.143a, figs1-27, pl.145, fig.15, pl.148, figs 4-7, pl.149, fig.17 **[ECPM]**

Plate 100, Figs 1-21; Plate 101, Figs 1-4

Morphometry (Assamaça, Valmar Stream) (n=21): Length = 11.9-14.5 µm; width = 3.3-3.6 µm; 22-24 striae/10 µm
SPI: S = 4.0; V = 2.0

***Encyonopsis subminuta* Krammer & E. Reichardt in Krammer 1997**, v. 37: p. 195-196; pl. 143a, figs 30-33, pl. 144, figs 1-11, 16-17, pl. 149, figs 9-16, pl. 150, figs 15-21 **[ESUM]**

Plate 100, Figs 52-57

Morphometry (Oleiros, Seca Stream) (n=6): Length = 18.1-20.7 µm; width = 3.9 µm; 22-24 striae/10 µm
SPI: S = 5.0; V = 1.0

***Encyonopsis tavirana* Krammer 1997**, v. 37: p. 196; pl. 148, figs 1-3 **[ECTA]**

Plate 100, Figs 35-51; Plate 102, Figs 1-5

Morphometry (Odeleite Reservoir, Odeleite Stream) (n=17): Length = 10.2-14.7 µm; width = 3.2-3.7 µm; 24-26 striae/10 µm
SPI: S = - ; V = -

Genus ***Placoneis*** Mereschkowsky 1903

***Placoneis clementis* (Grunow) E.J. Cox 1987**, p. 155; figs 28-33 **[PCLT]**

Plate 104, Figs 1-18

Basionym: *Navicula clementis* Grunow 1882
Morphometry (Coutada, Zêzere River) (n=12): Length = 21.2-35 µm; width = 10.5-13.3 µm; 11-13 striae/10 µm
Morphometry (Coutada, Zêzere River) (n=6): Length = 19.3-31 µm; width = 8-12.3 µm; 12-13 striae/10 µm
SPI: S = 5.0; V = 2.0

Family **Gomphonemataceae** Kützing 1844
Genus ***Gomphoneis*** Cleve 1894

***Gomphoneis minuta* (Stone) Kociolek & Stoermer 1988**, v. 140 (2): p. 56; figs 102-129 **[GMMI]**

Plate 105, Figs 1-4

Basionym: *Gomphoneis herculeana* var. *minuta* Stone in McLaughlin & Stone 1986
Morphometry (Malhadais, Mosteiró River) (n=3): Length = 70.7-89.0 µm; width = 17.7-20.3 µm; 10-11 striae/10 µm
SPI: S = 3.8; V = 3.0

Genus ***Gomphonema*** Ehrenberg 1832

***Gomphonema acidoclinatum* Lange-Bertalot & E. Reichardt in Werum & Lange-Bertalot 2004**, p. 160; pl. 92, figs 1-19, pl. 93, figs 1-3 **[GADC]**

Plate 112, Figs 1-17

Morphometry (Portela do Homem, Homem River) (n=17): Length = 28.7-50.7 µm; width = 6.7-8.0 µm; 13-15 striae/10 µm
SPI: S = 4.2; V = 1.0

***Gomphonema acuminatum* var. *pusillum* Grunow in Van Heurck 1880**, pl. 23, fig. 19 **[GAPS]**

Plate 107, Figs 9-11

Morphometry (Monte da Fazenda, Era Stream) (n=3): Length = 52.0-56.7 µm; width = 7.8-8.3 µm; 10-11 striae/10 µm
SPI: S = - ; V = -

***Gomphonema* aff. *angustatum* (Kützing) Rabenhorst 1864**, p. 283

Plate 126, Figs 8-32; Plate 127, Figs 1-36

Morphometry (Adobispo, Torto River) (n=25): Length = 18.3-42.7 µm; width = 3.8-7.0 µm; 9-12 striae/10 µm
Morphometry (Russilhão River) (n=21): Length = 13.7-46.7 µm; width = 4.5-7.7 µm; 10-11 striae/10 µm
Morphometry (Prata Stream) (n=12): Length = 20.0-53.7 µm; width = 4.7-8.0 µm; 7-10 striae/10 µm
SPI: S = - ; V = -

***Gomphonema bourbonense* E. Reichardt 1997**, p. 118; pl. 9, figs 1-15 **[GBOB]**

Plate 116, Figs 40-67

Morphometry (Marmelar Stream) (n=16): Length = 11.7-21.3 µm; width = 3.7-4.7 µm; 12-14 striae/10 µm
SPI: S = 3.8; V = 2.0
Ecological preferences (n=1): Current velocity (m s^{-1}): 0.7. Conductivity (µS cm^{-1}): 457. pH: 8.0. DO (% sat.): 79. DO (mg L^{-1}): 7.6. Alkalinity (HCO_3 L^{-1}): 115. N-NH_4^+ (µg N L^{-1}): 70. Ca^{2+} (mg Ca^{2+} L^{-1}): 70.5. BOD_5 (mg O_2 L^{-1}): 8.0. Cl^- (mg Cl^- L^{-1}): 51.1. TOC (mg C L^{-1}): 4.4. Total hardness (mg $CaCO_3$ L^{-1}): 216.0. P-PO_4^{3-} (µg P L^{-1}): 11. Total phosphorus (µg P L^{-1}): 15. Soluble reactive phosphorus (SRP) (µg P L^{-1}): 5. N-NO_3^- (µg N L^{-1}): 720. N-NO_2^- (µg N L^{-1}): 6. Na^+ (mg Na^+ L^{-1}): 3.9. SO_4^{2-} (mg SO_4^{2-} L^{-1}): 13.2.

***Gomphonema brebissonii* Kützing 1849**, p. 66 **[GBRE]**

Plate 107, Figs 1-8
Nomenclatural synonym: *Gomphonema acuminatum* var. *brebissonii* (Kützing) Hustedt 1909
Morphometry (Monte da Fazenda, Era Stream) (n=8): Length = 44.7-96.0 µm; width = = 7.3-10.7 µm; 9-10 striae/10 µm
SPI: S = 4.5; V = 3.0

***Gomphonema* cf. *commutatum* Grunow in Van Heurck 1880**, pl. 24, fig. 2
Plate 129, Figs 14-22
Morphometry (Bazágueda River) (n=9): Length = 29.3-40.0 µm; width = 6.3-7.3 µm; 11-12 striae/10 µm
SPI: S = - ; V = -

***Gomphonema exilissimum* (Grunow) Lange-Bertalot & E. Reichardt in Lange-Bertalot & Metzeltin 1996 sensu Krammer & Lange-Bertalot 2004**, pl. 76, figs 14-20 **[GEXL]**
Plate 109, Figs 12-50; Plate 110, Figs 1, 2
Basionym: *Gomphonema parvulum* var. *exilissima* Grunow in Van Heurck 1880
Morphometry (Redonda, Águeda River) (n=14): Length = 10.3-23.7 µm; width = 5.0-6.0 µm; 14-16 striae/10 µm
Morphometry (Sabugueiro, Fervença Stream) (n=13): Length = 12.3-25.5 µm; width = 5.3-6.2 µm; 14-20 striae/10 µm
Morphometry (São João do Monte, Águeda River) (n=12): Length = 12.0-21.1 µm; width = 4.5-6.1 µm; 14-18 striae/10 µm
SPI: S = 5.0; V = 1.0

***Gomphonema* cf. *gracile* Ehrenberg 1838**, p. 217; pl. 18, fig. 3
Plate 111, Figs 10-34
Morphometry (Bravura, Odeáxere Stream) (n=12): Length = 21.7-36.7 µm; width = 5.5-6.3 µm; 12-14 striae/10 µm
Morphometry (Martinhenos Creek) (n=13): Length = 21.7-39.0 µm; width = 4.7-6.0 µm; 13-16 striae/10 µm
SPI: S = - ; V = -

***Gomphonema ibericum* E. Reichardt 2007**, p. 111; pl. 3, figs 1-13, pl. 4, figs 1-6 **[GIBE]**
Plate 125, Figs 1-16; Plate 126, Figs 1-7
Morphometry (Chão Forca, Sertã Stream) (n=6): Length = 37.3-64.0 µm; width = 9.3-10.3 µm; 12-14 striae/10 µm
Morphometry (São João do Monte, Mondego River) (n=8): Length = 32.0-54.7 µm; width = 8.7-9.8 µm; 12-13 striae/10 µm
Morphometry (Fornelo, Vouga River) (n=6): Length = 38.0-57.3 µm; width = 8.0-8.7 µm; 12-13 striae/10 µm
SPI: S = 5.0; V = 3.0

***Gomphonema italicum* Kützing 1844**, p. 85; pl. 30, fig. 75 **[GITA]**
Plate 128, Figs 1-18; Plate 130, Figs 1, 2
Morphometry (Ficalho, Vidigão Stream) (n=15): Length = 27.8- 46.0 µm; width = 11.3-12.7 µm; 11-12 striae/10 µm
SPI: S = 5.0; V = 3.0

***Gomphonema lagenula* Kützing 1844**, p. 85; pl. 30, fig. 60 **[GLGN]**
Plate 108, Figs 41-64
Morphometry (Valmaior, Caima River) (n=24): Length = 12.3-24.2 µm; width = 5.0-7.3 µm; 14-18 striae/10 µm
SPI: S = 2.0; V = 3.0

***Gomphonema minusculum* Krasske 1932**, fig. 18 **[GMIS]**
Plate 117, Figs 74-90; Plate 119, Figs 1-5
Morphometry (Odeleite Reservoir, Odeleite Stream) (n=16): Length = 19.0-30.3 µm; width = 2.9-4.0 µm; 12-14 striae/10 µm
SPI: S = 5.0; V = 1.0

***Gomphonema minutum* C. Agardh 1831**, p. 34 **[GMIN]**

Plate 106, Figs 25-45

Morphometry (Espargal, Algibre Stream) (n=10): Length = 19.7-12.7 µm; width = 5.7-8.0 µm; 12-14 striae/10 µm

Morphometry (Benémola, Fonte Menalva Stream) (n=10): Length = 14.0-20.7 µm; width = 5.3-6.5 µm; 12 striae/10 µm

SPI: S = 4.0; V = 1.0

***Gomphonema olivaceum* (Hornemann) Kützing 1844**, p. 85 **[GOLI]**

Plate 106, Figs 1-24

Basionym: *Ulva olivacea* Hornemann 1806-1810

Morphometry (Algibre, Algibre Stream) (n=9): Length = 18.3-31.7 µm; width = 3.7-4.3 µm; 10-12 striae/10 µm

Morphometry (Tôr, Algibre Stream) (n=10): Length = 13.2-31.6 µm; width = 4.1-5.2 µm; 9-11 striae/10 µm

SPI: S = 4.6; V = 1.0

***Gomphonema parvulum* (Kützing) Kützing 1849**, p. 65 **[GPAR]**

Plate 108, Figs 1-40

Basionym: *Sphenella parvula* Kützing 1844

Morphometry (Belmonte, Zêzere River) (n=14): Length = 10.7-26.7 µm; width = 4.7-5.3 µm; 14-16 striae/10 µm

Morphometry (Boidobra, Corges Sream) (n=25): Length = 11.0-27.0 µm; width = 5.0-6.7 µm; 12-16 striae/10 µm

SPI: S = 2.0; V = 1.0

***Gomphonema parvulum* f. *saprophilum* Lange-Bertalot & E. Reichardt in Lange-Bertalot 1993**, p. 69-70; Bacill. 2/4, fig. 76: 8-13, fig. 77: 5-9 **[GPAS]**

Plate 109, Figs 1-11

Morphometry (Aveiras Stream) (n=11): Length =15.0-24.2 µm; width = 6.3-7.3 µm; 10-14 striae/10 µm

SPI: S = 2.0; V = 1.0

***Gomphonema pumilum* (Grunow) E. Reichardt & Lange-Bertalot 1991**, v. 53 (3-4): p. 528; pl. 6, figs 4-11 **[GPUM]**

Plate 112, Figs 18-31; Plate 113, Figs 1-32; Plate 114, Figs 1-5

Basionym: *Gomphonema intricatum* var. *pumila* Grunow in Van Heurck 1880

Morphometry (Cabroeira de Baixo, Xévora River) (n=14): Length = 14.0-46.7 µm; width = 3.7-7.0 µm; 10-12 striae/10 µm

Morphometry (Assamaça, Valmar Stream) (n=26): Length = 13.0-36.0 µm; width = 3.3-5.3 µm; 10-14 striae/10 µm

SPI: S = 4.5; V = 1.0

***Gomphonema pumilum* var. *elegans* E. Reichardt & Lange-Bertalot in Reichardt 1997**, p. 103; pl. 1, figs 1-6, pl. 2, figs 1-29, pl. 4, figs 20-23 **[GPEL]**

Plate 113, Figs 33-50; Plate 115, Figs 1, 2

Morphometry (Ameixial, Vascãozinho Stream) (n=15): Length = 14.5-26.7 µm; width = 2.7-4.2 µm; 12-14 striae/10 µm

SPI: S = 5.0; V = 1.0

***Gomphonema pumilum* var. *rigidum* E. Reichardt & Lange-Bertalot in Reichardt 1997**, p. 105; pl. 1, fig. 7, pl. 3, figs 1-41, pl. 4, figs 24-25 **[GPRI]**

Plate 113, Figs 51-65; Plate 116, Figs 1-39

Morphometry (Ficalho, Vidigão Stream) (n=11): Length = 13.7-33.3 µm; width = 3.3-5.0 µm; 12-14 striae/10 µm

Morphometry (Torgal Stream (Mira basin) (n=16): Length = 13.3-27.0 µm; width = 3.3-4.7 µm; 12-14 striae/10 µm

Morphometry (Vale da Arca, Vale da Ursa Stream) (n=9): Length = 13.0-20.0 µm; width = 3.3-4.3 µm; 12-16 striae/10 µm

SPI: S = 3.5; V = 1.0

***Gomphonema* cf. *pygmaeum* Kociolek & Stoermer 1991**, p. 1564-1565; figs 45-51, 69-70
Plate 117, Figs 1-73; Plate 118, Figs 1-4
Morphometry (Malhadais, Mosteiró River) (n=42): Length = 9.5-29.3 µm; width = 2.8-3.8 µm; 12-15 striae/10 µm
Morphometry (Junqueira, Maçãs River) (n=30): Length = 9.7-19.7 µm; width = 2.7-3.7 µm; 14-18 striae/10 µm
SPI: S = - ; V = -

***Gomphonema rhombicum* Fricke in Schmidt 1904**, pl. 248, fig. 1 **[GRHB]**
Plate 120, Figs 1-24; Plate 121, Figs 1-25; Plate 122, Figs 29-42; Plate 124, Figs 1-31
Morphometry (Espinhal, Azenha Stream) (n=22): Length = 19.3-50.7 µm; width = 3.7-6.7 µm; 12-14 striae/10 µm
Morphometry (Engenho, Alge Stream) (n=11): Length = 23.0-50.0 µm; width = 3.7-6.7 µm; 12-14 striae/10 µm
Morphometry (Foz do Alva, Alva River) (n=9): Length = 45.7-51.3 µm; width = 5.7-6.7 µm; 11-13 striae/10 µm
Morphometry (Ameixial, Vascãozinho Stream) (n=10): Length = 22.0-33.3 µm; width = 4.0-4.7 µm; 12-14 striae/10 µm
Morphometry (Chão Forca, Sertã Stream) (n=13): Length = 21.3-30.7 µm; width = 4.0-4.3 µm; 12-14 striae/10 µm
Morphometry (Bazágueda River) (n=11): Length = 25.7-34.7 µm; width = 3.6-4.3 µm; 12-14 striae/10 µm
Morphometry (Barbaído, Tripeiro River) (n=7): Length = 25.3-30.0 µm; width = 3.7-4.3 µm; 12-14 striae/10 µm
SPI: S = 5.0; V = 3.0

***Gomphonema rosenstockianum* Lange-Bertalot & E. Reichardt 1993**, p. 71; pl. 76, figs. 1-10 **[GROS]**
Plate 133, Figs 1-24; Plate 134, Figs 1-5
Morphometry (Pereira, Arão Stream) (n=11): Length = 10.1-29.6 µm; width = 4.8-5.7 µm; 12-16 striae/10 µm
Morphometry (Tôr, Algibre Stream) (n=10): Length = 10.1-32.8 µm; width = 4.5-6.1 µm; 12-15 striae/10 µm
SPI: S = 5.0; V = 1.0

***Gomphonema truncatum* Ehrenberg 1832**, p. 88 **[GTRU]**
Plate 129, Figs 1-13
Morphometry (Ficalho, Vidigão Stream) (n=4): Length = 27.3-34.7 µm; width = 9.3-10.0 µm; 11-13 striae/10 µm
Morphometry (Gomes Aires, Mira River) (n=3): Length = 25.3-39.3 µm; width = 9.3-10.7 µm; 11 striae/10 µm
SPI: S = 4.0; V = 1.0

***Gomphonema uniserhombicum* E. Reichardt 2005**, p. 136; pl. 9, figs 1-14 **[GURH]**
Plate 122, Figs 1-28; Plate 123, Figs 1-5
Morphometry (Barbaído, Tripeiro River) (n=): Length = 18.3-30.7 µm; width = 3.7-5.0 µm; 12-14 striae/10 µm
Morphometry (Chão Forca, Sertã Stream) (n=): Length = 21.7-39.7 µm; width = 5.0-6.7 µm; 14-16 striae/10 µm
SPI: S = 5.0; V = 1.0

***Gomphonema* sp.1**
Plate 111, Figs 1-9
Morphometry (Coutada, Zêzere River) (n=9): Length = 21.3-38.0 µm; width = 7.0-9.3 µm; 12-14 striae/10 µm
SPI: S = 5.0; V = 2.0

***Gomphonema* sp.2**

Plate 131, Figs 1-27; Plate 132, Figs 1, 2

Morphometry (Monte Novo Reservoir) (n=9): Length = 22.7-50.1 µm; width = 8.0-10.0 µm; 12-14 striae/10 µm

Morphometry (Ficalho, Vidigão Stream) (n=9): Length = 22.7-41.0 µm; width = 7.0-8.3 µm; 10-13 striae/10 µm

Morphometry (Azambuja Stream) (n=9): Length = 17.3-29.3 µm; width = 6.3-7.7 µm; 12-14 striae/10 µm

SPI: S = 5.0; V = 2.0

Genus ***Gomphosphenia*** Lange-Bertalot 1995

***Gomphosphenia* aff. *lingulatiformis* (Lange-Bertalot & E. Reichardt) Lange-Bertalot 1995**, p. 242; pl. 4, figs 1-4

Plate 133, Figs 25-42; Plate 135, Figs 1-4

Basionym: *Gomphonema lingulatiforme* Lange-Bertalot & E. Reichardt in Lange-Bertalot 1993

Morphometry (Alcabideque, BruscosStream) (n=18): Length = 11.5-34.7 µm; width = 3.3-5.0 µm; 20-22 striae/10 µm

SPI: S = - ; V = -

***Gomphosphenia oahuensis* (Hustedt) Lange-Bertalot 1998**, p. 42, 193 **[GOAH]**

Plate 133, Figs 43-60; Plate 136, Figs 1-4

Basionym: *Cymbella oahuensis* Hustedt 1942

Morphometry (Retorta, Ave River) (n=18): Length = 16.5-30.7 µm; width = 3.7-4.3 µm; 24 striae/10 µm

SPI: S = 3.2; V = 2.0

Ecological preferences (n=1): Current velocity (m s^{-1}): 0. Conductivity (µS cm^{-1}): 1506. pH: 7.5. DO (% sat.): 79.8. DO (mg L^{-1}): 6.9. Alkalinity (HCO_3 L^{-1}): 161.0. Ca^{2+} (mg Ca^{2+} L^{-1}): 22.0. Cl^- (mg Cl^- L^{-1}): 434. TOC (mg C L^{-1}): 8.2. Total hardness (mg $CaCO_3$ L^{-1}): 164.0. P-PO_4^{3-} (µg P L^{-1}): 98. Soluble reactive phosphorus (SRP) (µg P L^{-1}): 32. Na^+ (mg Na^+ L^{-1}): 88.2. SO_4^{2-} (mg SO_4^{2-} L^{-1}): 15.5.

Genus ***Reimeria*** Kociolek & Stoermer 1987

***Reimeria sinuata* (W. Gregory) Kociolek & Stoermer emend Sala, Guerrero & Ferrario 1993**, v. 8(2): p. 441; figs 2-6 [**RSIN]**

Plate 137, Figs 1-48

Basionym: *Cymbella sinuata* W. Gregory 1856

Morphometry (Besteiros, Seixe Stream) (n=17): Length = 10.1-17.1 µm; width = 3.7-4.6 µm; 11-15 striae /10 µm

Morphometry: (Belmonte, Zêzere River) (n= 17): Length 8.4-20.8= µm; width 3.5-6.3= µm; 11-15 striae /10 µm

SPI: S = 4.8; V = 1.0

***Reimeria uniseriata* Sala, Guerrero & Ferrario 1993**, p. 445; figs 7-10 **[RUNI]**

Plate 137, Figs 49-71

Morphometry (Tôr, Algibre Stream) (n= 8): Length = 19.5-26.4µm; width= 5.5 –6.93µm; 10-11striae/10 µm

Morphometry (Benémola, Fonte Menalva Stream) (n= 12): Length = 14.1-27.7µm; width= 5.5-6.7 µm; 8-11 striae/10 µm

SPI: S = 5.0; V = 1.0

Order **Achnanthales** P.C. Silva 1962
Family **Cocconeidaceae** Kützing 1844
Genus ***Cocconeis*** Ehrenberg 1837

***Cocconeis euglypta* Ehrenberg 1854**, pl. 34, fig. 6A, fig. 2 **[CEUG]**

Plate 138, Figs 1-58

Nomenclatural synonym: *Cocconeis placentula* var. *euglypta* (Ehrenberg) Cleve 1895

Morphometry (Vale da Arca, Vale da Ursa Stream) (n=14): Length = 12.3-23.1 µm; width = 6.7-11.5 µm; 18-20 striae/10 µm (R-), 21 striae/10 µm (R+)
Morphometry (Boina Stream) (n=10): Length = 9.3-21.3 µm; width = 5.6-10.9 µm; 18-22 striae/10 µm (R-), 21 striae/10 µm (R+)
Morphometry (Pavia, Freixo Stream) (n=18): Length = 10.7-24.1 µm; width = 6.1-12.9 µm; 20-22 striae/10 µm (R-), 20 striae/10 µm (R+)
SPI: S = 3.6; V = 1.0

***Cocconeis lineata* Ehrenberg 1854**, p. 8; pl. 6/1, fig. 40; pl. 39/II, fig. 11 **[CLNT]**

Plate 139, Figs 1-24; Plate 140, Figs 1-11

Nomenclatural synonyms: *Cocconeis placentula* var. *lineata* (Ehrenberg) Van Heurck 1885; *Cocconeis placentula* var. *lineata* (Ehrenberg) Cleve 1895
Morphometry (Curros Stream) (n=13): Length = 16.9-26.8 µm; width = 10.0-13.3 µm; 18-21 striae/10 µm (R-), 20-21 striae/10 µm (R+)
Morphometry (Lavacolhos, Ximassa Stream) (n=11): Length = 23.0-29.7 µm; width = 10.4-15.7 µm; 21 striae/10 µm (R-), 17-19 striae/10 µm (R+)
Morphometry (Alambiques Stream) (n=11): Length = 16.9-33.9 µm; width = 8.0-18.0 µm; 18-20 striae/10 µm (R-), 19-20 striae/10 µm (R+)
SPI: S = 4.0; V = 1.0

***Cocconeis neothumensis* Krammer 1990**, p. 151-152; figs 1, 2 part, 21-39 **[CNTH]**

Plate 141, Figs 1-21

Morphometry (Lanheses, Lima River) (n=21): Length = 7.5-12.5 µm; width = 3.7-6.7 µm; 22-24 striae/10 µm (R-), 21 striae/10 µm (R+)
SPI: S = 3.0; V = 1.0

***Cocconeis pediculus* Ehrenberg 1838**, p. 194; pl. 21, fig. 11 **[CPED]**

Plate 142, Figs 12-15

Morphometry (Tôr, Algibre Stream) (n=4): Length = 24.3-31.3 µm; width = 17.6-21.2 µm; 15-16 striae/10 µm (R-), 18 striae/10 µm (R+)
SPI: S = 4.0; V = 2.0

***Cocconeis pseudolineata* (Geitler) Lange-Bertalot in Werum & Lange-Bertalot 2004**, p. 133 **[COPL]**

Plate 140, Figs 12-24

Basionym: *Cocconeis placentula* var. *pseudolineata* Geitler 1927
Morphometry (Cabroeira de Baixo, Xévora River) (n=6): Length = 20.5-24.5 µm; width = 12.5-14.1 µm; 14-17 striae/10 µm (R-)
Morphometry (Vale da Arca, Vale da Ursa Stream) (n=7): Length = 15.5-26.7 µm; width = 8.5-14.7 µm; 14-17 striae/10 µm (R-), 21 striae/10 µm (R+)
SPI: S = 5.0; V = 1.0

***Cocconeis* sp. [COCS]**

Plate 141, Figs 22-30; Plate 142, Figs 1-11

Morphometry (Engenho, Alge Stream) (n=9): Length = 27.7-34.7 µm; width = 12.7-18.3 µm; 21-23 striae/10 µm (R-), 19-20 striae/10 µm (R+)
Morphometry (Queimado, Pardiela Stream) (n=11): Length = 12.0-31.6 µm; width = 6.3-20.7 □m; 22-25 striae/10 µm (R-), 21-23 striae/10 µm (R+)
SPI: S = -; V = -

Family **Achnanthaceae** Kützing 1844

Genus ***Achnanthes*** Bory 1822

***Achnanthes helvetica* var. *minor* Flower & Jones 1989**, p. 235; figs 19-25, 76-79 **[AHMI]**

Plate 182, Figs 1-28; Plate 183, Figs 1-4

Morphometry (Outeiro das Cabras, Âncora River) (n=28): Length = 7.7-14.7 µm; width = 4.7-6.0 µm; 25 striae/10 µm (R-), 25 striae/10 µm (R+)
SPI: S = 5.0; V = 2.0

Ecological preferences WA (min-max): Current velocity (m s^{-1}): 0.8 (0.2-1.4). Conductivity (µS cm^{-1}): 32 (4-44). pH: 6.3 (5.9-7.1). DO (% sat.): 85 (70-98). DO (mg L^{-1}): 7.9 (6.3-9.3). Alkalinity (HCO_3 L^{-1}): 10.1 (7.5-16.0). N-NH_4^+ (µg N L^{-1}): 53 (10-320). Ca^{2+} (mg Ca^{2+} L^{-1}): 2.7 (2.0-4.0). BOD_5 (mg O_2 L^{-1}): 3.5 (1.0-6.0). Cl^- (mg Cl^- L^{-1}): 6.7 (0.5-10.0). TOC (mg C L^{-1}): 2.4 (1.3-4.1). Total hardness (mg $CaCO_3$ L^{-1}): 10.6 (5.0-15.0). P-PO_4^{3-} (µg P L^{-1}): 4 (2-7). Total phosphorus (µg P L^{-1}): 5 (2-7). Soluble reactive phosphorus (SRP) (µg P L^{-1}): 1 (1-2). N-NO_3^- (µg N L^{-1}): 1256 (60-3100). N-NO_2^- (µg N L^{-1}): 7 (2-24). Na^+ (mg Na^+ L^{-1}): 5.0 (0.8-6.2). SO_4^{2-} (mg SO_4^{2-} L^{-1}): 2.4 (0.1-20.1).

Family **Achnanthidiaceae** D.G. Mann in Round et al. 1990
Genus ***Achnanthidium*** Kützing 1844

***Achnanthidium atomoides* Monnier, Lange-Bertalot & Ector in Monnier et al. 2004**, p. 128; figs 1-41, 117-123 **[ADAM]**

Plate 151, Figs 58-124; Plate 154, Figs 1-4

Morphometry (Caravelas Stream) (n=44): Length = 5.0-12.0 µm; width = 2.0-3.0 µm; 30 striae/10 µm (R-), 30 striae/10 µm (R+)
Morphometry (Vale de Moinhos Stream) (n=23): Length = 5.7-11.0 µm; width = 2.0-3.0 µm; striae/10 µm
SPI: S = 5.0; V = 2.0

***Achnanthidium caravelense* Novais & Ector**

Plate 159, Figs 1-118; Plate 160, Figs 1-5; Plate 161, Figs 1-5; Plate 162, Figs 1-4

Morphometry (Louredo, Froufe River) (n = 32): Length = 13.0-18.3 µm; width = 3.3-4.3 µm; 30 striae/10 µm (R-), 30 striae/10 µm (R+)
Morphometry (Assento, Vizela River) (n = 39): Length = 5.3-21.0 µm; width = 3.0-4.3 µm
Morphometry (Torno River) (n = 21): Length = 7.3-20.7 µm; width = 2.3-3.7 µm; 30 striae/10 µm (R-), 30 striae/10 µm (R+)
Morphometry (Caravelas Stream) (n = 120): Length = 9.6-17.0 µm; width = 2.5-4.2 µm; 30 striae/10 µm (up to 35-40 striae/10 µm near the apices) in both R- and R+ valves
SPI: S = - ; V = -

***Achnanthidium catenatum* (J. Bílý & Marvan) Lange-Bertalot 1999**, p. 277 **[ADCT]**

Plate 168, Figs 75-128; Plate 171, Figs 1-4

Basionym: *Achnanthes catenata* J. Bílý & Marvan 1959
Morphometry (Coimbra, Mondego River) (n=35): Length = 8.0-15.7 µm; width = 2.7-3.3 µm; 30 striae/10 µm (R-), 30-35 striae/10 µm (R+)
Morphometry (Santa Luzia Reservoir, Unhais River) (n=12): Length = 14.3-17.0 µm; width = 2.7-3.0 µm
SPI: S = 4.5; V = 2.0

***Achnanthidium eutrophilum* (Lange-Bertalot in Lange-Bertalot & Metzeltin) Lange-Bertalot 1999**, p. 277 **[ADEU]**

Plate 145, Figs 66-104; Plate 150, Figs 1-4

Basionym: *Achnanthes eutrophila* Lange-Bertalot in Lange-Bertalot & Metzeltin 1996
Morphometry (Monte Novo Reservoir, Degebe River) (n = 120): Length = 7.0-17.0 µm; width = 2.5-4.5 µm; 30 striae/10 µm (R-), 30 striae/10 µm (R+)
SPI: S = 3.0; V = 1.0

***Achnanthidium exiguum* (Grunow) Czarnecki 1994 sensu lato [ADEG]**

Plate 179, Figs 114-138

Basionym: *Achnanthes exigua* Grunow in Cleve & Grunow 1880
Morphometry (Cegonhas, Aravil River) (n=25): Length = 5.3-10.3 µm; width = 4.0-4.7 µm
SPI: S = 3.0; V = 2.0

***Achnanthidium lauenburgianum* (Hustedt) Monnier, Lange-Bertalot & Ector in Monnier et al. 2007**, p. 155 **[ADLB]**

Plate 182, Figs 29-54

Basionym: *Achnanthes lauenburgiana* Hustedt 1950

Morphometry (Amieira, Tagus River) (n=26): Length = 6.3-16.0 µm; width = 4.0-5.3 µm; 24-27 striae/10 µm (R-), 24-27 striae/10 µm (R+)
SPI: S = 4.8; V = 3.0

***Achnanthidium lineare* W. Smith 1855**, p. 8; pl. 1, fig. 9 **[ACLI]**
Plate 155, Figs 1-51; Plate 156, Figs 1-5
Nomenclatural synonym: *Achnanthes linearis* (W. Smith) Grunow in Cleve & Grunow 1880
Morphometry (Caravelas Stream) (n=51): Length = 7.0-11.0 µm; width = 1.7-3.0 µm; 30 striae/10 µm (R-), 30 striae/10 µm (R+)
SPI: S = 5.0; V = 2.0

***Achnanthidium* aff. *lineare* W. Smith 1855**, p. 8; pl. 1, fig. 9
Plate 155, Figs 52-87; Plate 157, Figs 1-5
Morphometry (Assamaça, Valmar Stream) (n=36): Length = 8.7-15.3 µm; width = 2.3-3.0 µm; 30 striae/10 µm (R-), 30 striae/10 µm (R+)
SPI: S = - ; V = -

***Achnanthidium minutissimum* (Kützing) Czarnecki 1994**, p. 157 **[ADMI]**
Plate 143, Figs 1-96; Plate 144, Figs 1-6
Basionym: *Achnanthes minutissima* Kützing 1833
Morphometry (Gorazes, Oeiras Stream) (n=21): Length = 8.3-18.0 µm; width = 2.3-3.0 µm
Morphometry (Barranco, Vascão Stream) (n=13): Length = 9.3-18.0 µm; width = 2.8-3.3 µm
Morphometry (Gomes Aires (ETAR), Mira River) (n=33): Length = 7.2-19.7 µm; width = 2.7-3.3 µm
Morphometry (Torno River) (n=46): Length = 7.3-18.0 µm; width = 2.0-2.7 µm; 30 striae/10 µm (R-), 30 striae/10 µm (R+)
Morphometry (Gomes Aires, Mira River) (n=21): Length = 7.3-16.7 µm; width = 2.7-3.3 µm
SPI: S = 5.0; V = 1.0

***Achnanthidium minutissimum* (Kützing) Czarnecki 1994 sensu lato [ADMI]**
Plate 145, Figs 1-21; Plate 146, Figs 1-5; Plate 151, Figs 1-41; Plate 152, Figs 1-5
Morphometry (Azenha, Alfambras Stream) (n=20): Length = 8.7-14.0 µm; width = 2.7-3.3 µm; 30 striae/10 µm (R-), 30 striae/10 µm (R+)
Morphometry (Vidual, Tapado Stream) (n=41): Length = 10.7-15.3 µm; width = 2.7-3.3 µm; 30 striae/10 µm (R-), 30 striae/10 µm (R+)
SPI: S = 5.0; V = 1.0

***Achnanthidium pseudolineare* Van de Vijver, Novais & Ector**
Plate 155, Figs 88-138; Plate 158, Figs 1-5
Morphometry (Abelheira Stream) (n=49): Length = 7.5-26.0 µm; width = 2.1-3.3 µm; 32-35 striae/10 µm (c. 40 striae/10 µm near the apices) in both R- and R+ valves
SPI: S = - ; V = -

***Achnanthidium pyrenaicum* (Hustedt) Kobayasi 1997**, p. 148-149; figs 1-18 **[ADPY]**
Plate 151, Figs 42-57; Plate 153, Figs 1-4
Basionym: *Achnanthes pyrenaica* Hustedt 1939
Morphometry (Cabroeira de Baixo, Xévora River) (n=16): Length = 9.3-16.0 µm; width = 3.0-4.0 µm; 30 striae/10 µm (R-), 30 striae/10 µm (R+)
SPI: S = 5.0; V = 1.0

***Achnanthidium rivulare* Potapova & Ponader 2004**, p. 36; figs 1-18, 28-43 **[ADRI]**
Plate 179, Figs 1-61; Plate 180, Figs 1-5
Morphometry (Caravelas Stream) (n=29): Length = 4.0-13.3 µm; width = 3.0-4.0 µm; 30 striae/10 µm (R-), 25 striae/10 µm (R+)
Morphometry (Veral, Tâmega River) (n=32): Length = 4.0-8.3 µm; width = 3.0-3.3 µm
SPI: S = 4.0; V = 1.0

***Achnanthidium saprophilum* (H. Kobayasi & Mayama) Round & Bukhtiyarova 1996**, p. 349 **[ADSA]**
Plate 145, Figs 22-65; Plate 147, Figs 1-4; Plate 148, Figs 1-4; Plate 149, Figs 1-4

Basionym: *Achnanthes minutissima* var. *saprophila* H. Kobayasi & Mayama 1982
Morphometry (Canal Caveira, Grândola Stream) (n=15): Length = 7.0-11.3 µm; width = 2.7-3.3 µm; 30 striae/10 µm (R-), 30 striae/10 µm (R+)
Morphometry (Sado River) (n=24): Length = 7.0-15.3 µm; width = 2.7-3.7 µm; 30 striae/10 µm (R-), 30 striae/10 µm (R+)
SPI: S = 3.0; V = 1.0

***Achnanthidium straubianum* (Lange-Bertalot) Lange-Bertalot 1999**, p. 279 **[ADSB]**
Plate 179, Figs 62-85
Basionym: *Achnanthes straubiana* Lange-Bertalot in Lange-Bertalot & Metzeltin 1996
Morphometry (Fonte da Benémola, Fonte Menalva Stream) (n=22): Length = 5.0-10.0 µm; width = 2.7-4.0 µm
SPI: S = 3.0; V = 2.0

***Achnanthidium subatomoides* (Hustedt) Monnier, Lange-Bertalot & Ector in Monnier et al. 2007**, p. 155 **[ADSO]**
Plate 182, Figs 55-85; Plate 183, Figs 1-4
Basionym: *Navicula subatomoides* Hustedt in Schmidt et al. 1936
Morphometry (Barcelos, Cávado River) (n=31): Length = 6.3-9.7 µm; width = 4.0-4.7 µm; 40 striae/10 µm (R-), 40 striae/10 µm (R+)
SPI: S = 5.0; V = 1.0

***Achnanthidium subhudsonis* (Hustedt) H. Kobayasi in Kobayasi et al. 2006**, p. 13, 129 **[ADSH]**
Plate 179, Figs 86-113; Plate 181, Figs 1-5
Basionym: *Achnanthes subhudsonis* Hustedt 1921
Morphometry (Aldeia das Freiras, Pêra Stream) (n=28): Length = 8.7-12.0 µm; width = 2.7-4.0 µm; 20 striae/10 µm (R-), 20 striae/10 µm (R+)
SPI: S = 5.0; V = 2.0

***Achnanthidium* sp3.**
Plate 163, Figs 1-79; Plate 164, Figs 1-4; Plate 165, Figs 1-5; Plate 166, Figs 1-4
Morphometry (Covas, Coura River) (n=42): Length = 7.7-16.7 µm; width = 2.3-3.0 µm; 35-40 striae/10 µm (R-), 35-40 striae/10 µm (R+)
Morphometry (Lamas de Mouro, Mouro River) (n=33): Length = 7.7-16.7 µm; width = 2.3-3.3 µm; 35-40 striae/10 µm (R-), 35-40 striae/10 µm (R+)
SPI: S = - ; V = -

***Achnanthidium* sp4.**
Plate 163, Figs 80-121; Plate 167, Figs 1-6
Morphometry (Portela do Homem, Homem River) (n=41): Length = 8.3-17.7 µm; width = 2.7-3.3 µm; 35 striae/10 µm (R-), 35 striae/10 µm (R+)
SPI: S = - ; V = -

***Achnanthidium* sp5.**
Plate 168, Figs 1-42; Plate 169, Figs 1-4
Morphometry (Boeiro, Sertã Stream) (n=41): Length = 6.3-15.0 µm; width = 2.0-3.7 µm; 35 striae/10 µm (R-), 30-35 striae/10 µm (R+)
SPI: S = - ; V = -

***Achnanthidium* sp6.**
Plate 168, Figs 43-74; Plate 170, Figs 1-7
Morphometry (Boeiro, Sertã Stream) (n=30): Length = 8.3-19.3 µm; width = 2.3-4.3 µm; 30-35 striae/10 µm (R-), 30-35 striae/10 µm (R+)
SPI: S = - ; V = -

***Achnanthidium* sp7.**
Plate 172, Figs 1-171; Plate 173, Figs 1-4
Morphometry (Lousã, São João Stream) (n=49): Length = 4.3-15.3 µm; width = 2.0-3.7 µm

Morphometry (Côja, Alva River) (n=40): Length = 5.0-15.7 µm; width = 2.3-3.3 µm; 30 striae/10 µm (R-), 30 striae/10 µm (R+)
Morphometry (Alvoco das Várzeas, Alvoco Stream) (n=39): Length = 5.7-14.0 µm; width = 2.3-3.3 µm
Morphometry (Urtigosa, Urtigosa Stream) (n=42): Length = 5.0-14.7 µm; width = 2.0-3.0 µm
SPI: S = - ; V = -

***Achnanthidium* sp8.**

Plate 174, Figs 1-45; Plate 175, Figs 1-4; Plate 176, Figs 1-4

Morphometry (Adobispo, Torto River) (n=44): Length = 5.0-9.7 µm; width = 2.0-2.7 µm; 40 striae/10 µm (R-), 40 striae/10 µm (R+)
SPI: S = - ; V = -

***Achnanthidium* sp9.**

Plate 174, Figs 46-121; Plate 177, Figs 1-4; Plate 178, Figs 1-4

Morphometry (Carregal, Zêzere River) (n=40): Length = 5.3-13.0 µm; width = 2.3-3.0 µm; 30 striae/10 µm (R-), 30 striae/10 µm (R+)
Morphometry (Janeiro de Baixo, Zêzere River) (n=29): Length = 4.7-11.7 µm; width = 2.3-3.0 µm; 30 striae/10 µm (R-), 30 striae/10 µm (R+)
SPI: S = - ; V = -

Genus ***Karayevia*** Round & Bukhtiyarova ex Round 1998

***Karayevia clevei* (Grunow) Bukhtiyarova 2006**, p. 88, figs 1, 5-8 **[KCLV]**

Plate 193, Figs 1-40

Basionym: *Achnanthes clevei* Grunow in Cleve & Grunow 1880
Morphometry (Amieira, Tagus River) (n=27): Length = 11-16.2 µm; width = 5.3-6.3 µm; 14-16 striae/10 µm (R-), 20-22 striae/10 µm (R+)
Morphometry (Machadinho, Guadiana River) (n=13): Length = 14.6-11.5 µm; width = 5.3-6.3 µm; 14-16 striae/10 µm (R-), 20-22 striae/10 µm (R+)
SPI: S = 4.0; V = 2.0

***Karayevia oblongella* (Østrup) Aboal in Aboal, Alvarez-Cobelas, Cambra & Ector 2003**, p. 159 **[KOBG]**

Plate 193, Figs 41-83; Plate 194, Figs 1, 2

Basionym: *Achnanthes oblongella* Østrup 1902
Morphometry (Seixe Stream) (n=19): Length = 6.3-16.5 µm; width = 5.4-7.5 µm; 11-13 striae/10 µm (R-), 22-24 striae/10 µm (R+)
Morphometry (Capelinha Stream) (n=24): Length = 10.5-14.5 µm; width = 5.6-7 µm; 11-13 striae/10 µm (R-), 22-24 striae/10 µm (R+)
SPI: S = 4.5; V = 1.0

Genus ***Lemnicola*** Round & Basson 1997

***Lemnicola hungarica* (Grunow) Round & Basson 1997**, p. 77; figs 4-7, 26-31 **[LHUN]**

Plate 186, Figs 42-46

Basionym: *Achnanthidium hungaricum* Grunow 1863
Nomenclatural synonym: *Achnanthes hungarica* (Grunow) Grunow in Cleve & Grunow 1880
Morphometry (Safara Stream) (n=5): Length = 17.3-25.6 µm; width = 6.5-7.1 µm; 21 striae/10 µm (R-), 21-22 striae/10 µm (R+)
SPI: S = 2.0; V = 3.0

Genus ***Planothidium*** Round & Bukhtiyarova 1996

***Planothidium conspicuum* (Ant. Mayer) E. Morales 2006**, p. 327 **[PNCO]**

Plate 189, Figs 54-69

Basionym: *Achnanthes conspicua* Ant. Mayer 1919
Morphometry (Amieira, Tagus River) (n=16): Length = 5.3-14 µm; width = 3.3-5 µm; 16 striae/10 µm (R-), 15-16 striae/10 µm (R+)
SPI: S = 4.0; V = 1.0

***Planothidium daui* (Foged) E. Morales 2006**, p. 331 **[PDAU]**

Plate 189, Figs 1-35; Plate 190, Figs 1-3

Basionym: *Achnanthes daui* Foged 1962
Morphometry (Lanheses, Lima River) (n=35): Length = 6-11.2 µm; width = 3.3-4.3 µm; 16-18 striae/10 µm (R-), 16-18 striae/10 µm (R+)
SPI: S = 4.8; V = 2.0

***Planothidium delicatulum* (Kützing) Round & Bukhtiyarova 1996 sensu lato [PTDE]**

Plate 186, Figs 1-41; Plate 187, Figs 1-4

Basionym: *Achnanthidium delicatulum* Kützing 1844
Nomenclatural synonym: *Achnanthes delicatula* (Kützing) Grunow in Cleve & Grunow 1880
Morphometry (Amieira, Tagus River) (n=24): Length = 13-19.5 µm; width = 6-7 µm; 12-13 striae/10 µm (R-), 12-13 striae/10 µm (R+)
Morphometry (Barquinha, Tagus River) (n=17): Length = 13-20.5 µm; width = 6-7 µm; 12-13 striae/10 µm (R-), 12-13 striae/10 µm (R+)
SPI: S = 3.0; V = 3.0

***Planothidium engelbrechtii* (Cholnoky) Round & Bukhtiyarova 1996**, p. 353 **[PLEN]**

Plate 185, Figs 57-83

Basionym: *Achnanthes engelbrechtii* Cholnoky 1955
Morphometry (Abela, Martinhenos Creek) (n=14): Length = 6.5-13.5 µm; width = 3.5-5 µm; 18-20 striae/10 µm (R-), 17-18 striae/10 µm (R+)
Morphometry (Peramanca Stream) (n=9): Length = 9-15 µm; width = 4-5 µm; 15-18 striae/10 µm (R-), 16-18 striae/10 µm (R+)
SPI: S = 2.9; V = 2.0

***Planothidium frequentissimum* (Lange-Bertalot in Krammer & Lange-Bertalot) Lange-Bertalot 1999**, p. 282 **[PLFR]**

Plate 185, Figs 1-30

Basionym: *Achnanthes lanceolata* subsp. *frequentissima* Lange-Bertalot in Krammer & Lange-Bertalot 1993
Morphometry (Amieira, Tagus River) (n=30): Length = 7.5-14 µm; width = 4-5.5 µm; 13-15 striae/10 µm (R-), 14-16 striae/10 µm (R+)
SPI: S = 3.4; V = 1.0

***Planothidium granum* (M.H. Hohn & Hellerman) Lange-Bertalot 1999**, p. 282 **[PGRN]**

Plate 189, Figs 70-88

Basionym: *Achnanthes grana* M.H. Hohn & Hellerman 1963
Morphometry (Amieira, Tagus River) (n=19): Length = 6.5-9.5 µm; width = 3.7-4.2 µm; 16-18 striae/10 µm (R-), 16-18 striae/10 µm (R+)
SPI: S = 5.0; V = 1.0

***Planothidium lanceolatum* (Brébisson ex Kützing) Lange-Bertalot 1999**, p. 287 **[PTLA]**

Plate 185, Figs 31-56

Basionym: *Achnanthidium lanceolatum* Brébisson ex Kützing 1846
Nomenclatural synonym: *Achnanthes lanceolata* (Brébisson ex Kützing) Grunow in Cleve & Grunow 1880
Morphometry (Torto River) (n=12): Length = 12-24 µm; width = 5.5-7 µm; 13 striae/10 µm (R-), 13-14 striae/10 µm (R+)
Morphometry (Passil, Aljezur Stream) (n=12): Length = 9.5-22 µm; width = 4.5-7 µm; 13-14 striae/10 µm (R-), 13-14 striae/10 µm (R+)
SPI: S = 4.6; V = 1.0

***Planothidium minutissimum* (Krasske) E.A. Morales 2006**, p. 338 **[PMNT]**

Plate 189, Figs 36-53

Basionym: *Achnanthes lanceolata* var. *minutissima* Krasske 1938
Morphometry (Amieira, Tagus River) (n=18): Length = 7.3-10.5 µm; width = 3.3-4.3 µm; 16-18 striae/10 µm (R-), 15-18 striae/10 µm (R+)

SPI: S = - ; V = -

Genus ***Psammothidium*** Bukhtiyarova & Round 1996

***Psammothidium altaicum* Bukhtiyarova in Bukhtiyarova & Round 1996**, p. 5; figs 12-15 **[PALT]**
Plate 189, Figs 99-102; Plate 191, Fig. 3
Basionym: *Achnanthes altaica* (Poretzky) Cleve-Euler 1953
Morphometry (Lamas de Mouro, Mouro River) (n=4): Length = 8.7-12.0 µm; width = 4.7-5.7 µm
SPI: S = 5.0; V = 2.0

***Psammothidium marginulatum* (Grunow) Bukhtiyarova & Round 1996**, p. 5; figs 2-11 **[PMRG]**
Plate 189, Figs 89-98; Plate 191, Figs 1, 2
Basionym: *Achnanthes marginulata* Grunow in Cleve & Grunow 1880
Morphometry (Lamas de Mouro, Mouro River) (n=14): Length = 10.7-15.3 µm; width = 4.7-6.5 µm; 26-28 striae/10 µm (R-), 25-27 striae/10 µm (R+)
SPI: S = 5.0; V = 2.0

Order **Naviculales** Bessey 1907
Suborder **Neidiineae** D.G. Mann in Round et al. 1990
Family **Diadesmidaceae** D.G. Mann in Round et al. 1990
Genus ***Diadesmis*** Kützing 1844

***Diadesmis* cf. *biceps* Arnott 1880**
Plate 195, Figs 21-46; Plate 196, Figs 1-3
Nomenclatural synonym: *Navicula contenta* f. *biceps* (Arnott, Grunow in Van Heurck) Hustedt 1930
Morphometry (Senra, Lima River) (n=25): Length = 8.0-14.0 µm; width = 2.6-3.5 µm
SPI: S = - ; V = -

***Diadesmis confervacea* Kützing 1844**, p. 109; pl. 30, fig. 8 **[DCOF]**
Plate 195, Figs 1-20
Nomenclatural synonym: *Navicula confervacea* (Kützing) Grunow in Van Heurck 1880
Morphometry (Coutada, Zêzere River) (n=20): Length = 12.6-18.7 µm; width = 6.2-6.7 µm; 21-24 striae/10 µm
SPI: S = 1.0; V = 3.0

***Diadesmis paracontenta* subsp. *magisconcava* Lange-Bertalot in Lange-Bertalot & Werum 2001**, p. 9; figs 11-14, 60-64 **[DPMA]**
Plate 195, Fig. 47
Morphometry (Senra, Lima River) (n=1): Length = 11.7 µm; width = 2.8 µm
SPI: S = - ; V = -

***Diadesmis perpusilla* (Grunow) D.G. Mann in Round, Crawford & Mann 1990 sensu lato [DPER]**
Plate 195, Figs 48-61; Plate 197, Figs 1, 2
Basionym: *Navicula perpusilla* Grunow 1860
Nomenclatural synonyms: *Navicula gallica* var. *perpusilla* (Grunow) Lange-Bertalot in Krammer & Lange-Bertalot 1985; *Diadesmis gallica* var. *perpusilla* (Grunow) Lange-Bertalot in Lange-Bertalot & Metzeltin 1996
Morphometry (Sabugueiro, Fervença Stream) (n=14): Length = 9.9-13.0 µm; width = 3.2-4.3 µm
SPI: S = 5.0; V = 1.0

Genus ***Luticola*** D.G. Mann in Round et al. 1990

***Luticola goeppertiana* (Bleisch in Rabenhorst) D.G. Mann in Round, Crawford & Mann 1990**, p. 670 **[LGOE]**
Plate 198, Figs 1-43
Basionym: *Navicula mutica* var. *goeppertiana* (Bleisch in Rabenhorst) Grunow in Van Heurck 1880
Nomenclatural synonym: *Navicula goeppertiana* (Bleich ex Rabenhorst) H.L. Smith 1876-1888

Morphometry (Coutada, Zêzere River) (n=20): Length = 14.7-30.7 µm; width = 6.5-8.3 µm; 17-18 striae/10 µm
Morphometry (Coimbra, Mondego River) (n=11): Length = 14.3-30.0 µm; width = 5.3-8.0 µm; 18-20 striae/10 µm
Morphometry (Miranda, Douro River) (n=12): Length = 10.5-29.7 µm; width = 5.8-8.0 µm; 18 striae/10 µm
SPI: S = 2.0; V = 2.0

***Luticola mutica* (Kützing) D.G. Mann in Round, Crawford & Mann 1990**, p. 670 **[LMUT]**
Plate 199, Figs 24-36
Basionym: *Navicula mutica* Kützing 1844
Morphometry (Casal Rei, Zêzere River) (n=13): Length = 6.7-14.3 µm; width = 5.3-6.7 µm; 20-24 striae/10 µm
SPI: S = 2.0; V = 2.0

***Luticola* aff. *mutica* (Kützing) D.G. Mann in Round, Crawford & Mann 1990**, p. 670
Plate 199, Figs 1-23
Morphometry (Penha de Águia, Guadiana River) (n=23): Length = 7.7-14.0 µm; width = 5.7-7.0 µm; 16-18 striae/10 µm
SPI: S = - ; V = -

***Luticola ventriconfusa* Lange-Bertalot in Lange-Bertalot, Cavacini, Tagliaventi & Alfinito 2003**, p. 72; pl. 73, figs 12-20 **[LVCF]**
Plate 199, Figs 37-69; Plate 200, Figs 1-4
Morphometry (Miranda, Douro River) (n=15): Length = 16.7-19.3 µm; width = 7.3-7.7 µm; 20 striae/10 µm
Morphometry (Belver, Tagus River) (n=18): Length = 10.7-16.7 µm; width = 5.3-6.7 µm; 20 striae/10 µm
SPI: S = 2.0; V = 3.0
Ecological preferences WA (min-max): Current velocity (m s^{-1}): 0.9 (0.3-1.2). Conductivity (µS cm^{-1}): 456 (287-718). pH: 7.7 (7.5-7.9). DO (% sat.): 78 (67-98). DO (mg L^{-1}): 6.4 (5.3-8.2). Alkalinity (HCO_3 L^{-1}): 41.6 (10.0-154.0). N-NH_4^+ (µg N L^{-1}): 77 (50-80). Ca^{2+} (mg Ca^{2+} L^{-1}): 45.2 (41.0-54.0). BOD_5 (mg O_2 L^{-1}): 1.6 (1.0-8.0). Cl^- (mg Cl^- L^{-1}): 40.2 (11.0-83.9). TOC (mg C L^{-1}): 8.8 (2.6-19.0). Total hardness (mg $CaCO_3$ L^{-1}): 147.1 (110.0-205.0). P-PO_4^{3-} (µg P L^{-1}): 13 (6-74). Total phosphorus (µg P L^{-1}): 14 (2-38). Soluble reactive phosphorus (SRP) (µg P L^{-1}): 4 (2-24). N-NO_3^- (µg N L^{-1}): 512 (480-835). N-NO_2^- (µg N L^{-1}): 115 (1-120). Na^+ (mg Na^+ L^{-1}): 6.2 (2.0-13.1). SO_4^{2-} (mg SO_4^{2-} L^{-1}): 68.6 (12.6-158.4).

Genus ***Nupela*** Vyverman & Compère 1991

***Nupela lapidosa* (Krasske) Lange-Bertalot 1999**, p. 280 **[NULA]**
Plate 186, Figs 47-53; Plate 188, Figs 1, 2
Basionym: *Achnanthes lapidosa* Krasske 1929
Morphometry (Sabugueiro, Fervença Stream) (n=7): Length = 17.5-22 µm; width = 5.8-11.3 µm; 23 striae/10 µm (R-), 22-23 striae/10 µm (R+)
SPI: S = 5.0; V = 3.0

***Nupela* sp.**
Plate 189, Figs 103-142; Plate 192, Figs 1-4
Morphometry (Barcelos, Cávado River) (n=37): Length = 5.6-14.3 µm; width = 3-4 µm
SPI: S = - ; V = -

Family **Amphipleuraceae** Grunow 1862
Genus ***Amphipleura*** Kützing 1844

***Amphipleura pellucida* (Kützing) Kützing 1844**, p. 103; pl. 3, fig. 52, pl. 30, fig. 84 **[APEL]**
Plate 201, Figs 1-7
Basionym: *Frustulia pellucida* Kützing 1833
Morphometry (Luzianes, Monte Novo Stream) (n=7): Length = 79.1-100.3 µm; width = 7.5-8.1 µm

SPI: S = 4.0; V = 1.0

Family **Brachysiraceae** D.G. Mann in Round et al. 1990
Genus ***Brachysira*** Kützing 1836

***Brachysira brebissonii* R. Ross in B. Hartley 1986**, p. 607 **[BBRE]**

Plate 202, Figs 71-83; Plate 204, Figs 1-6

Basionym: *Navicula brachysira* Brébisson in Rabenhorst 1853
Nomenclatural synonyms: *Anomoeoneis brachysira* (Brébisson in Rabenhorst) Cleve 1895; *Anomoeoneis serians* var. *brachysira* (Brébisson in Rabenhorst) Hustedt 1930
Morphometry (Covas, Coura River) (n=12): Length = 11.8-25.0 µm; width = 4.7-6.9 µm; 24-28 striae/10 µm
SPI: S = 5.0; V = 2.0

***Brachysira neglectissima* Lange-Bertalot in Werum & Lange-Bertalot 2004**, p. 128; pl. 53, figs 1-13, pl. 54, figs 1-6 [**BNEG]**

Plate 202, Figs 1-70; Plate 203, Figs 1-5

Morphometry (Besteiros, Seixe Stream) (n=17): Length = 11.5-23.3 µm; width = 3.8-4.7 µm
Morphometry (Oleiros, Seca Stream) (n=18): Length = 11.1-25.0 µm; width = 3.2-4.6 µm; 30 striae/10 µm
Morphometry (Brunhais, Ave River) (n=18): Length = 11.7-23.0 µm; width = 3.7-4.6 µm
Morphometry (Vilarinho das Furnas Reservoir, Homem River) (n=15): Length = 13.9-22.3 µm; width = 4.0-4.8 µm
SPI: S = - ; V = -

Family **Neidiaceae** Mereschkowsky 1903
Genus ***Neidium*** Pfitzer 1871

***Neidium* cf. *ampliatum* (Ehrenberg) Krammer in Krammer & Lange-Bertalot 1985**, p. 101; pl. 2, figs 8, 9, pl. 3, fig. 4

Plate 205, Fig. 36

Basionym: *Navicula ampliata* Ehrenberg 1854
Nomenclatural synonym: *Neidium iridis* var. *ampliata* (Ehrenberg; Ehrenberg) Cleve 1894
Morphometry (Sabugueiro, Fervença Stream) (n=1): Length = 48.3 µm; width = 13.7 µm; 21 striae/10 µm
SPI: S = - ; V = -

***Neidium bisulcatum* (Lagerstedt) Cleve 1894**, p. 68 **[NBIS]**

Plate 205, Fig. 13

Basionym: *Navicula bisulcata* Lagerstedt 1873
Morphometry (Sabugueiro, Fervença Stream) (n=1): Length = 55.0 µm; width = 10.3 µm; 28 striae/10 µm
SPI: S = 5.0; V = 2.0

***Neidium longiceps* (W. Gregory) Cleve-Euler 1955**, v. 5(4): p. 112 **[NLGI]**

Plate 205, Figs 27-35; Plate 206, Fig. 3

Basionym: *Navicula longiceps* W. Gregory 1856
Nomenclatural synonym: *Neidium affine* var. *longiceps* (W. Gregory) Cleve 1894
Morphometry (Brunhais, Ave River) (n=9): Length = 17.7-23.1 µm; width = 4.4-5.6 µm; 17-21 striae/10 µm
SPI: S = 4.0; V = 3.0

***Neidium* sp. [NESP]**

Plate 205, Figs 14-26; Plate 206, Figs 1, 2, 4

Morphometry (Brunhais, Ave River) (n=13): Length = 10.5-23.7 µm; width = 3.5-4.5 µm
SPI: S = - ; V = -

Suborder **Sellaphorineae** D.G. Mann in Round et al. 1990

Family **Sellaphoraceae** Mereschkowsky 1902
Genus ***Adlafia*** Gerd Moser, Lange-Bertalot & Metzeltin 1998

***Adlafia* sp.1**

Plate 210, Figs 41-62; Plate 211, Figs 1-6
Morphometry (Sanceriz, Aguieiras Stream) (n=22): Length = 6.0-12.7 µm; width = 2.2-2.7 µm; striae/10 µm
SPI: S = - ; V = -

***Adlafia* sp.2**

Plate 210, Figs 63-122; Plate 212, Figs 1-4
Morphometry (Barral, Homem River) (n=28): Length = 6.5-15.1 µm; width = 3.5-4.7 µm;
Morphometry (Açude da Moreira, Caima River) (n=19): Length = 8.0-12.5 µm; width = 3.7-4.2 µm
Morphometry (Barcelos, Cávado River) (n=13): Length = 9.5-13.9 µm; width = 3.5-4.5 µm; 40 striae/10 µm
SPI: S = 5.0; V = 1.0

Genus ***Chamaepinnularia*** Lange-Bertalot & Krammer 1996

***Chamaepinnularia* cf. *rexii* Veselá & Johansen 2009**, p. 465; figs 120-135, 192-194

Plate 207, Figs 120-132
Morphometry (Barral, Homem River) (n=11): Length = 6.5-8.7 µm; width = 3.0-3.3 µm; 24 striae/10 µm
SPI: S = 4.6; V = 1.0

Genus ***Eolimna*** Lange-Bertalot & Schiller 1997

***Eolimna comperei* Ector, Coste & Iserentant in Coste & Ector 2000**, p. 383; pl. 1, figs 46-55, pl. 3, figs 1-6, 8-12, 15-28 **[EOCO]**

Plate 207, Figs 61-93; Plate 208, Figs 1-4
Morphometry (Veral, Tâmega River) (n=31): Length = 5.9-14.2 µm; width = 2.4-4.3 µm; 21-28 striae/10 µm
SPI: S = 1.5; V = 1.0

***Eolimna minima* (Grunow in Van Heurck) Lange-Bertalot in Moser, Lange-Bertalot & Metzeltin 1998**, p. 153 **[EOMI]**

Plate 207, Figs 1-45
Basionym: *Navicula minima* Grunow in Van Heurck 1880
Morphometry (Belmonte, Zêzere River) (n=22): Length = 6.0-9.9 µm; width = 3.1-3.9 µm; 27 striae/10 µm
Morphometry (Gomes Aires, Mira River) (n=18): Length = 6.3-10.0 µm; width = 2.7-3.6 µm; 24-27 striae/10 µm
SPI: S = 3.0; V = 1.0

***Eolimna subminuscula* (Manguin) Gerd Moser, Lange-Bertalot & Metzeltin 1998**, p. 154 **[ESBM]**

Plate 207, Figs 46-60
Basionym: *Navicula subminuscula* Manguin 1942
Morphometry (Peramanca Stream) (n=14): Length = 8.3-10.0 µm; width = 3.8-4.1 µm; 15-18 striae/10 µm
SPI: S = 2.0; V = 1.0

***Eolimna* sp.1**

Plate 195, Figs 62-69
Morphometry (Açude da Moreira, Caima River) (n=7): Length = 13.7-19.6 µm; width = 5.0-5.5 µm; 21-23 striae/10 µm
SPI: S = - ; V = -

***Eolimna* sp.2**

Plate 207, Figs 94-119; Plate 209, Figs 1-4
Morphometry (Carvalhosa Stream) (n=26): Length = 5.8-11.7 µm; width = 2.9-4.1 µm; 24 striae/10 µm
SPI: S = - ; V = -

***Eolimna* sp.3**

Plate 210, Figs 123-126; Plate 213, Figs 1-4
Morphometry (Barcelos, Cávado River) (n=4): Length = 10.1-11.5 µm; width = 3.9-4.5 µm; 24-27 striae/10 µm
SPI: S = - ; V = -

Genus ***Fallacia*** A.J. Stickle & D.G. Mann in Round et al. 1990

***Fallacia* cf. *clepsidroides* Witkowski 1994**, p. 120; pl. 26, figs 1-12 **[FCLE]**

Plate 224, Figs 21-36; Plate 225, Figs 1, 2
Morphometry (Amieira, Tagus River) (n=16): Length = 8.7-10.3 µm; width = 4.3-5.0 µm; 22-24 striae/10 µm
SPI: S = 2.0; V = 2.0

***Fallacia subhamulata* (Grunow in Van Heurck) Bukhtiyarova 1995**, v. 5(4): p. 422 **[FSBH]**

Plate 224, Figs 37-39
Basionym: *Navicula subhamulata* Grunow in Van Heurck 1880
Morphometry (Assamaça, Valmar Stream) (n=3): Length = 13.3-18.3 µm; width = 4.7-5.3 µm; 26 striae/10 µm
SPI: S = 4.0; V = 1.0

Genus ***Fistulifera*** Lange-Bertalot 1997

***Fistulifera saprophila* (Lange-Bertalot & Bonik) Lange-Bertalot 1997**, p. 73; fig. 32 **[FSAP]**

Plate 210, Figs 23-40
Basionym: *Navicula saprophila* Lange-Bertalot & Bonik 1976
Morphometry (Alferce, Monchique Stream) (n=18): Length = 5.5-6.9 µm
SPI: S = 2.0; V = 1.0

Genus ***Mayamaea*** Lange-Bertalot 1997

***Mayamaea permitis* (Hustedt) Bruder & Medlin 2008**, p. 327 **[MPMI]**

Plate 210, Figs 1-22
Basionym: *Navicula permitis* Hustedt 1945
Nomenclatural synonyms: *Navicula atomus* var. *permitis* (Hustedt) Lange-Bertalot in Krammer & Lange-Bertalot 1985; *Mayamaea atomus* var. *permitis* (Hustedt) Lange-Bertalot 1997
Morphometry (Alferce, Monchique Stream) (n=22): Length = 6.9-7.5 µm; width = 2.5-3.0 µm
SPI: S = 2.3; V = 1.0

Genus ***Sellaphora*** Mereschkowsky 1902

***Sellaphora bacillum* (Ehrenberg) D.G. Mann 1989**, p. 2; figs 2, 9, 13, 14, 18, 39, 40 **[SEBA]**

Plate 226, Figs 1-22
Basionym: *Navicula bacillum* Ehrenberg 1839
Morphometry (Junqueira, Maçãs River) (n=13): Length = 24.1-14.1 µm; width = 6.2-7.1 µm; 22-24 striae/10 µm
Morphometry (Constância, Tagus River) (n= 5): Length = 27.9-19.6 µm; width = 6.3-7.2 µm; 20-21 striae/10 µm
Morphometry (Machadinho, Guadiana River) (n= 4): Length = 26.3-13.5 µm; width = 6.0-7.5 µm; 21-23 striae/10 µm
SPI: S = 5.0; V = 2.0

***Sellaphora pupula* (Kützing) Mereschkowsky 1902**, p. 187; pl. 4, figs 1-5 **[SPUP]**

Plate 227, Figs 1-26

Basionym: *Navicula pupula* Kützing 1844
Morphometry (Safareja Stream) (n=11): Length = 14.0-24.0 µm; width = 6.0-7.0 µm; 18-20 striae/10 µm
Morphometry (Lentiscais, Farropinha Stream) (n=7): Length = 19.7-28.0 µm; width = 6.3-7.0 µm; 18-20 striae/10 µm
Morphometry (Peramanca Stream) (n=8): Length = 13.3-26.0 µm; width = 6.3-7.0 µm; 18-20 striae/10 µm
SPI: S = 2.6; V = 2.0

***Sellaphora seminulum* (Grunow) D.G. Mann 1989**, p. 2 **[SSEM]**

Plate 227, Figs 27-48

Basionym: *Navicula seminulum* Grunow 1860
Morphometry (Lagar de Água Stream) (n=22): Length = 8.0-16.0 µm; width = 3.3-4.0 µm; 18-21 striae/10 µm
SPI: S = 1.5; V = 2.0

Family **Pinnulariaceae** D.G. Mann in Round et al. 1990
Genus ***Caloneis*** Cleve 1894

***Caloneis amphisbaena* (Bory) Cleve 1894**, p. 58 **[CAMP]**

Plate 228, Figs 1-3

Basionym: *Navicula amphisbaena* Bory 1824
Morphometry (Machadinho, Guadiana River) (n=3): Length = 63.5-78.1 µm; width = 23.6-24.9 µm; 14-16 striae/10 µm
SPI: S = 2.0; V = 3.0

***Caloneis* aff. *lancettula* (Schulz) Lange-Bertalot & Witkowski in Lange-Bertalot & Metzeltin 1996**, v. 2: p. 29-30; pl. 87, fig. 18

Plate 229, Figs 15-45; Plate 230, Figs 1-65

Basionym: *Caloneis aemula* var. *lancettula* Schulz 1926
Morphometry (Machadinho, Guadiana River) (n=14): Length = 11.3-22.0 µm; width = 3.9-4.3 µm; 24-26 striae/10 µm
Morphometry (Benémola, Fonte Menalva Stream) (n = 11): Length = 12.3-20.7 µm; width = 3.9-4.9 µm; 26-28 striae/10 µm
Morphometry (Assamaça, Valmar Stream) (n=17): Length = 15.1-20.7 µm; width = 3.9-4.7 µm; 24-26 striae/10 µm
Morphometry (Sado River) (n = 14): Length = 8.9-17.5 µm; width = 4.0-4.5 µm; 24-26 striae/10 µm
Morphometry (Porto de Vacas) (n=22): Length = 11.3-21.3 µm; width = 4.0-5.3 µm; 24-28 striae/10 µm
Morphometry (Alcabideque, Bruscos Stream) (n=10): Length = 10.5-22.0 µm; width = 3.7-4.5 µm; 24-28 striae/10 µm
SPI: S = - ; V = -

***Caloneis* sp.1**

Plate 229, Figs 1-5

Basionym: *Navicula silicula* Ehrenberg 1839
Morphometry (Prata Stream) (n=5): Length = 34.1-50.8 µm; width = 10-11.3 µm; 16-17 striae/10 µm
SPI: S = 5.0; V = 3.0

***Caloneis* sp.2**

Plate 229, Figs 6-12

Basionym: *Navicula silicula* Ehrenberg 1839
Morphometry (Prata Stream) (n=7): Length = 22.1-33.2 µm; width = 7.5-8.3 µm; 18-19 striae/10 µm
SPI: S = 5.0; V = 3.0

***Caloneis* sp.3**

Plate 229, Figs 13, 14

Morphometry (Saucelle Reservoir, Douro River) (n=2): Length = 26.0-30.5 µm; width = 7.0-7.3 µm; 18-20 striae/10 µm
SPI: S = - ; V = -

Genus ***Pinnularia*** Ehrenberg 1843

Pinnularia obscuriformis **Krammer 2000**, p. 51 **[POBF]**

Plate 235, Figs 19-22
Morphometry (Prata Stream) (n=4): Length = 29.5-41 µm; width = 6.5-7 µm; 8-10 striae/10 µm
SPI: S = 3.0; V = 1.0

Pinnularia parvulissima **Krammer 2000**, p. 95, 220; pl. 65, figs 9, 10, pl. 69, figs 7-11 **[PPVS]**

Plate 235, Figs 23, 24
Morphometry (Prata Stream) (n=2): Length = 39.5-50 µm; width = 9 µm; 9-11 striae/10 µm
SPI: S = 3.0; V = 3.0

Pinnularia saprophila **Lange-Bertalot, Kobayasi & Krammer in Krammer 2000**, p. 109, 223; pl. 85, figs. 10-**18 [PSAP]**

Plate 233, Figs 1-22
Morphometry (Boidobra, Corges Stream) (n=22): Length = 16.5-31 µm; width = 5.3-5.6 µm; 12-13 striae/10 µm
SPI: S = 3.0; V = 2.0

Pinnularia stidolphii **Krammer 2000**, p. 154, 231; pl. 134, figs 1-7, pl. 183, fig. 3 **[PSDO]**

Plate 237, Fig. 2
Morphometry (Prata Stream) (n=1): Length = 197 µm; width = 29 µm; 5-6 striae/10 µm
SPI: S = - ; V = -

Pinnularia subbrevistriata **Krammer 2000**, p. 94; pl. 70, figs 7, 8 **[PSBV]**

Plate 231, Figs 1-16
Morphometry (Boidobra, Corges Stream) (n=15): Length = 33.8-54 µm; width = 8.5-10 µm; 11 striae/10 µm
SPI: S = - ; V = -

Pinnularia subcapitata **W. Gregory 1856**, p. 9; pl. 1, fig. 30 **[PSCA]**

Plate 233, Figs 23-44; Plate 234, Figs 1-4
Basionym: *Navicula subcapitata* (W. Gregory) Ralfs in Pritchard 1861
Morphometry (Porto de Vacas) (n=13): Length = 22.7-38.0 µm; width = 5.0-6.0 µm; 12-16 striae/10 µm
Morphometry (Sabugueiro) (n=10): Length = 22.7-38.0 µm; width = 5.0-6.0 µm; 12-16 striae/10 µm
SPI: S = 5.0; V = 2.0

Pinnularia subgibba **var. *undulata*** **Krammer 1992**, p. 127, 176-177; pl. 46, fig. 5, pl. 47, fig. 5 **[PSUN]**

Plate 232, Figs 1-17
Morphometry (Porto de Vacas, Zêzere River) (n=21): Length = 35.3-70.0 µm; width = 8.0-9.3 µm; 10-12 striae/10 µm
SPI: S = - ; V = -
Note: The Portuguese population is smaller and presents higher striae density. It also resembles *P. parvulissima*, nevertheless the latter is wider (width = 10-12 µm).

Pinnularia viridiformis **Krammer var. *viridiformis*** **morphotype 2 1992**, p. 168; pl. 161, figs1- 4, pl. 162, figs 2-4, pl. 166, figs 1-4, pl. 167, figs 1-5 **[PVTW]**

Plate 237, Fig. 1
Morphometry (Brunhais, Ave River) (n=1): Length = 182 µm; width = 28 µm; 6 striae/10 µm
SPI: S = 5.0; V = 2.0

Pinnularia **sp.**

Plate 235, Figs 1-18; Plate 236, Figs 1, 2

Morphometry (n = 18): Length = 16.0-29.3 µm; width = 4.7-5.3 µm; 18-21 striae/10 µm
SPI: S = - ; V = -
Note: This population resembles to *Pinnularia subinterrupta* Krammer & Schroeter in Krammer 1992, p. 111; pl. 40, figs 1-14 (dimensions: length = 14.0-34.0 µm, width = 3.6-6.0 µm; 13-16 striae/10 µm, nevertheless *P. subinterrupta* presents more divergent striae, narrower axial area and coarser striation.

Suborder **Diploneidineae** D.G. Mann in Round et al. 1990
Family **Diploneidaceae** D.G. Mann in Round et al. 1990
Genus ***Diploneis*** (Ehrenberg) Cleve 1894

***Diploneis separanda* Lange-Bertalot in Werum & Lange-Bertalot 2004**, p. 144; pl. 76, figs 1-16, pl. 77, figs 1-5 **[DSEP]**

Plate 72, Figs 18-48; Plate 73, Figs 1-5

Morphometry (Assamaça, Valmar Stream) (n=20): Length = 10.0-23.9 µm; width = 5.5-7.3 µm; 18-20 striae/10 µm
Morphometry (Luzianes, Monte Novo Stream) (n=11): Length = 10.6-26.3 µm; width = 5.5-6.9 µm; 16-19 striae/10 µm
SPI: S = 5.0; V = 2.0

Suborder **Naviculineae** Hendey 1937
Family **Naviculaceae** Kützing 1844
Genus ***Geissleria*** Lange-Bertalot & Metzeltin 1996

***Geissleria decussis* (Østrup) Lange-Bertalot & Metzeltin 1996**, p. 65; pl. 104, fig. 2, pl. 125, figs 3-6 **[GDEC]**

Plate 238, Figs 1-22

Basionym: *Navicula decussis* Østrup 1910
Morphometry (Amieira, Tagus River) (n=11): Length = 15.3-25.4 µm; width = 6.4-8.1 µm; 14-16 striae/10 µm
Morphometry (Belmonte, Zêzere River) (n=11): Length = 20.7-22.1 µm; width = 7.1-7.3 µm; 16-18 striae/10 µm
SPI: S = 4.8; V = 2.0

***Geissleria* aff. *schoenfeldii* (Hustedt) Lange-Bertalot & Metzeltin 1996**, v. 2: p. 67; pl. 123, figs 5-6, pl. 124, figs 1-4

Plate 238, Figs 23-38; Plate 239, Figs 1-4

Basionym: *Navicula schoenfeldii* Hustedt 1930
Morphometry (Amieira, Tagus River) (n=16): Length = 7.7-14.9 µm; width = 4.3-5.5 µm; 15-18 striae/10 µm
SPI: S = - ; V = -

***Geissleria* sp. [GESP]**

Plate 238, Figs 39-52; Plate 240, Figs 1-4

Morphometry (Amieira, Tagus River) (n=14): Length = 11.3-17.0 µm; width = 5.0-5.9 µm; 14-15 striae/10 µm
SPI: S = - ; V = -

Genus ***Hippodonta*** Lange-Bertalot, Witkowski & Metzeltin 1996

***Hippodonta capitata* (Ehrenberg) Lange-Bertalot, Metzeltin & Witkowski 1996**, p. 254; pl. 2, fig. 5, pl. 3, fig. 1, pl. 4, fig. 23 **[HCAP]**

Plate 241, Figs 31-42

Basionym: *Navicula capitata* Ehrenberg 1838
Nomenclatural synonym: *Navicula hungarica* var. *capitata* (Ehrenberg) Cleve 1895
Morphometry (Arrouquelas, Lebre Stream) (n=11): Length = 18.7-22.0 µm; width = 6.0-6.3 µm; 8 striae/10 µm

SPI: S = 4.0; V = 1.0

***Hippodonta hungarica* (Grunow) Lange-Bertalot, Metzeltin & Witkowski 1996**, p. 259; pl. 1, figs 22-26 **[HHUN]**

Plate 241, Figs 1-30; Plate 242, Figs 1-4

Basionym: *Navicula hungarica* Grunow 1860
Nomenclatural synonym: *Navicula capitata* var. *hungarica* (Grunow) Ross 1947
Morphometry (Prata Stream) (n=15): Length = 8.7-17.7 µm; width = 4.7-5.0 µm; 8 striae/10 µm
Morphometry (Peramanca Stream) (n=11): Length = 11.0-22.7 µm; width = 4.7-5.3 µm; 8 striae/10 µm
SPI: S = 4.0; V = 1.0

***Hippodonta pseudoacceptata* (H. Kobayasi) Lange-Bertalot 1996**, v. 4: p. 263 **[HPDA]**

Plate 241, Figs 43-80; Plate 243, Figs 1-4

Basionym: *Navicula pseudoacceptata* H. Kobayasi in Kobayasi & Mayama 1986
Morphometry (Chamusca, Tagus River) (n=19): Length = 10.3-13.3 µm; width = 3.3-3.7 µm; 18 striae/10 µm
Morphometry (Porto de Lagos, Boina Stream) (n=14): Length = 10.7-14.0 µm; width = 3.0-3.7 µm; 18 striae/10 µm
Morphometry (Lanheses, Lima River) (n=5): Length = 7.0-9.7 µm; width = 3.3-3.7 µm; 18 striae/10 µm
SPI: S = - ; V = -

Genus ***Navicula*** Bory 1822

***Navicula angusta* Grunow 1860**, p. 528; pl. 3, fig. 19 (pl. 5, fig. 19) **[NAAN]**

Plate 219, Figs 15-24

Morphometry (Açude da Moreira, Caima River) (n=10): Length = 48.0-58.3 µm; width = 6.9-7.3 µm; 11 striae/10 µm
SPI: S = 5.0; V = 3.0

***Navicula capitatoradiata* Germain 1981**, p. 188-189; pl. 72, fig. 7, 7 bis **[NCPR]**

Plate 217, Figs 8-17

Morphometry (Valada, Seiça Stream) (n=7): Length = 32.0-36.7 µm; width = 7.3 µm; 14 striae/10 µm
SPI: S = 3.0; V = 2.0

***Navicula cataracta-rheni* Lange-Bertalot 1993**, p. 99-100; pl. 59, figs 13-15, Bacill. 2/4, fig. 71: 1-6 **[NCTT]**

Plate 223, Figs 1-7

Morphometry (Sabugueiro, Fervença Stream) (n=7): Length = 29.3-32.7 µm; width = 6.0-6.7 µm; 14 striae/10 µm
SPI: S = 3.0; V = 1.0
Ecological preferences WA (min-max): Current velocity (m s^{-1}): 0.6 (0.1-0.8). Conductivity (µS cm^{-1}): 76 (33-116). pH: 7.0 (6.5-7.6). DO (% sat.): 94 (90-101). DO (mg L^{-1}): 7.8 (7.3-8.8). Alkalinity (HCO_3 L^{-1}): 19.0 (5.0-46.0). N-NH_4^+ (µg N L^{-1}): 26 (1-140). Ca^{2+} (mg Ca^{2+} L^{-1}): 4.7 (2.0-8.0). BOD_5 (mg O_2 L^{-1}): 3.3 (1.0-10.0). Cl^- (mg Cl^- L^{-1}): 6.8 (0.5-13.9). TOC (mg C L^{-1}): 3.2 (1.7-10.4). Total hardness (mg $CaCO_3$ L^{-1}): 14.9 (5.0-25.0). P-PO_4^{3-} (µg P L^{-1}): 11 (2-73). Total phosphorus (µg P L^{-1}): 29 (3-99). Soluble reactive phosphorus (SRP) (µg P L^{-1}): 4 (1-24). N-NO_3^- (µg N L^{-1}): 2583 (5-4260). N-NO_2^- (µg N L^{-1}): 39 (10-120). Na^+ (mg Na^+ L^{-1}): 8.4 (0.7-15.8). SO_4^{2-} (mg SO_4^{2-} L^{-1}): 5.7 (0.6-14.9).

***Navicula cryptocephala* Kützing 1844**, p. 95; pl. 3, figs 20, 26 19 **[NCRY]**

Plate 219, 25-34; Plate 220, Figs 1-13

Morphometry (Proença-a-Velha, Taliscas Stream) (n=10): Length = 26.3-33.0 µm; width = 6.0-6.7 µm; 14-16 striae/10 µm
Morphometry (Lentiscais, Farropinha Stream) (n=13): Length = 22.7-36.0 µm; width = 5.7-6.3 µm; 15-16 striae/10 µm
SPI: S = 3.5; V = 2.0

***Navicula cryptotenella* Lange-Bertalot in Krammer & Lange-Bertalot 1985**, p. 62-64; pl. 18, figs 22-23, pl. 19, figs 1-10, pl. 27, figs 1, 4 **[NCTE]**

Plate 222, Figs 1-29
Morphometry (Valada, Seiça Stream) (n=15): Length = 11.7-32.7 µm; width = 4.0-5.9 µm; 14-16 striae/10 µm
Morphometry (Casalinhas, Campo Stream) (n=14): Length = 17.3-25.7 µm; width = 5.3-5.7 µm; 16 striae/10 µm
SPI: S = 4.0; V = 1.0

***Navicula* cf. *cryptotenella* Lange-Bertalot in Krammer & Lange-Bertalot 1985**, p. 62-64; pl. 18, figs 22-23, pl. 19, figs 1-10, pl. 27, figs 1, 4

Plate 222, Figs 30-56
Morphometry (Corgo River) (n=12): Length = 20.3-29.3 µm; width = 6.3-6.7 µm; 14 striae/10 µm
Morphometry (Coimbra, Mondego River) (n=15): Length = 14.0-27.0 µm; width = 4.7-5.3 µm; 14-16 striae/10 µm
SPI: S = - ; V = -

***Navicula germainii* J.H. Wallace 1960**, p. 3; pl. 2, figs 1 A-C **[NGER]**

Plate 223, Figs 11-14
Nomenclatural synonym: *Navicula viridula* var. *germainii* (J.H. Wallace) Lange-Bertalot 1993
Morphometry (Curros Stream) (n=4): Length = 34.7-38.7 µm; width = 7.3-7.7 µm; 13-14 striae/10 µm
SPI: S = 3.0; V = 2.0

***Navicula gregaria* Donkin 1861**, p. 10; pl. 1, fig. 10 **[NGRE]**

Plate 216, Figs 8-17
Morphometry (Peramanca Stream) (n=10): Length = 21.0-27.3 µm; width = 5.5-6.7 µm; 17-18 striae/10 µm
SPI: S = 3.4; V = 1.0

***Navicula lanceolata* (C. Agardh) Kützing 1844**, p. 94; pl. 28, fig. 38, pl. 30, fig. 48 **[NLAN]**

Plate 217, Figs 1-7
Basionym: *Frustulia lanceolata* C. Agardh 1827
Morphometry (Valada, Seiça Stream) (n=7): Length = 42.3-63.3 µm; width = 9.3-11.3 µm; 10-11 striae/10 µm
SPI: S = 3.8; V = 1.0

***Navicula libonensis* Schoeman 1970**, p. 342; pl. 3, figs 36, 37 **[NLIB]**

Plate 218, Figs 49-51
Morphometry (Lentiscais, Farropinha Stream) (n=3): Length = 30.3-33.7 µm; width = 6.0-6.3 µm; 12 striae/10 µm
SPI: S = 3.0; V = 2.0

***Navicula notha* J.H. Wallace 1960**, p. 4; pl. 1, figs 4 A-D **[NNOT]**

Plate 218, Figs 1-30
Morphometry (Coutada, Zêzere River) (n=15): Length = 24.3-31.0 µm; width = 4.7-5.0 µm; 16 striae/10 µm
Morphometry (Barbaído, Tripeiro River) (n=15): Length = 28.0-32.7 µm; width = 4.7-5.3 µm; 16 striae/10 µm
SPI: S = 4.8; V = 1.0

***Navicula radiosa* Kützing 1844**, p. 91; pl. 4, fig. 23 **[NRAD]**

Plate 216, Figs 1-7
Morphometry (Casalinhas, Campo Stream) (n=7): Length = 52.7-74.7 µm; width = 9.3-10.7 µm; 10-11 striae/10 µm
SPI: S = 5.0; V = 2.0

***Navicula reichardtiana* Lange-Bertalot in Lange-Bertalot & Krammer 1989**, p. 163-164; fig. 98: 19-27 **[NRCH]**

Plate 218, Figs 31-48
Morphometry (Malhada, Almuro Stream) (n=9): Length = 13.3-16.0 µm; width = 4.7-5.0 µm; 16 striae/10 µm

Morphometry (Maranhão Reservoir, Seda Stream) (n=9): Length = 15.0-18.3 µm; width = 4.7-5.7 µm; 14-16 striae/10 µm
SPI: S = 3.6; V = 1.0

***Navicula rhynchocephala* Kützing 1844**, pl. 30, fig. 35 **[NRHY]**

Plate 223, Fig. 8

Morphometry (Curros Stream) (n=1): Length = 54 µm; width = 10 µm; 10 striae/10 µm
SPI: S = 4.0; V = 3.0

***Navicula rostellata* Kützing 1844**, p. 95; pl. 3, fig. 65 **[NROS]**

Plate 224, Figs 1-9

Nomenclatural synonyms: *Navicula rhynchocephala* var. *rostellata* (Kützing) Cleve & Grunow 1880; *Navicula viridula* var. *rostellata* (Kützing) Cleve 1895
Morphometry (Escusa, Sorraia River) (n=9): Length = 33.3-36.7 µm; width = 8.0-8.7 µm; 11-12 striae/10 µm
SPI: S = 3.0; V = 3.0

***Navicula schmassmanni* Hustedt 1943**, p. 165-166; figs 36, 37

Plate 210, Figs 127-147; Plate 214, Figs 1-5

Morphometry (Barcelos, Cávado River) (n=18): Length = 8.0-9.1 µm; width = 2.7-3.0 µm; 40 striae/10 µm
SPI: S = 5.0; V = 2.0

***Navicula striolata* (Grunow) Lange-Bertalot in Reichardt 1984**, p. 56 **[NSTL]**

Plate 223, Figs 9, 10

Morphometry (Amieira, Tagus River) (n=2): Length = 64.0-78.7 µm; width = 12.3-13.0 µm; 10 striae/10 µm
SPI: S = 5.0; V = 3.0

***Navicula simulata* Manguin 1942**, p. 142; pl. 3, fig. 50 **[NSIA]**

Plate 224, Figs 10-20

Morphometry (Alcáçovas Stream) (n=11): Length = 30.7-36.0 µm; width = 6.0-7.3 µm; 13-16 striae/10 µm
SPI: S = 3.0; V = 2.0

***Navicula tripunctata* (O.F. Müller) Bory 1827**, p. 563 **[NTPT]**

Plate 215, Figs 1-17

Basionym: *Vibrio tripunctatus* O.F. Müller 1786
Morphometry (Valada, Seiça Stream) (n=16): Length = 37.3-54.7 µm; width = 7.7-8.0 µm; 10-12 striae/10 µm
SPI: S = 4.4; V = 2.0

***Navicula trivialis* Lange-Bertalot 1980**, p. 31; pl. 1, figs 5-9, pl. 9, figs 1-2 **[NTRV]**

Plate 221, Figs 1-24

Morphometry (Safareja Stream) (n=17): Length = 30.3-42.0 µm; width = 7.3-9.3 µm; 11-12 striae/10 µm
Morphometry (Malhada, Almuro Stream) (n=7): Length = 33.3-41.7 µm; width = 7.7-9.5 µm; 11-12 striae/10 µm
SPI: S = 2.0; V = 3.0

***Navicula veneta* Kützing 1844**, p. 95; pl. 30, fig. 76 **[NVEN]**

Plate 219, Figs 1-14; Plate 220, Figs 14-54

Morphometry (Safareja Stream) (n=13): Length = 17.7-25.0 µm; width = 5.0-5.5 µm; 14 striae/10 µm
Morphometry (Monte Novo Reservoir, Degebe River) (n=13): Length = 17.0-22.0 µm; width = 5.0-5.3 µm; 14-16 striae/10 µm
Morphometry (Peramanca Stream) (n=13): Length = 17.7-23.0 µm; width = 5.0-5.3 µm; 14-16 striae/10 µm
Morphometry (Aveiras, Aveiras Stream) (n=13): Length = 20.0-23.7 µm; width = 5.3-5.7 µm; 14-16 striae/10 µm

SPI: S = 1.0; V = 2.0

Family **Stauroneidaceae** D.G. Mann in Round et al. 1990
Genus ***Craticula*** Grunow 1867

***Craticula cuspidata* (Kützing) D.G. Mann in Round, Crawford & Mann 1990**, p. 666 [**CRCU]**
Plate 244, Figs 1-3
Basionym: *Frustulia cuspidata* Kützing 1833
Morphometry (Safareja Stream) (n=3): Length = 90.7-108.5 µm; width = 23.3-26.7 µm; 12-14 striae/10 µm
SPI: S = 2.6; V = 3.0

Genus ***Stauroneis*** Ehrenberg 1927

***Stauroneis smithii* Grunow 1860**, p. 564; pl. 4, fig. 16, (pl. 6, fig. 16) **[SSMI]**
Plate 205, Figs 1-12
Morphometry (Prata Stream) (n=12): Length = 16.4-28.2 µm; width = 5.7-7.9µm; 26-28 striae/10 µm
SPI: S = 5.0; V = 2.0

Order **Thalassiophysales** D.G. Mann in Round et al. 1990
Family **Catenulaceae** Mereschkowsky 1903
Genus ***Amphora*** Ehrenberg ex Kützing 1844

***Amphora copulata* (Kützing) Schoeman & R.E.M. Archibald 1986**, p. 429; figs 11-13, 30-34 **[ACOP]**
Plate 245, Figs 10-27
Basionym: *Frustulia copulata* Kützing 1833
Morphometry (Arrouquelas, Lebre Stream) (n=17): Length = 20.7-34.7 µm; width = 5.3-8.0 µm; 13-17 striae/10 µm
SPI: S = 4.0; V = 2.0

***Amphora indistincta* Levkov 2009**, p. 69-70, 287; pl. 56, figs 20-21; pl. 78, figs 29-39; pl. 152, fig. 3; pl. 193, figs 1-6; pl. 196, fig. 3 **[AMID]**
Plate 247, Figs 36-42
Morphometry (Tôr, Algibre Stream) (n=6): Length = 10.5-22.5 µm; width = 3.1-4.4 µm; 14 striae/10 µm
SPI: S = - ; V = -

***Amphora lange-bertalotii* var. *tenuis* Levkov & Metzeltin in Levkov 2009**, p. 73-74, 288; pl. 53, figs 1-12; pl. 163, figs 1-6 **[ALGT]**
Plate 245, Figs 1-9
Morphometry (Prata Stream) (n=8): Length = 21.2-50.7 µm; width = 5.9-10.3 µm; 14 striae/10 µm
SPI: S = - ; V = -

***Amphora pediculus* (Kützing) Grunow in Schmidt 1875**, pl. 26, fig. 99 [**APED]**
Plate 247, Figs 1-35
Basionym: *Cymbella pediculus* Kützing 1844
Morphometry (Azenha, Alfambras Stream) (n=15): Length = 7.7-17.0 µm; width = 2.9-3.9 µm; 15-18 striae/10 µm
Morphometry (Tôr, Algibre Stream) (n=13): Length = 7.9-16.9 µm; width = 2.7-3.9 µm; 14-15 striae/10 µm
SPI: S = 4.0; V = 1.0

Genus ***Halamphora*** (Cleve) Levkov 2009

***Halamphora* aff. *montana* (Krasske) Levkov 2009**, p. 207
Plate 245, Figs 28-47; Plate 246, Figs 1, 2
Basionym: *Amphora montana* Krasske 1932

Morphometry (Valeira Reservoir, Douro River) (n=20): Length = 11.5-17.2 µm; width = 2.9-3.5µm
SPI: S = - ; V = -

***Halamphora pseudomontana* (Cholnoky) Levkov 2009**, p. 217 **[HPMO]**

Plate 247, Figs 43-49

Basionym: *Amphora pseudomontana* Cholnoky 1960
Morphometry (Odemira, Mira River) (n=7): Length = 23.1-28.2 µm; width = 5.3-5.7 µm; 20-22 striae/10 µm
SPI: S = - ; V = -

***Halamphora veneta* (Kützing) Levkov 2009**, p. 242 **[HVEN]**

Plate 247, Figs 55-69

Basionym: *Amphora veneta* Kützing 1844
Morphometry (Peramanca Stream) (n=12): Length = 12.0-36.0 µm; width = 3.6-6.6 µm; 18-19 striae/10 µm
SPI: S = 1.0; V = 2.0

***Halamphora* sp.**

Plate 247, Figs 50-54

Morphometry (Odemira, Mira River) (n=5): Length = 20.9-22.6 µm; width = 4.0-4.7 µm; 18 striae/10 µm
SPI: S = - ; V = -

Order **Bacillariales** Hendey 1937
Family **Bacillariaceae** Ehrenberg 1831
Genus ***Nitzschia*** Hassall 1845

***Nitzschia acidoclinata* Lange-Bertalot 1976**, p. 253-308; figs 1-2 **[NACD]**

Plate 255, Figs 67-84

Morphometry (Serra do Lobo, Vale Santo Stream) (n=17): Length = 14.7-26.7 µm; width = 2.3-2.7 µm; 28-30 striae/10 µm; 10-12 fibulae/10 µm
SPI: S = 5.0; V = 2.0

***Nitzschia amphibia* Grunow 1862**, p. 574; pl. 28/12, fig. 23 **[NAMP]**

Plate 259, Figs 1-48

Morphometry (Azambuja Stream) (n=9): Length = 15.3-36.7 µm; width = 4.3-5.3 µm; 16 striae/10 µm; 6-8 fibulae/10 µm
Morphometry (Xarrama River) (n=15): Length = 10.3-23.3 µm; width = 4.0-4.3 µm; 16-18 striae/10 µm; 8-10 fibulae/10 µm
Morphometry (Belver, Tagus River) (n=13): Length = 10.7-29.3 µm; width = 4.0-5.0 µm; 16-18 striae/10 µm; 6-8 fibulae/10 µm
SPI: S = 2.0; V = 2.0

***Nitzschia brevissima* Grunow in Van Heurck 1881**, pl. 67, fig. 4 **[NBRE]**

Plate 260, Figs 1-26; Plate 261, Figs 1-4

Basionym: *Nitzschia obtusa* var. *brevissima* Van Heurck 1885
Morphometry (Belver, Tagus River) (n=13): Length = 28.0-40.0 µm; width = 4.3-5.0 µm; 6-8 fibulae/10 µm
Morphometry (Penha de Águia, Guadiana River) (n=13): Length = 24.3-41.0 µm; width = 4.3-5.3 µm; 6-7 fibulae/10 µm
SPI: S = 2.0; V = 3.0

***Nitzschia capitellata* Hustedt in Schmidt 1922**, pl. 348; 57-58 **[NCPL]**

Plate 258, Figs 1-11

Morphometry (Azambuja Stream) (n=11): Length = 29.0-47.0 µm; width = 4.3-4.7 µm; 12-14 fibulae/10 µm
SPI: S = 1.0; V = 3.0

***Nitzschia dissipata* (Kützing) Grunow 1862**, p. 561 **[NDIS]**

Plate 260, Figs 27-38

Basionym: *Synedra dissipata* Kützing 1844
Morphometry (Benémola, Fonte Menalva Stream) (n=12): Length = 20.3-38.0 µm; width = 4.3-5.0 µm; 7 fibulae/10 µm
SPI: S = 4.5; V = 3.0

***Nitzschia filiformis* (W. Smith) Van Heurck 1896**, p. 406; pl. 33, fig. 882 **[NFIL]**

Plate 262, Figs 1-14

Basionym: *Homoeocladia filiformis* W. Smith
Morphometry (Machadinho, Guadiana River) (n=14): Length = 30.7-79.3 µm; width = 4.3-4.7 µm; 30-32 striae/10 µm; 8-10 fibulae/10 µm
SPI: S = 3.0; V = 3.0

***Nitzschia fonticola* (Grunow) Grunow in Van Heurck 1881**, pl. 69, figs. 15-20 **[NFON]**

Plate 255, Figs 31-66

Basionym: *Nitzschia palea* var. *fonticola* Grunow 1880
Morphometry (Belver, Tagus River) (n=18): Length = 12.7-31.3 µm; width = 3.3-4.3 µm; 24 striae/10 µm; 12-14 fibulae/10 µm
Morphometry (Barquinha, Tagus River) (n=18): Length = 12.0-27.0 µm; width = 3.0-4.0 µm; 24-26 striae/10 µm; 12-14 fibulae/10 µm
SPI: S = 3.5; V = 1.0

***Nitzschia* cf. *incognita* Legler & Krasske 1940**, p. 343; pl. 11, figs 3 a-b

Plate 257, Figs 21-37

Morphometry (Casalinhas, Campo Stream) (n=17): Length = 24.3-58.3 µm; width = 2.3-3.0 µm; 14 fibulae /10 µm
SPI: S = 2.5; V = 1.0

***Nitzschia inconspicua* Grunow 1862**, p. 579; pl. 28/12, fig. 25 **[NINC]**

Plate 248, Figs 24-139; Plate 250, Figs 1-3; Plate 251, Figs 1-3

Morphometry (Tôr, Algibre Stream) (n=23): Length = 5.0-19.0 µm; width = 2.3-2.8 µm; 24-27 striae/10 µm, 11-15 fibulae/10 µm
Morphometry (Ficalho, Vidigão Stream) (n=27): Length = 5.5-18.5 µm; width = 2.0-2.6 µm; 25-27 striae/10 µm; 13-14 fibulae/10 µm
Morphometry (Bensafrim, Machada Stream) (n=18): Length = 6.3-17.0 µm; width = 2.2-2.6 µm; 27-28 striae/10 µm; 14 fibulae/10 µm
Morphometry (Marmelar Stream, Guadiana basin) (n=25): Length = 5.3-17 µm; width = 2.3-2.4 µm; 24-26 striae/10 µm; 13-14 fibulae/10 µm
Morphometry (Queimado, Pardiela Stream) (n=23): Length = 5.5-17.0 µm; width = 2.2-2.4 µm; 26-28 striae/10 µm; 12-14 fibulae/10 µm
SPI: S = 2.8; V = 1.0

***Nitzschia palea* (Kützing) W. Smith 1856**, p. 89 **[NPAL]**

Plate 256, Figs 1-51

Basionym: *Synedra palea* Kützing 1844
Morphometry (Bicho, Ave River) (n=16): Length = 21.3-36.3 µm; width = 3.3-4.5 µm; 10-13 fibulae/10 µm
Morphometry (Xarrama River) (n=14): Length = 20.2-36.3 µm; width = 4.3-5.3 µm; 9-13 fibulae/10 µm
Morphometry (Boidobra, Corges Stream) (n=20): Length = 20.7-36.0 µm; width = 3.4-3.7 µm; 10-14 fibulae/10 µm
SPI: S = 1.0; V = 3.0

***Nitzschia paleacea* Grunow in Van Heurck 1881**, pl. 68, figs 9-10 **[NPAE]**

Plate 257, Figs 1-20

Morphometry (Monte Novo reservoir, Degebe River) (n=20): Length = 19.0-41.3 µm; width = 2.0-3.0 µm; 16-18 fibulae/10 µm
SPI: S = 2.5; V = 1.0

***Nitzschia* cf. *rectiformis* Hustedt 1943**, p. 229; figs 49-52

Plate 258, Figs 12-26

Morphometry (Sabugueiro, Fervença Stream) (n=15): Length = 32.7-44.3 µm; width = 3.7-4.7 µm; 7-8 fibulae/10 µm
SPI: S = 3.0; V = 2.0

***Nitzschia supralitorea* Lange-Bertalot 1979**, p. 215; figs 25-27, 76-78 **[NZSU]**

Plate 255, Figs 1-30

Morphometry (Safareja Stream) (n=18): Length = 12.0-19.1 µm; width = 3.0-3.3 µm; 26-28 striae/10 µm; 14 fibulae/10 µm
Morphometry (Peramanca Stream) (n=10): Length = 14.7-19.1 µm; width = 3.0-3.7 µm; 26 striae/10 µm; 14 fibulae/10 µm
SPI: S = 1.5; V = 2.0

***Nitzschia tabellaria* (Grunow) Grunow in Cleve & Grunow 1880**, p. 82 **[NTAB]**

Plate 257, Figs 38-47

Basionym: *Denticula tabellaria* Grunow 1862
Nomenclatural synonym: *Nitzschia sinuata* var. *tabellaria* (Grunow) Grunow in Van Heurck 1881
Morphometry (Junqueira, Maçãs River) (n=10): Length = 19.7-22.7 µm; width = 6.7-7.3 µm; 22 striae/10 µm; 8 fibulae /10 µm
SPI: S = 5.0; V = 2.0

***Nitzschia valdestriata* Aleem & Hustedt 1951**, p. 19; figs 5 a-b **[NIVA]**

Plate 252, Figs 72-100; Plate 253, Figs 1-3

Morphometry (Lanheses, Lima River) (n=29): Length = 4.5-11.3 µm; width = 2.1-2.2 µm; 16 striae/10 µm; 9-10 fibulae/10 µm
SPI: S = 2.0; V = 2.0

***Nitzschia vitrea* var. *salinarum* Grunow 1880**, p. 94 **[NVSA]**

Plate 262, Figs 15-25

Morphometry (Guadiana-Caia, Guadiana River) (n=11): Length = 33.7-42.7 µm; width = 5.3-6.7 µm; 24 striae/10 µm; 9 fibulae /10 µm
SPI: S = 2.0; V = 3.0

***Nitzschia* sp.1**

Plate 248, Figs 1-23; Plate 249, Figs 1-3

Morphometry (Amieira, Tagus River) (n=23): Length = 5.0-12.7 µm; width = 2.6-3.0 µm; 27-29 striae/10 µm; 13-14 fibulae/10 µm
SPI: S = - ; V = -

***Nitzschia* sp.2**

Plate 252, Figs 1-71

Morphometry (Alfundão Stream, Sado basin) (n=21): Length = 6.6-13.5µm; width = 2.5-3.3µm; 27-30 striae/10 µm; 13-17 fibulae /10 µm
Morphometry (Safara Stream, Guadiana basin) (n=14): Length = 5.5-12µm; width = 2.7-3.2µm; 27 striae/10 µm; 14-18 fibulae /10 µm
Morphometry (Azambuja Stream, Guadiana basin) (n=15): Length = 6.3-16µm; width = 2.6-3.3µm; 24-27 striae/10 µm; 14-17 fibulae /10 µm
Morphometry (Xarrama River, Sado basin) (n=19): Length = 5.6-13.3µm; width = 2.8-3.5µm; 30 striae/10 µm; 14-16 fibulae /10 µm
SPI: S = - ; V = -

***Nitzschia* sp.3**

Plate 252, Figs 101-117; Plate 254, Figs 1-7

Basionym: *Nitzschia frustulum* var. *bryophila* Hustedt 1937
Morphometry (Campinho, Aravil River) (n=17): Length = 12-16 µm; width = 2.2-2.5 µm; 26-28 striae/10 µm; 8-10 fibulae/10 µm
SPI: S = 3.8; V = 1.0

Genus ***Tryblionella*** W. Smith 1853

***Tryblionella debilis* Arnott ex O'Meara 1873**, p. 310 **[TDEB]**

Plate 263, Figs 21-25

Nomenclatural synonyms: *Nitzschia debilis* (Arnott in O'Meara) Grunow in Cleve & Grunow 1880; *Nitzschia tryblionella* var. *debilis* (Arnott) Hustedt 1913
Morphometry (Guadiana-Caia, Guadiana River) (n=5): Length = 15.7-17.3 µm; width = 7.0-7.3 µm; 18 striae/10 µm
SPI: S = 2.0; V = 2.0

***Tryblionella hungarica* (Grunow) D.G. Mann in Round, Crawford & Mann 1990**, p. 678 **[THUN]**

Plate 263, Figs 1-20

Basionym: *Nitzschia hungarica* Grunow 1862
Morphometry (Arrouquelas, Lebre Stream) (n=10): Length = 38.7-65.3 µm; width = 5.3-7.0 µm; 16-17 striae/10 µm; 9-11 fibulae/10 µm
Morphometry (Prata Stream) (n=10): Length = 35.7-64.3 µm; width = 5.3-7.0 µm; 15-17 striae/10 µm; 10-12 fibulae/10 µm
SPI: S = 2.2; V = 2.0

***Tryblionella salinarum* (Grunow in Cleve & Grunow) Pelletan 1889**, p. 30

Plate 258, Figs 27-33

Basionym: *Nitzschia tryblionella* var. *salinarum* Grunow in Cleve & Grunow 1880
Nomenclatural synonym: *Nitzschia levidensis* (W. Smith) Grunow var. *salinarum* Grunow in Van Heurck 1881
Morphometry (Peramanca Stream) (n=7): Length = 19.7-27.3 µm; width = 7.0-8.0 µm; 11-12 striae/10 µm
SPI: S = 2.0; V = 2.0

Order **Rhopaloidales** D.G. Mann in Round et al. 1990
Family **Rhopalodiaceae** (Karsten) Topachevskyj & Oksiyuk 1960
Genus ***Epithemia*** Kützing 1844

***Epithemia adnata* var. *proboscidea* (Kützing) Hendey 1954** sensu You et al. 2009, p. 402, figs 10-14

Plate 264, Figs 1-11

Basionym: *Epithemia proboscidea* Kützing 1844
Morphometry (Grândola Stream) (n=11): Length = 34.5-88.9 µm; width = 8.5-9.5 µm; 14-16 striae/10 µm
SPI: S = 4.0; V = 3.0

***Epithemia sorex* Kützing 1844**, p. 33; pl. 5/12, figs 5 a-**c [ESOR]**

Plate 265, Figs 5-9

Morphometry (Monte das Águias, Divor Stream) (n=5): Length = 25.4-33.9 µm; width = 7.5-8.5 µm; 13-16 striae/10 µm
SPI: S = 4.0; V = 2.0

***Epithemia turgida* (Ehrenberg) Kützing 1844**, p. 34; pl. 5, fig. 14 **[ETUR]**

Plate 265, Figs 1-4; Plate 266, Figs 1-3

Basionym: *Navicula turgida* Ehrenberg 1830
Morphometry (Grândola Stream) (n=7): Length = 77.7-115.3 µm; width = 12.7-18.3 µm; 7-10 striae/10 µm
SPI: S = 4.2; V = 3.0

Genus ***Rhopalodia*** O. Müller 1895

***Rhopalodia gibba* (Ehrenberg) O. Müller 1895**, p. 65; pl. 1, figs 15-17 **[RGIB]**

Plate 267, Figs 1-9

Basionym: *Navicula gibba* Ehrenberg 1830

Morphometry (Grândola Stream) (n=9): Length = 49.9-118.3 µm; width = 8.1-8.9 µm; 7-8 striae/10 µm
SPI: S = 5.0; V = 3.0

Order **Surirellales** D.G. Mann in Round et al. 1990
Family **Surirellaceae** Kützing 1844
Genus ***Cymatopleura*** W. Smith 1851

***Cymatopleura solea* var. *apiculata* (W. Smith) Ralfs in Pritchard 1861**, p. 793 **[CSAP]**
Plate 268, Figs 1-3

Basionym: *Cymatopleura apiculata* W. Smith 1853
Morphometry (Prata Stream) (n=3): Length = 52.2-64.9 µm; width = 14.3-16.9 µm; 28 striae/10 µm
SPI: S = 4.0; V = 2.0

Genus ***Surirella*** Turpin 1828

***Surirella angusta* Kützing 1844**, p. 61; pl. 30, fig. 52 **[SANG]**
Plate 270, Figs 2-19

Morphometry (Peramanca Stream) (n=10): Length = 21.0-41.7 µm; width = 7.5-9.9 µm
Morphometry (Arrouquelas, Lebre Stream) (n=5): Length = 19.0-26.3 µm; width = 7.1-8.0 µm
SPI: S = ; V:=

***Surirella brebissonii* var. *kuetzingii* Krammer & Lange-Bertalot 1987**, p. 85; figs 52-68 **[SBKU]**
Plate 269, Figs 7-11

Morphometry (Ficalho, Vidigão Stream) (n=5): Length = 16.4-26.0 µm; width = 12.0-17.3 µm; 16-20 striae/10 µm
SPI: S = 4.0; V = 1.0

***Surirella linearis* W. Smith 1853**, p. 31; pl. 8, fig. 58 **[SLIN]**
Plate 270, Fig. 1

Morphometry (Outeiro das Cabras, Âncora River) (n=1): Length = 58.3 µm; width = 16.9 µm
SPI: S = 5.0; V = 2.0

***Surirella ovalis* Brébisson 1838**, p. 17 **[SOVI]**
Plate 268, Figs 4-7; Plate 269, Figs 1-6; Plate 271, Figs 1-4

Morphometry (Prata Stream) (n=3): Length = 34.7-53.7 µm; width = 17.3-28.2 µm; 15-17 striae/10 µm
Morphometry (Arrouquelas, Lebre Stream) (n=6): Length = 26.9-41.5 µm; width = 16.9-24.7 µm; 16-17 striae/10 µm
SPI: S = 2.0; V = 2.0

***Surirella roba* Leclercq 1983**, p. 495; figs 1(2-6), 2(2-8), 3(1-6) **[SRBA]**
Plate 270, Figs 20-28

Morphometry (Outeiro das Cabras, Âncora River) (n=9): Length = 24.9-41.1 µm; width = 7.9-8.5 µm
SPI: S = 5.0; V = 3.0

Iconographic atlas:
LM and SEM Plates

Plate 1

LM: x1500

Figs 1-14: *Actinocyclus normanii* (Gregory ex Greville) Hustedt, p. 7 [ANMN]

Scale bar = 10 μm

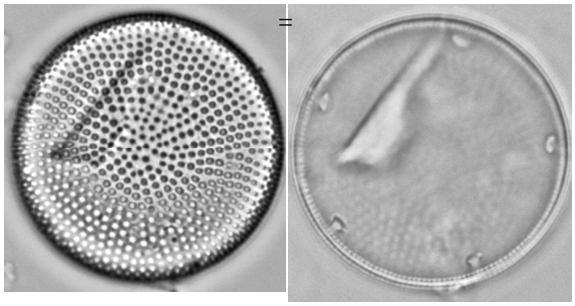
Figs 1-4: Belver Reservoir, Tejo River (Tejo basin), 11-07-2006.

Figs 5-14: Fratel Reservoir, Tejo River (Tejo basin), 12-07-2006.

Figs 1-3, 5-14: Valve view.

Fig. 4: Girdle view.

Actinocyclus



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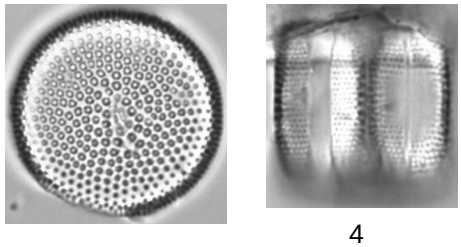

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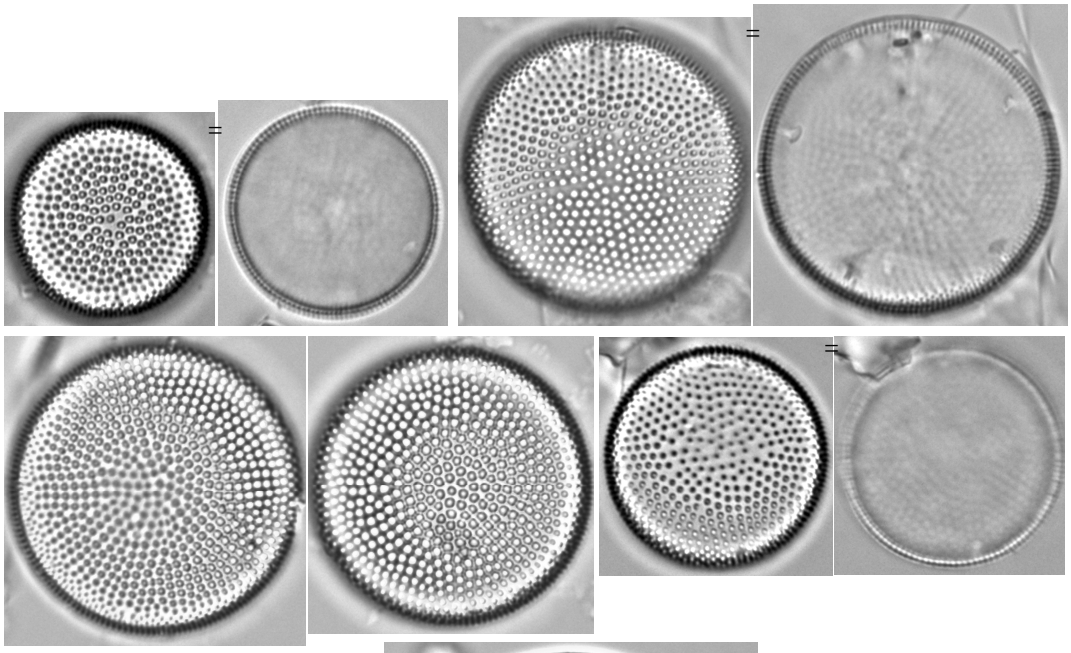
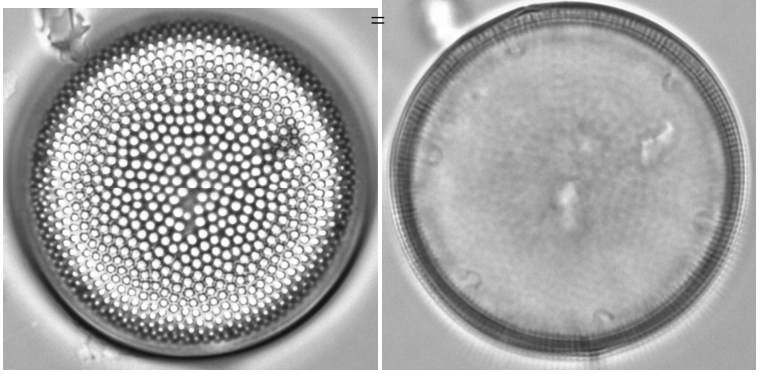




5 - 14

Plate 2

Figs 1-4: *Actinocyclus normanii* (Gregory ex Greville) Hustedt, p. 7 [ANMN]

Scale bars = 2 μm

Figs 1-4: Fratel Reservoir, Tejo River (Tejo basin), 12-07-2006.

Fig. 1: External valve view.

Fig. 2 Internal valve view.

Figs 3, 4: Detail of internal view with marginal labiate process with long internal tube and one strutted process.

Actinocyclus

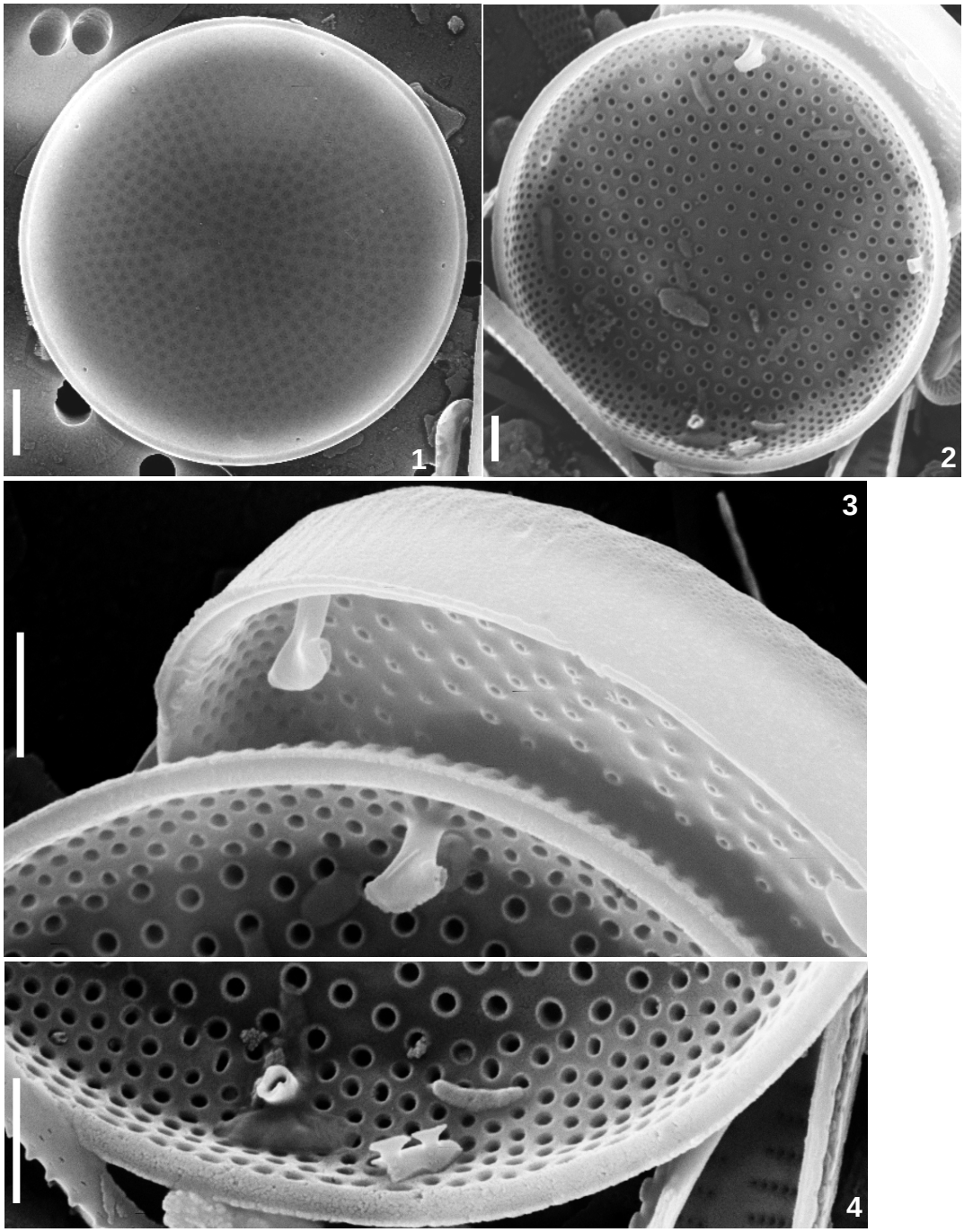


Plate 3

LM: x1500

Figs 1-21: *Melosira varians* C. Agardh, p. 7 [MVAR]

Scale bar = 10 μm

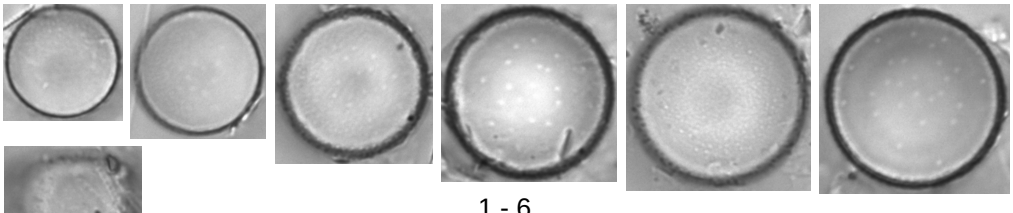
Figs 1-13: Monte Novo Reservoir, Degebe River (Guadiana basin), 02-02-2006.

Figs 14-21: Pereira, Arão Stream (Ribeiras do Algarve basin), 06-05-2006.

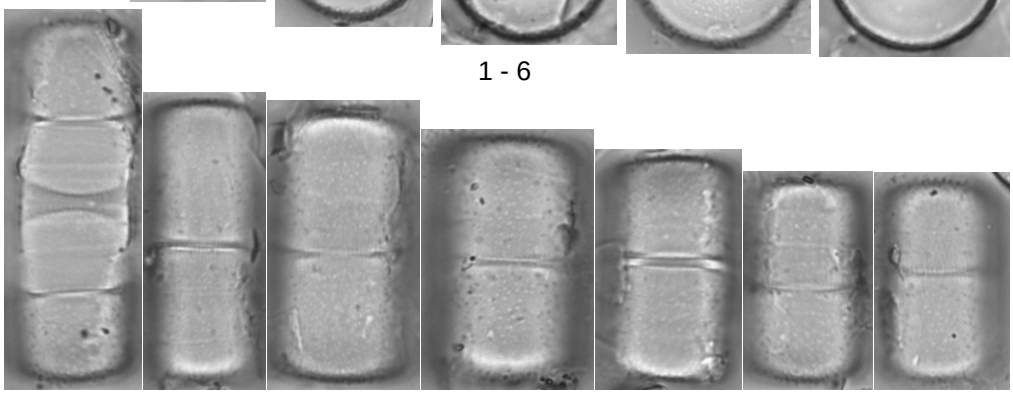
Figs 1-6, 14-17: Valve view.

Figs 7-13, 18-21: Girdle view.

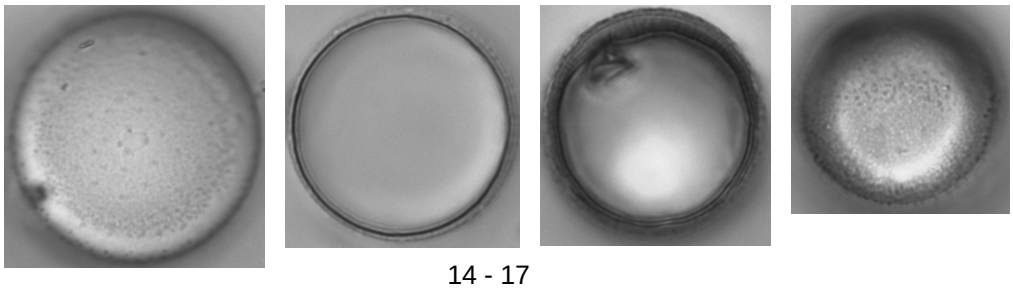
Melosira



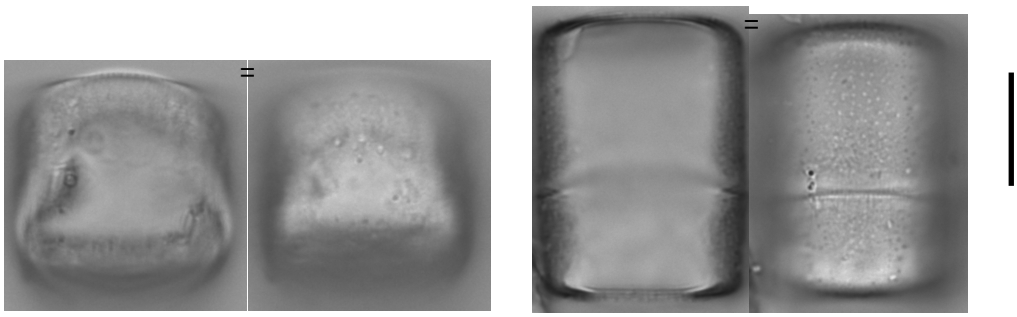
1 - 6



7 - 13



14 - 17



18 - 21

Plate 4

LM: x1500

Figs 1-7: *Aulacoseira subarctica* (O. Müller) Haworth, p. 8 [AUSU]

Figs 8-15: *Aulacoseira pusilla* (Meister) Tuji & Houki, p. 8 [AUPU]

Figs 16-29: *Aulacoseira ambigua* f. *japonica* Tuji & D.M. Williams, p. 8

Figs 30-32: *Aulacoseira granulata* var. *angustissima* (O. Müller) Simonsen, p. 8 [AUGA]

Figs 33-38, 39-40 (?) : *Aulacoseira granulata* (Ehr.) Simonsen, p. 8 [AUGR]

Scale bar = 10 μm

Figs 1-15: Senra, Lima River (Lima basin), 27-09-2007.

Figs 16-19, 33-38: Fratel Reservoir, Tejo River (Tejo basin), 12-07-2006.

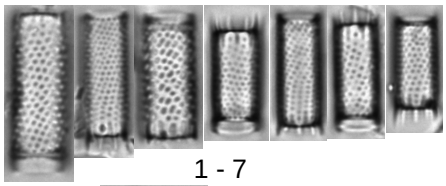
Figs 20-29, 39, 40: Belver Reservoir, Tejo River (Tejo basin), 11-07-2006.

Figs 30-32: Marateca Reservoir, Ocreza River (Tejo basin), 16-11-2006.

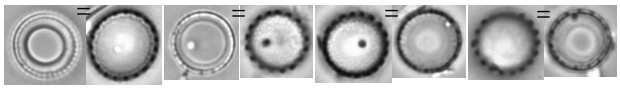
Figs 8-15: Valve view.

Figs 1-7, 16-40: Girdle view.

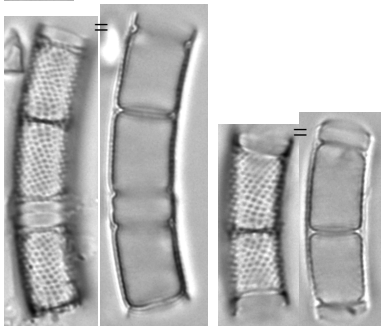
Aulacoseira



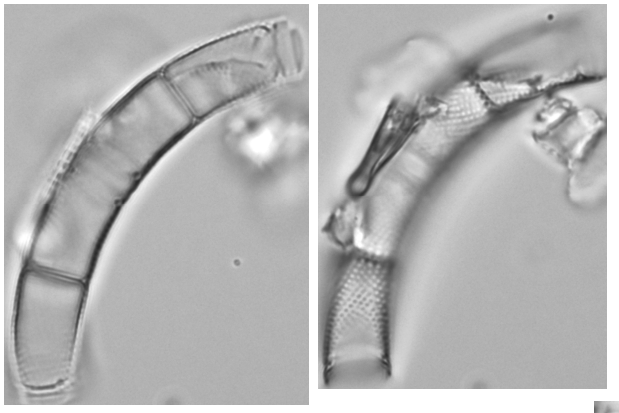
1 - 7



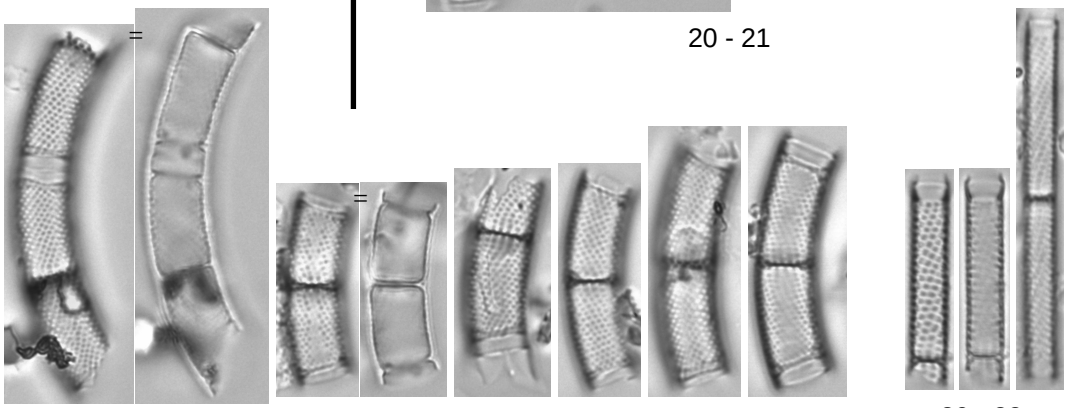
8 - 15



16 - 19

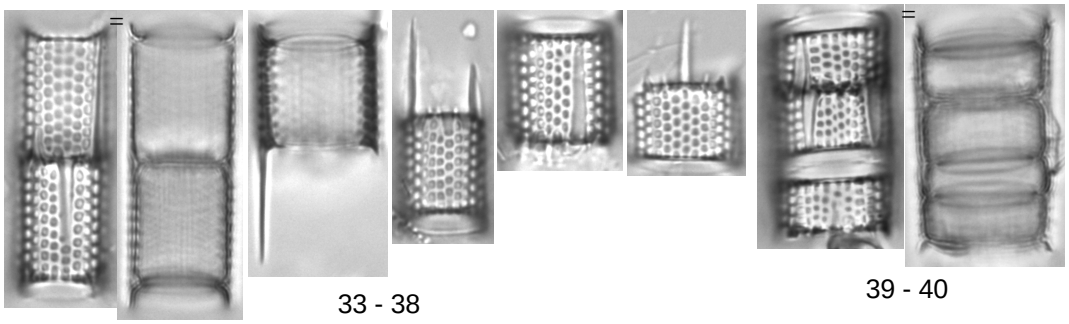


20 - 21



22 - 29

30 - 32



33 - 38

39 - 40

Plate 5

Figs 1-3: *Aulacoseira subarctica* (O. Müller) Haworth, p. 8 [AUSU]

Figs 4-6: *Aulacoseira pusilla* (Meister) Tuji & Houki, p. 8 [AUPU]

Scale bars = 1 μm

Figs 1-6: Senra, Lima River (Lima basin), 27-09-2007.

Figs 1, 2, 3, 6: External girdle view.

Fig. 4: Internal valve view.

Fig. 5: External oblique view.

Aulacoseira

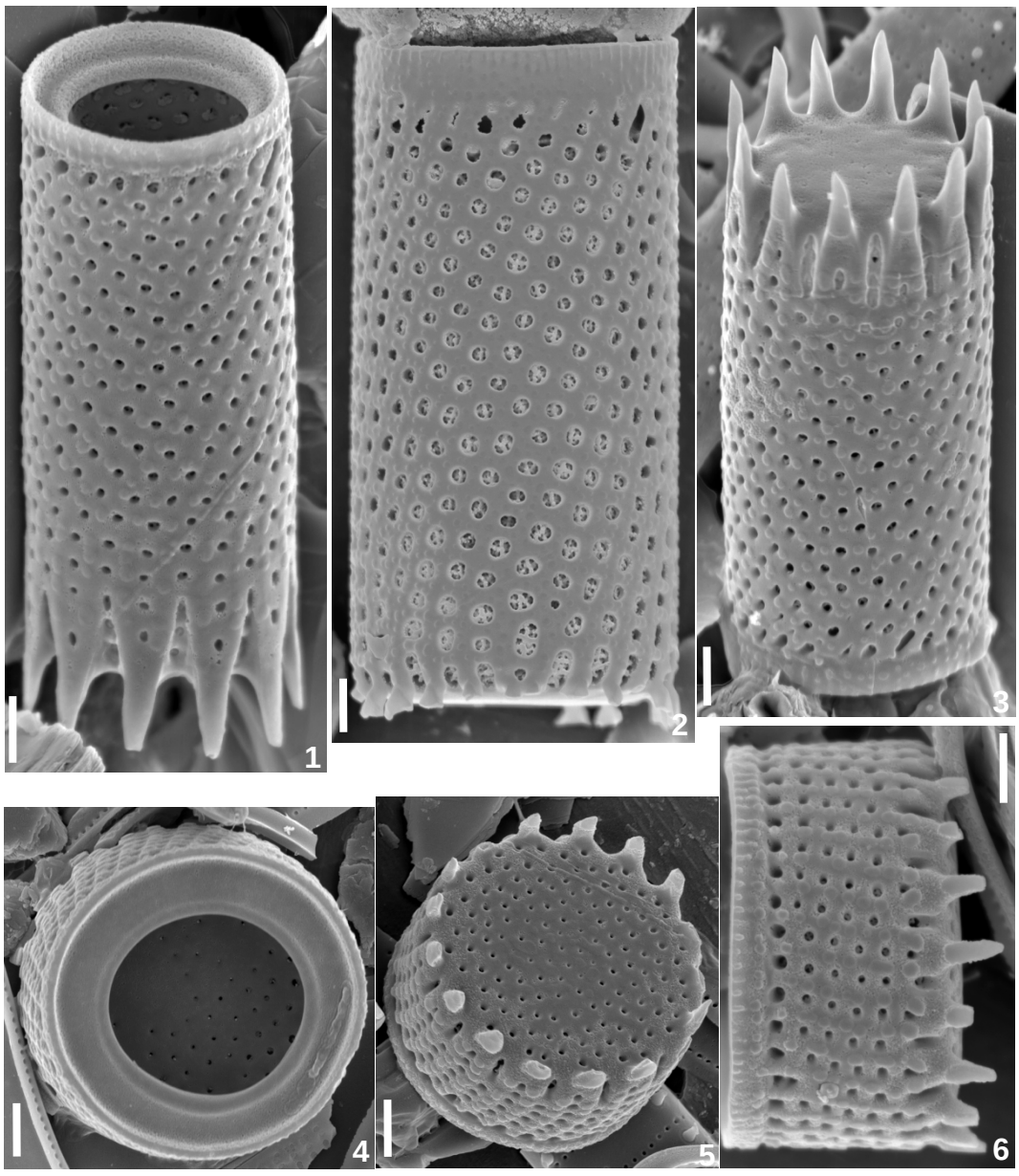


Plate 6

LM: x1500

Figs 1-22: *Aulacoseira pusilla* (Meister) Tuji & Houki, p. 8 [AUPU]

Figs 23-44: *Aulacoseira tenella* (Nygaard) Simonsen, p. 8 [AUTL]

Figs 45-70: *Aulacoseira ambigua* (Grunow) Simonsen, p. 7 [AAMB]

Scale bar = 10 μm

Figs 1-16: Casal Rei, Zêzere River (Tejo basin), 26-06-2006.

Figs 17-22: Marateca Reservoir, Ocreza River (Tejo basin), 16-11-2006.

Figs 23-32: Meimoa Reservoir, Meimoa Stream (Tejo basin), 23-02-2006.

Figs 33-44: Santa Luzia Reservoir, Unhais River (Tejo basin), 10-05-2006.

Figs 45-58: Meimoa Reservoir, Meimoa Stream (Tejo basin), 23-02-2006.

Figs 59-70: Caia, Guadiana River (Guadiana basin), 20-06-2006.

Figs 9-16, 19-27, 33-40: Valve view.

Figs 1-8, 17, 18, 28-32, 41-70: Girdle view.

Aulacoseira

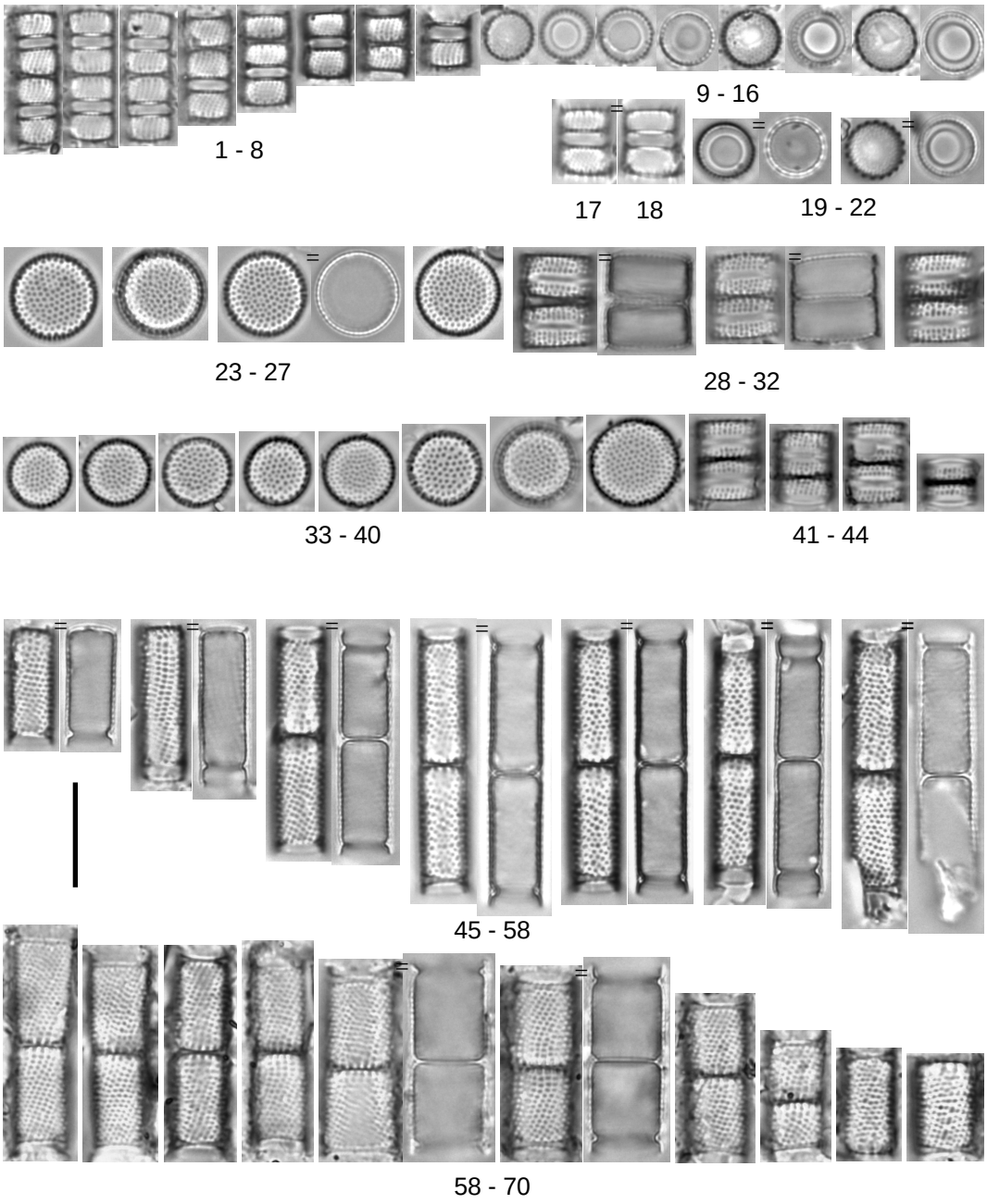


Plate 7

Figs 1-6: *Aulacoseira tenella* (Nygaard) Simonsen, p. 8 [AUTL]

Scale bars = 1 μm

Figs 1-6: Meimoa Reservoir, Meimoa Stream (Tejo basin), 23-02-2006.

Fig. 1: Internal valve view.

Figs 2, 3: External valve view.

Fig. 4: Internal valve view oblique.

Figs 5, 6: External girdle view.

Aulacoseira

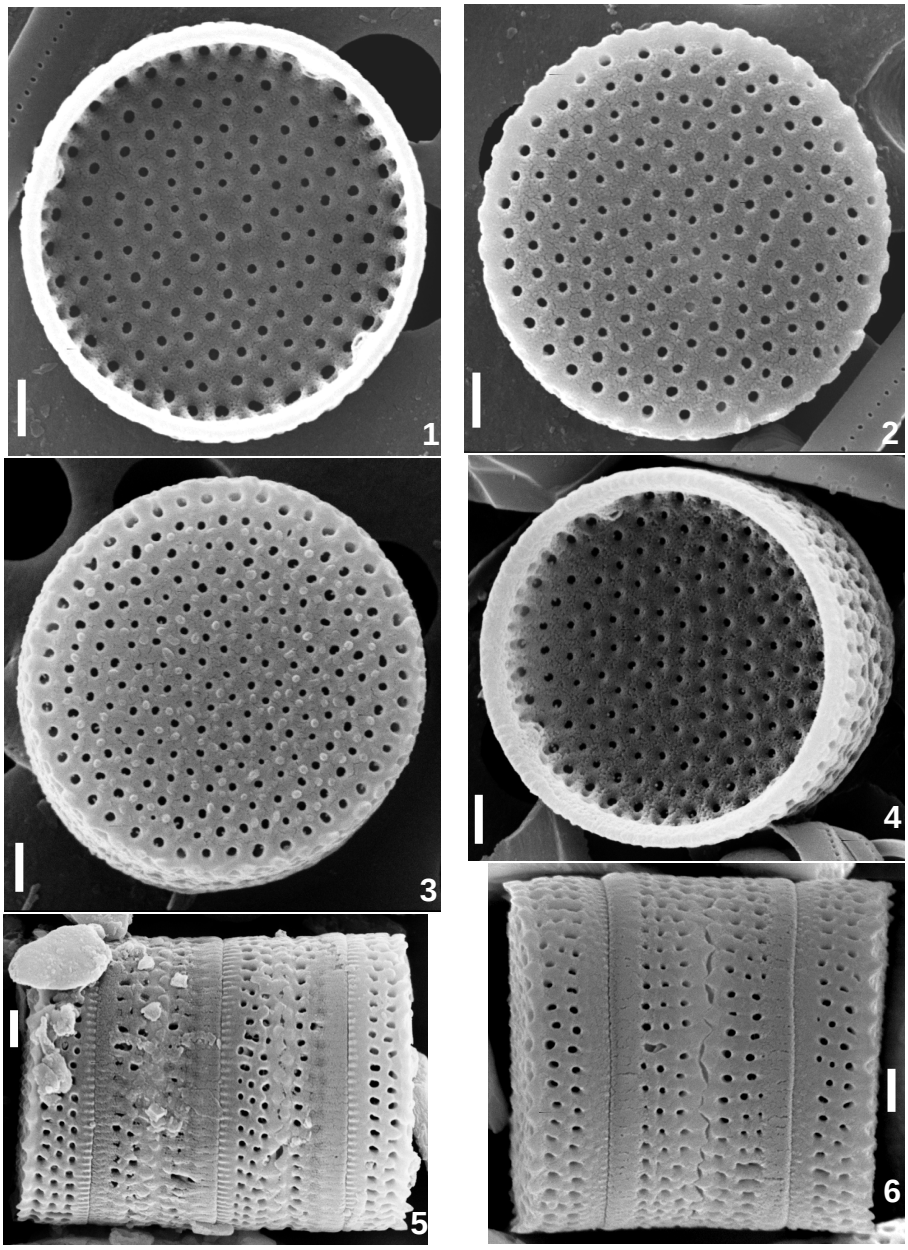


Plate 8

Figs 1-4: *Aulacoseira tenella* (Nygaard) Simonsen, p. 8 [AUTL]

Scale bars = 1 μm

Figs 1-4: Santa Luzia Reservoir, Unhais River (Tejo basin), 10-05-2006.

Figs 1, 2: External valve view.

Fig. 3: External girdle view.

Fig. 4: Internal valve view.

Aulacoseira

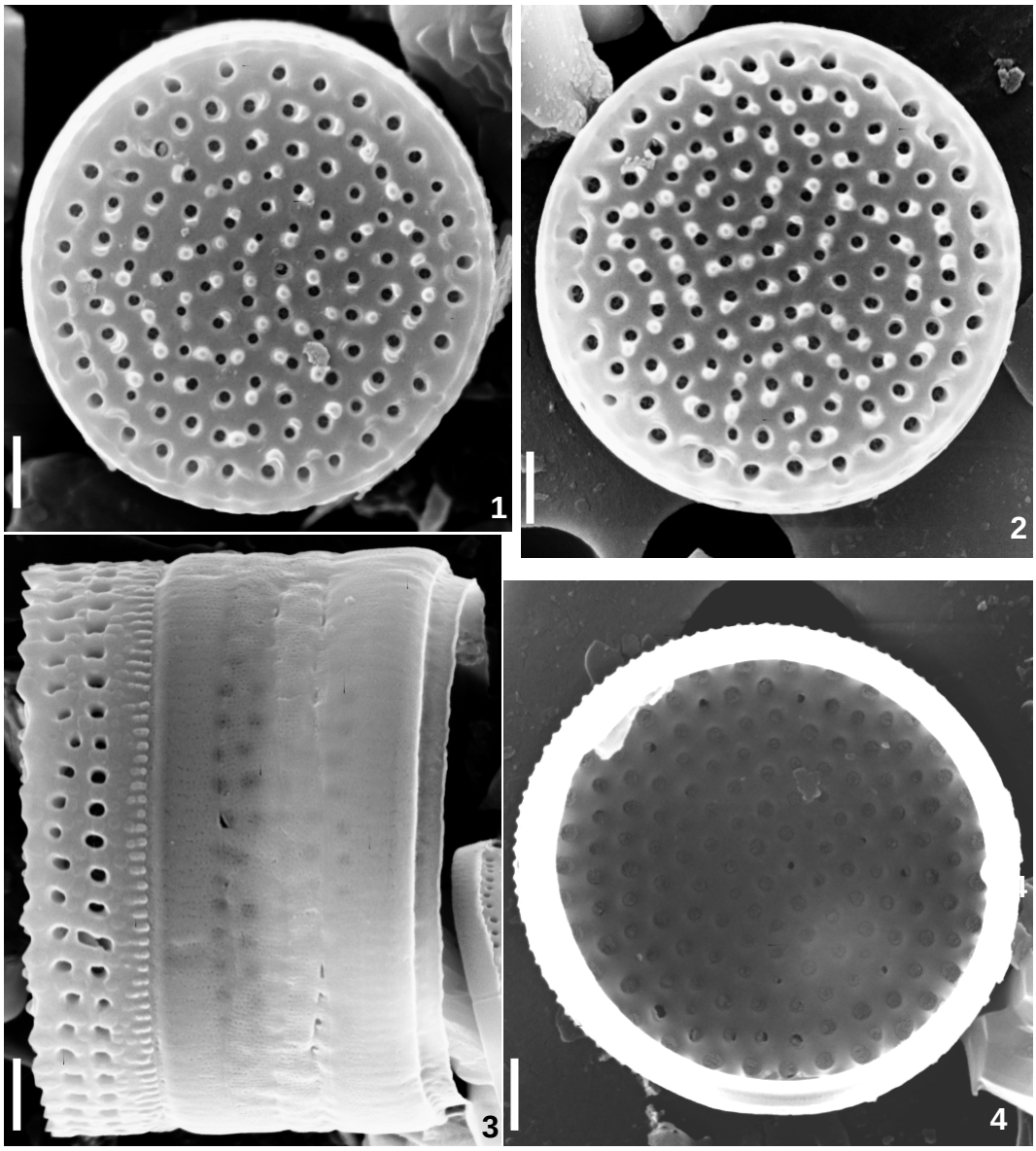


Plate 9

Figs 1-5: *Aulacoseira ambigua* (Grunow) Simonsen, p. 7 [AAMB]

Scale bars = 1 μm

Figs 1-5: Meimoa Reservoir, Meimoa Stream (Tejo basin), 23-02-2006.

Figs 1-5: External girdle view.

Fig. 1: Detail of separating spines.

Fig. 2: Detail of linking spines.

Aulacoseira

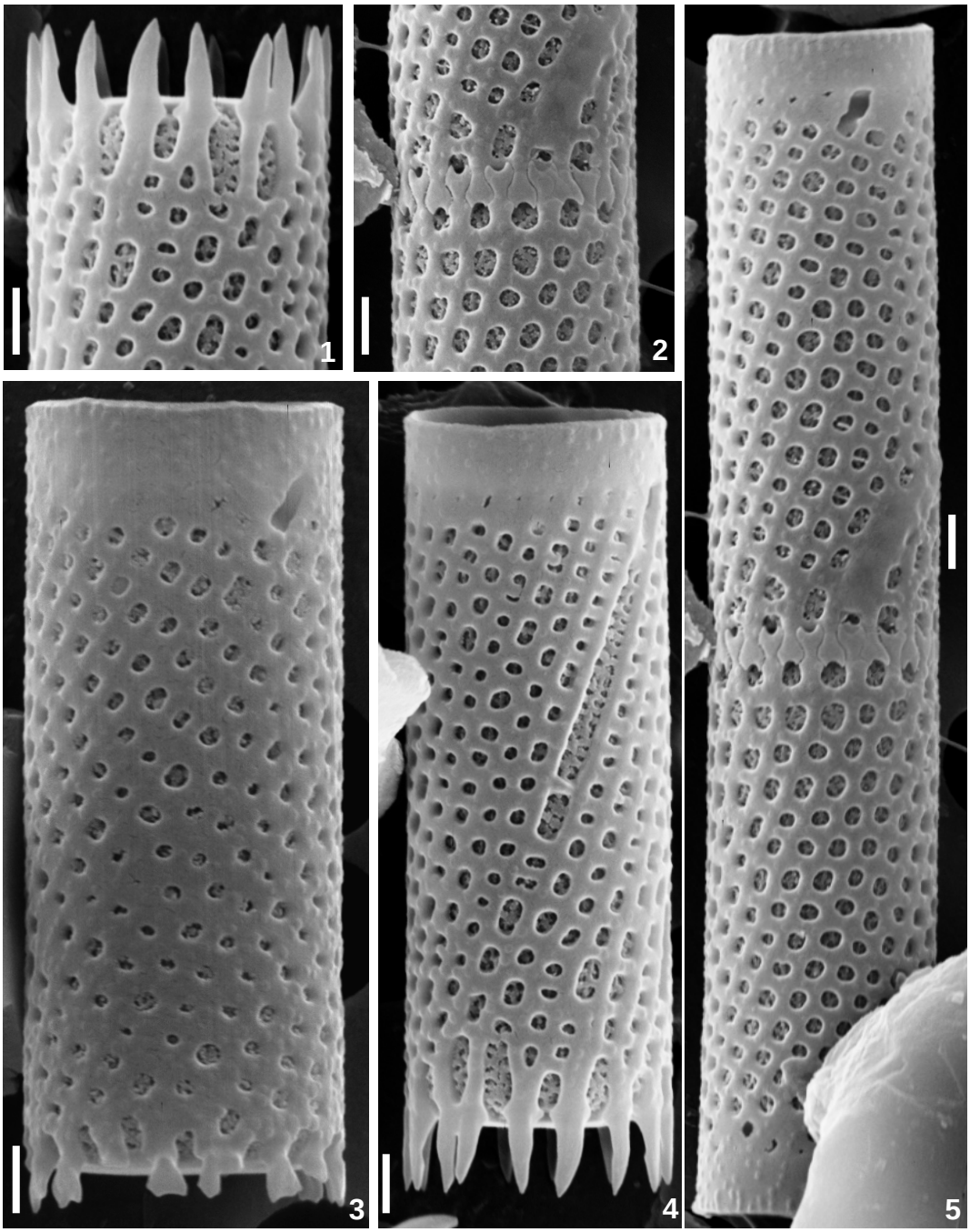


Plate 10

LM: x1500

Figs 1-6: *Cyclotella radiosa* (Grunow) Lemmermann, p. 9 [CRAD]

Figs 7-22: *Cyclotella meneghiniana* Kützing, p. 9 [CMEN]

Figs 23-30: *Cyclotella distinguenda* Hustedt, p. 9 [CDTG**]**

Figs 31-41: *Cyclotella ocellata* Pantocsek, p. 9 [COCE]

Figs 42-62: *Cyclotella atomus* Hustedt, p. 9 [CATO]

Scale bar = 10 μm

Figs 1-6: Bemposta, Douro River (Douro basin), 14-09-2007.

Figs 7-22: Peramanca Stream (Sado basin), 05-04-2006.

Figs 23-30: Assamaça, Valmar Stream (Mondego basin), 10-06-2007.

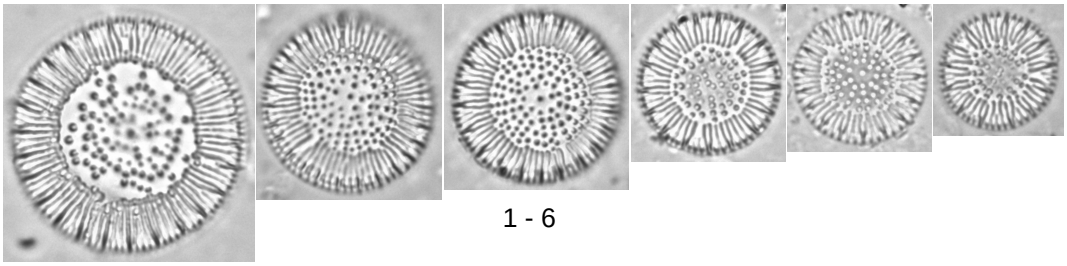
Figs 31-41: Odeleite Reservoir, Odeleite Stream (Ribeiras do Algarve basin), 27-07-2006.

Figs 42-62: Sabor River (Douro basin), 11-08-2007.

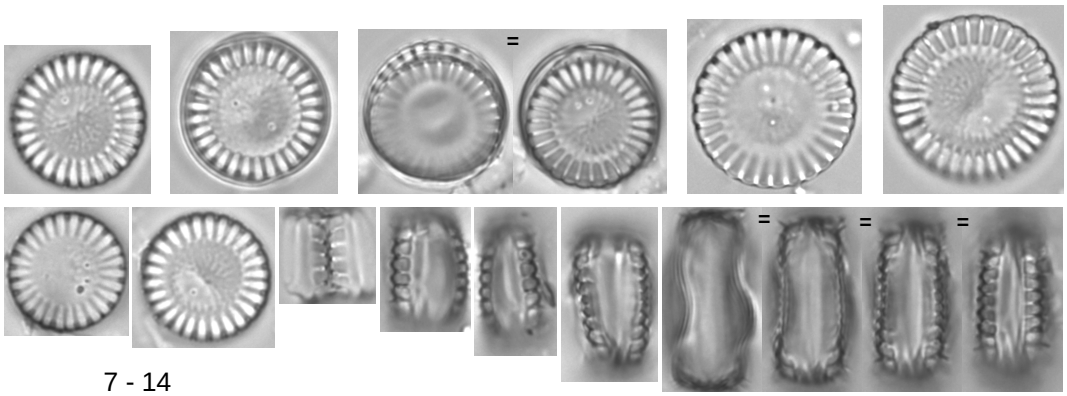
Figs 1-14, 23-62: Valve view.

Figs 15-22: Girdle view.

Cyclotella

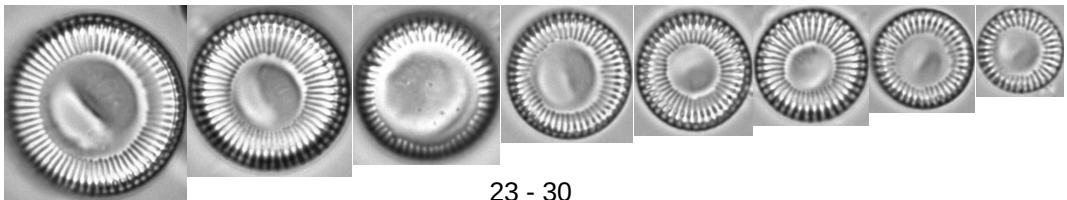


1 - 6

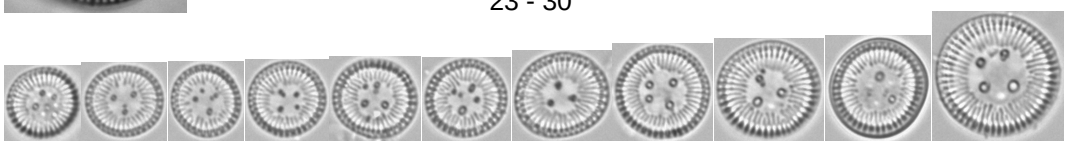


7 - 14

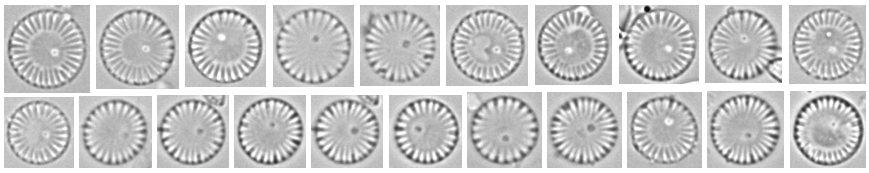
15 - 22



23 - 30



31 - 41



42 - 62

Plate 11

Figs 1-5: *Cyclotella ocellata* Pantocsek, p. 9 [COCE]

Scale bars = 2 μm

Figs 1-5: Odeleite Reservoir, Odeleite Stream (Ribeiras do Algarve basin), 27-07-2006.

Fig. 1: External valve view.

Fig. 2: Internal valve view.

Fig. 3: External oblique view.

Fig. 4: External view of a small valve, with papillae.

Fig. 5: Detail of internal view with the fultoportulae with two satellite pores (1) and the labium of the rimoportula (2).

Cyclotella

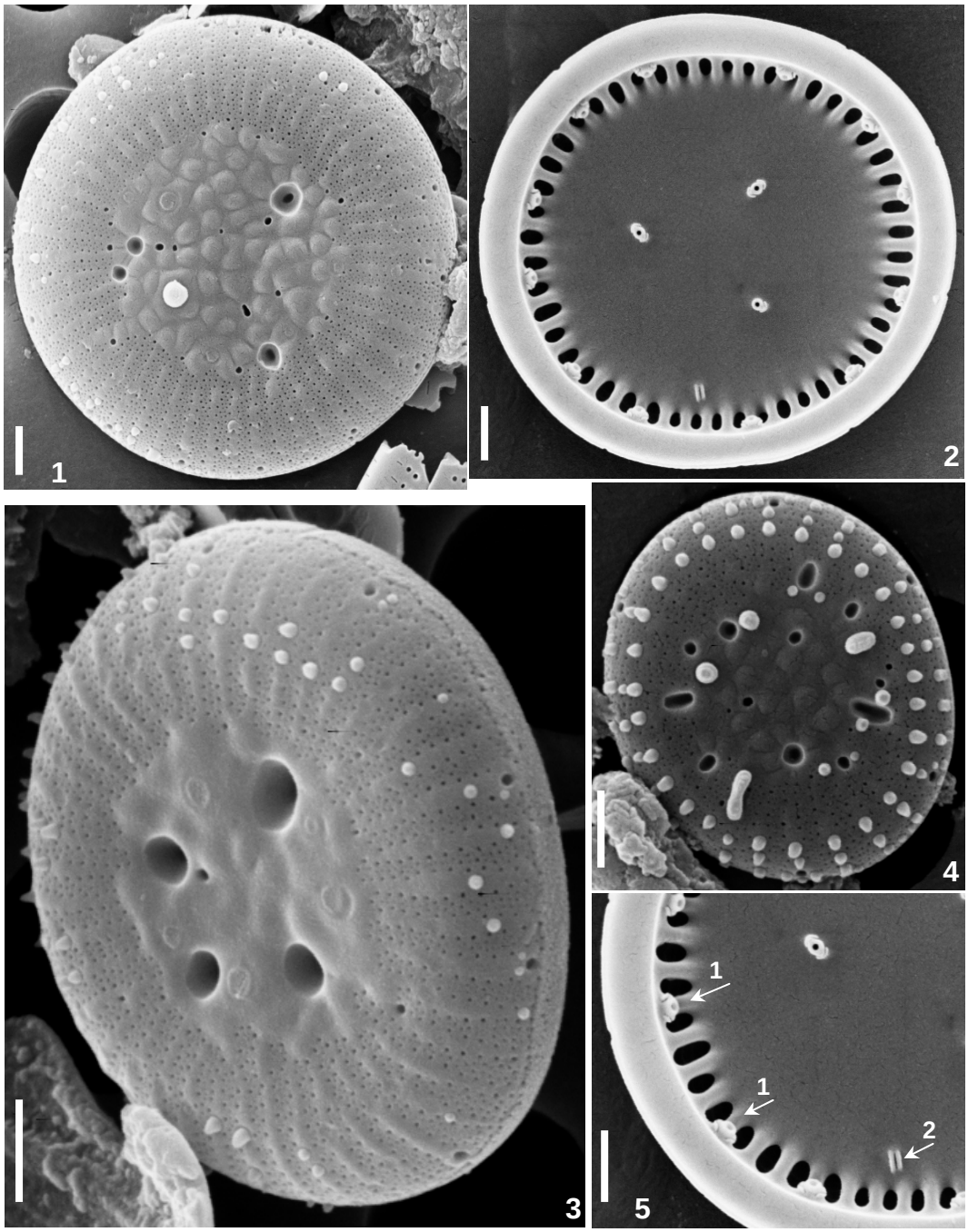


Plate 12

LM: x1500

Figs 1-18: *Discostella stelligera* (Cleve & Grunow) Houk & Klee, p. 10 [DSTE]

Figs 19-42: *Discostella* sp., p. 10

Figs 43-56: *Cyclostephanos dubius* (Fricke) Round, p. 9 [CDUB]

Figs 57-65: *Cyclostephanos delicatus* (Genkal) Kling & Håkansson, p. 9 [CSDE]

Figs 66-80: *Cyclostephanos invisitatus* (Hohn & Hellerman) Theriot, Stoermer & Håkansson, p. 9 [CINV]

Scale bar = 10 μm

Figs 1-8: Meimoa Reservoir, Meimoa Stream (Tejo basin), 23-02-2006.

Figs 9-18: Santa Luzia Reservoir, Pampilhosa Stream (Tejo basin), 10-05-2006.

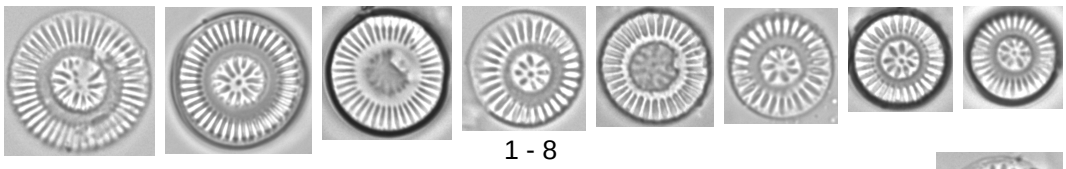
Figs 19-56, 73-80: Alcáçovas Stream (Sado basin), 15-05-2006.

Figs 57-72: Valverde, São Brissos Stream (Sado basin), 15-05-2006.

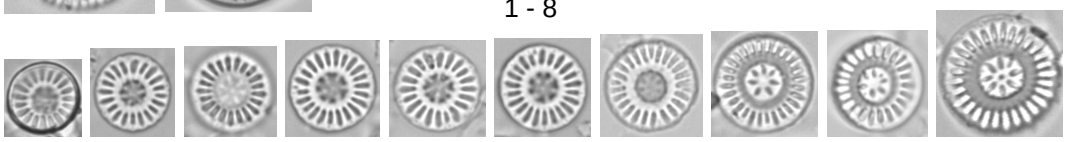
Figs 1-18, 22-63, 66-80: Valve view.

Figs 19, 20, 21, 64, 65: Girdle view.

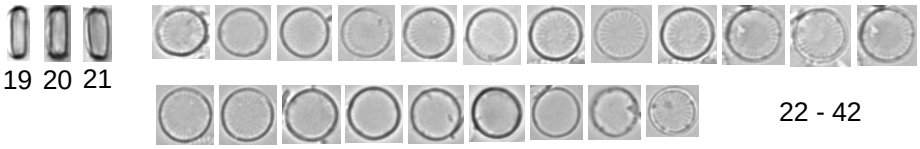
Discostella
Cyclostephanos



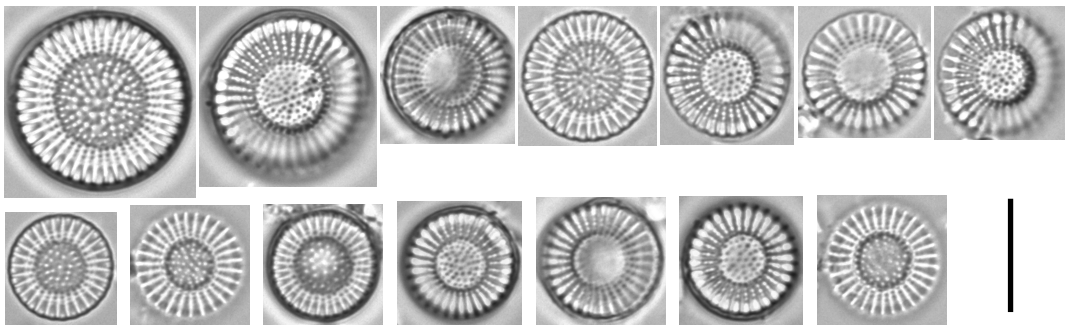
1 - 8



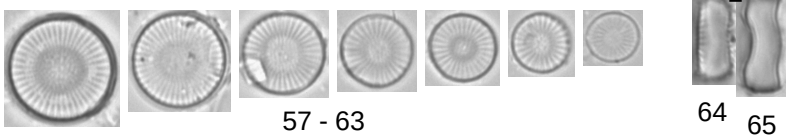
9 - 18



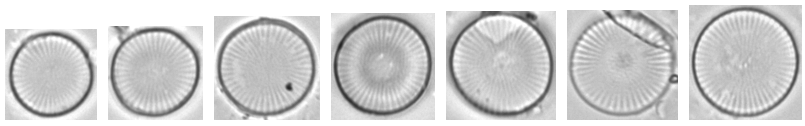
19 20 21 22 - 42



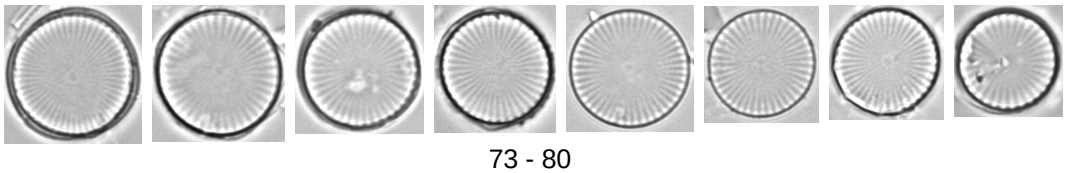
43 - 56



57 - 63 64 65



66 - 72



73 - 80

Plate 13

Figs 1-6: *Discostella stelligera* (Cleve & Grunow) Houk & Klee, p. 10 [DSTE]

Scale bars = 1 μm

Figs 1-6: Meimoa Reservoir, Meimoa Stream (Tejo basin), 23-02-2006.

Fig. 1: External valve view.

Figs 2, 5: Internal valve view.

Fig. 3: Detail of internal view with the fultoportulae with two satellite pores .

Figs 4, 6: Detail of external view.

Discostella

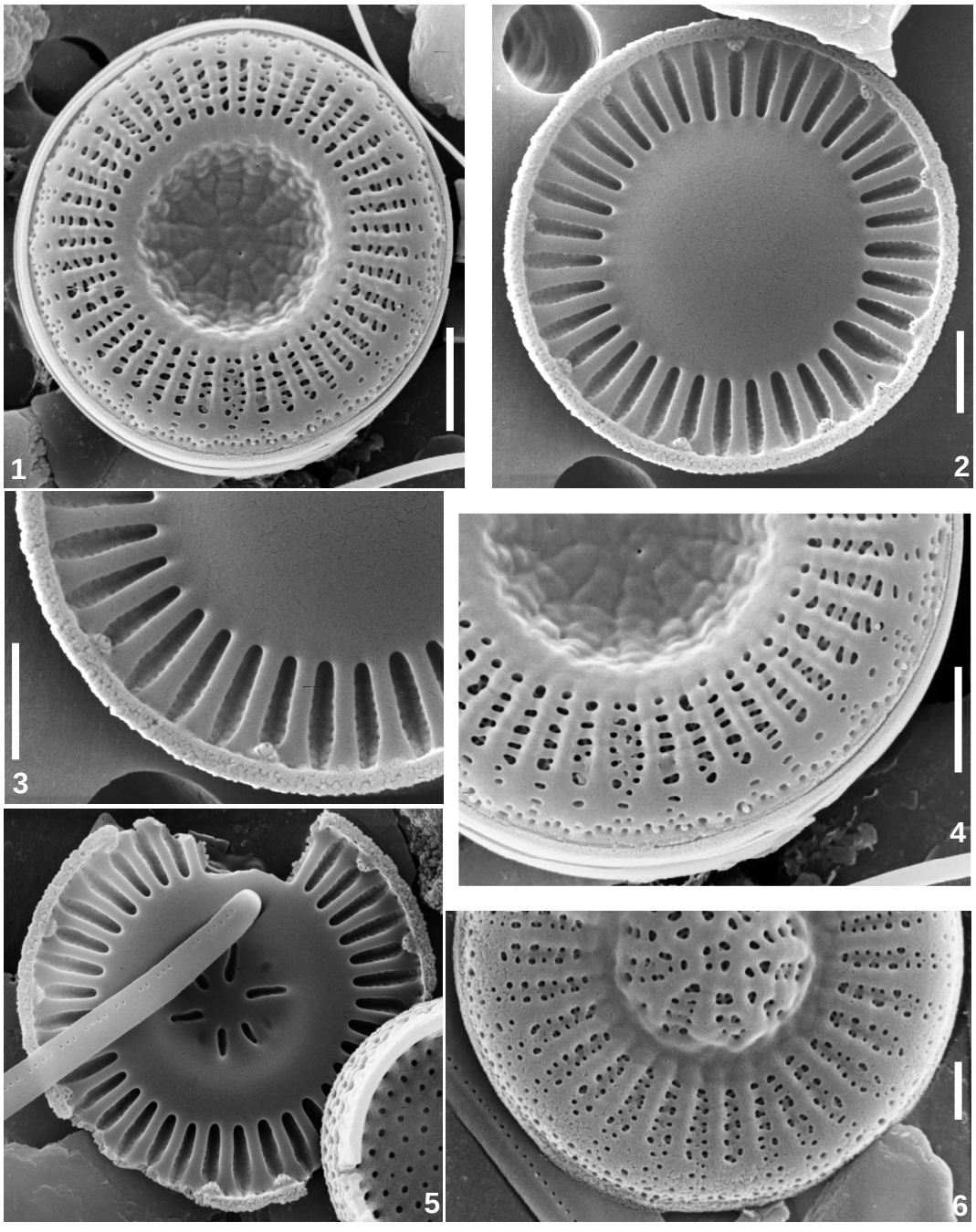


Plate 14

LM: x1500

Figs 1-13: *Stephanodiscus neoastraea* Håkansson & Hickel, p. 10 [SNEO]

Figs 14-20: *Stephanodiscus hantzschii* Grunow, p. 10 [SHAN]

Figs 21-30: *Stephanodiscus vestibulis* Håkansson, Theriot & Stoermer, p. 10 [SVES]

Scale bar = 10 μm

Figs 1-20: Bemposta, Douro River (Douro basin), 14-09-2007.

Figs 21-30: Alcáçovas Stream (Sado basin), 15-05-2006.

Figs 1-30: Valve view.