

**Table S1:** Presence on the different sampled substrates of the 208 taxa used in the statistical analysis.

Taxa/Substrates	Algae	Eelgrass	Algae on rock	Rock	Sediment	Sand	Barnacle	Shell	Wood	Metal	Styrofoam
<i>Achnanthes brevipes</i> var. <i>intermedia</i>	x		x	x			x	x	x	x	
<i>Achnanthes brevipes</i> var. <i>intermedia</i> shape 2				x							
<i>Achnanthes</i> cf. <i>kuwaitensis</i>	x		x	x			x	x	x		x
<i>Achnanthes</i> cf. <i>kuwaitensis</i> shape 2	x			x							
<i>Achnanthes</i> cf. <i>punctulata</i>		x					x	x			
<i>Achnanthes</i> cf. <i>ricula</i>	x			x	x	x		x	x		x
<i>Achnanthes delicatula</i> subsp. <i>septentrionalis</i>				x	x						x
<i>Achnanthes minuscula</i>	x	x	x	x	x	x	x	x			
<i>Achnanthes nitidiformis</i>				x				x			
<i>Achnanthes</i> sp. 23					x			x			x
<i>Achnanthes</i> sp. 61	x			x		x	x	x	x		
<i>Achnanthes</i> sp. 67	x	x				x					
<i>Achnanthes</i> sp. 76					x	x					
<i>Achnanthidium minutissimum</i>				x			x				
<i>Amphora</i> cf. <i>inariensis</i>		x									
<i>Amphora holsatica</i>				x							
<i>Amphora</i> sp. 12								x			
<i>Amphora</i> sp. 7								x			

<i>Amphora</i> sp. 8				x	x	x		x			
<i>Astartiella bremeyeri</i>	x			x	x				x		x
<i>Astartiella</i> sp. 149	x	x			x	x		x			
<i>Aulacoseira</i> sp. 2				x							
<i>Aulacoseira</i> sp. 3				x				x			
<i>Bacillaria paxillifera</i>	x							x		x	
<i>Berkeleya rutilans</i>		x	x	x	x		x	x	x	x	x
<i>Chaetoceros</i> sp. 3	x	x		x	x			x			
<i>Cocconeis costata</i>	x	x	x	x	x		x	x	x	x	x
<i>Cocconeis neothumensis</i>	x	x	x	x	x	x	x		x		x
<i>Cocconeis peltoidea</i>	x			x						x	
<i>Cocconeis placentula</i> shape 1	x	x	x	x	x		x	x	x	x	x
<i>Cocconeis placentula</i> shape 2	x			x					x		x
<i>Cocconeis placentula</i> var. <i>euglypta</i>	x	x	x	x	x	x	x	x	x	x	x
<i>Cocconeis placentula</i> var. <i>euglypta</i> shape 2	x		x								
<i>Cocconeis scutellum</i>	x	x	x	x	x	x	x	x	x	x	x
<i>Cocconeis scutellum</i> shape 2	x	x	x	x	x			x			x
<i>Cocconeis scutellum</i> var. <i>parva</i>	x	x	x	x	x		x	x	x	x	x
<i>Cocconeis</i> sp. 16	x			x							
<i>Cocconeis</i> sp. 17		x		x	x				x		x

<i>Cocconeis speciosa</i>	x	x	x	x	x				x		x
<i>Cocconeis stauroneiformis</i>	x	x	x	x	x		x	x	x		x
<i>Ctenophora pulchella</i>	x	x		x	x	x	x	x	x		
<i>Diploneis cf. puella</i>	x	x	x	x	x	x		x			
<i>Diploneis didyma</i>	x	x	x	x	x			x			
<i>Diploneis littoralis var. clathrata</i>	x	x						x			
<i>Diploneis smithii</i>		x						x			
<i>Eunotia binularis</i>	x	x			x						
<i>Eunotia</i> group 1 (girdle view)		x		x	x	x		x	x		
<i>Eunotia</i> group 2 (girdle view)	x	x		x				x			
<i>Eunotia</i> group 3 (girdle view)	x			x				x			
<i>Eunotia incisa</i>	x	x		x	x	x					
<i>Eunotia meisteri</i>	x							x			
<i>Eunotia</i> sp. 25		x		x							
<i>Eunotia</i> sp. 38				x				x	x		
<i>Eunotia</i> sp. 9		x		x				x	x		
<i>Fragilaria</i> sp. 21	x		x	x	x	x	x				x
<i>Fragilaria</i> sp. 38	x	x		x				x			

<i>Fragilaria</i> sp. 39				x							
<i>Fragilaria striatula</i>	x			x							
<i>Fragilariforma virescens</i> var. <i>exigua</i> shape 1	x		x	x	x	x	x	x	x		x
<i>Fragilariforma virescens</i> var. <i>exigua</i> shape 2	x	x	x	x	x			x	x	x	x
<i>Fragilariforma virescens</i> var. <i>subsalina</i>				x	x	x		x			
<i>Fragilariopsis cylindrus</i>	x	x		x	x	x		x			
<i>Frustulia saxonica</i>		x		x	x			x	x		
<i>Gomphonemopsis exigua</i>	x	x	x	x	x	x		x	x	x	x
<i>Gomphonemopsis pseudexigua</i>	x			x					x		
<i>Grammatophora marina</i>	x		x		x		x		x		
<i>Grammatophora oceanica</i>	x	x	x	x	x		x	x	x		x
<i>Gyrosigma acuminatum</i>	x		x		x			x			
<i>Gyrosigma fasciola</i>	x		x		x						x
<i>Halamphora</i> cf. <i>obscura</i>	x					x		x			
<i>Halamphora</i> cf. <i>tumida</i>	x			x			x	x	x		x
<i>Halamphora</i> sp. 21								x		x	
<i>Halamphora</i> sp. 29	x				x						
<i>Halamphora</i> sp. 30	x	x	x		x					x	
<i>Halamphora</i> sp. 36				x				x			
<i>Halamphora</i> sp. 39				x							



<i>Halamphora</i> sp. 50			x	x					x		
<i>Haslea crucigera</i>	x										
<i>Licmophora dalmatica</i>			x	x	x		x				
<i>Luticola mutica</i>				x							
<i>Martyana schulzii</i>	x			x		x					
<i>Mastogloia</i> cf. <i>pumila</i>	x	x			x			x			
<i>Mastogloia exigua</i>			x		x	x					
<i>Melosira ambigua</i>	x										
<i>Melosira moniliformis</i>	x										
<i>Melosira numuloides</i>	x			x							
<i>Melosira varians</i>	x			x			x	x			
<i>Navicula</i> aff. <i>subadnata</i>	x			x	x	x		x			x
<i>Navicula arenaria</i>	x						x				
<i>Navicula</i> cf. <i>cari</i>	x							x			
<i>Navicula</i> cf. <i>flanatica</i>		x		x	x		x	x			
<i>Navicula</i> cf. <i>halophiloides</i>		x				x		x		x	x
<i>Navicula</i> cf. <i>sublucidula</i>	x					x					
<i>Navicula directa</i>	x		x	x				x			
<i>Navicula germanopolonica</i>	x	x	x	x			x	x	x	x	x
<i>Navicula gregaria</i>	x	x	x	x	x	x	x	x	x		x
<i>Navicula gregaria</i> shape 2	x			x	x	x		x			x

<b>Navicula group 1 (girdle view)</b>	x	x		x	x			x	x	x	x
<b>Navicula group 10 (girdle view)</b>					x						
<b>Navicula group 11 (girdle view)</b>					x	x					
<b>Navicula group 12 (girdle view)</b>	x		x					x			
<b>Navicula group 2 (girdle view)</b>	x	x		x	x			x			
<b>Navicula group 4 (girdle view)</b>	x		x	x							
<b>Navicula group 5 (girdle view)</b>	x				x			x	x	x	x
<b>Navicula group 6 (girdle view)</b>	x								x		
<b>Navicula group 7 (girdle view)</b>			x	x	x				x	x	
<b>Navicula group 8 (girdle view)</b>	x							x			

<b>Navicula group 9 (girdle view)</b>					x					x	
<i>Navicula lanceolata</i>	x			x			x				
<i>Navicula parapontica</i>	x	x	x	x				x	x		
<i>Navicula pavillardii</i>	x			x			x	x	x	x	x
<i>Navicula perminuta</i>	x	x	x	x	x		x	x	x		x
<i>Navicula phyllepta</i> shape 2	x	x	x	x	x			x			
<i>Navicula phyllepta</i> shape 1		x	x	x	x		x	x	x		x
<i>Navicula platyventris</i>	x							x			
<i>Navicula ramosissima</i>	x			x				x	x		
<i>Navicula salinarum</i>	x							x			x
<i>Navicula</i> sp. 102	x	x	x	x	x		x	x	x	x	x
<i>Navicula</i> sp. 105					x						
<i>Navicula</i> sp. 13		x		x	x			x	x		x
<i>Navicula</i> sp. 178	x	x									
<i>Navicula</i> sp. 196		x		x	x			x			
<i>Navicula</i> sp. 227	x									x	x
<i>Navicula</i> sp. 278			x	x							
<i>Navicula</i> sp. 285					x						x
<i>Navicula</i> sp. 324	x			x	x		x				

<i>Navicula</i> sp. 325	x										
<i>Navicula</i> sp. 41	x			x	x		x	x			x
<i>Navicula</i> sp. 82	x				x			x			x
<i>Navicula</i> sp. 87	x	x		x	x			x	x		
<i>Navicula subinflata</i>				x	x			x			
<i>Neosynedra provincialis</i>	x		x	x	x						
<i>Nitzschia agnita</i>				x	x						
<i>Nitzschia angustatula</i>	x	x	x	x	x			x	x		
<i>Nitzschia brevissima</i>	x	x									
<i>Nitzschia capitellata</i>	x	x		x	x			x			
<i>Nitzschia clausii</i>	x	x		x				x	x		
<i>Nitzschia compressa</i> var. <i>balatonis</i>	x			x	x	x		x	x		
<i>Nitzschia dissipata</i>	x	x	x	x	x		x	x	x		x
<i>Nitzschia filiformis</i>	x			x	x	x		x	x		
<i>Nitzschia fonticola</i>	x		x	x			x	x			
<i>Nitzschia frustulum</i>	x	x	x	x	x		x	x	x	x	x
<i>Nitzschia improvisa</i>	x		x	x	x			x			
<i>Nitzschia inconspicua</i>	x	x		x		x	x	x	x		
<i>Nitzschia liebetruthii</i>	x	x	x	x	x	x		x	x		x

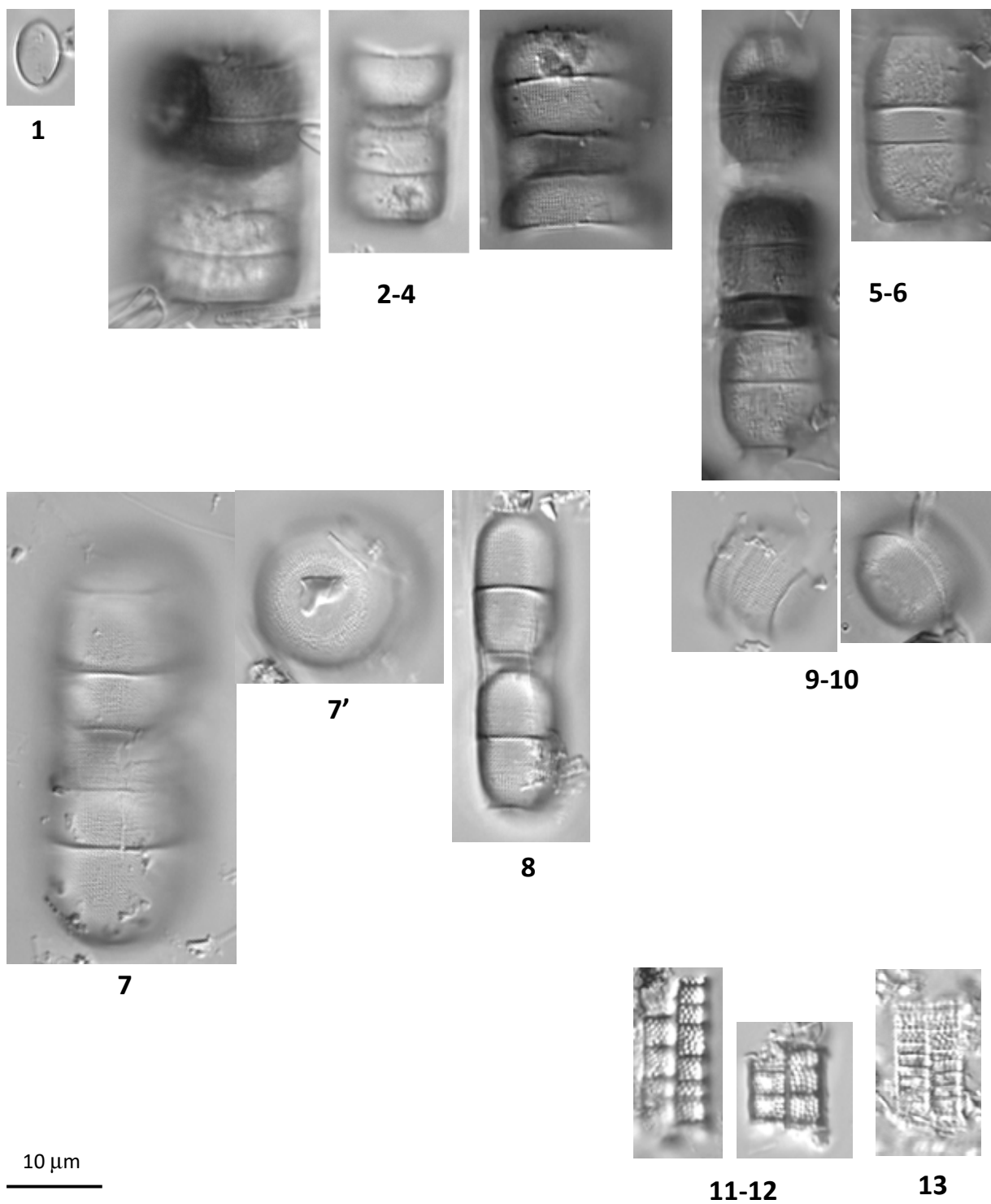
<i>Nitzschia microcephala</i> shape 1		x		x		x					
<i>Nitzschia microcephala</i> shape 2	x				x	x					
<i>Nitzschia ovalis</i>		x		x			x	x			
<i>Nitzschia palea</i>	x	x	x	x	x	x	x	x	x		
<i>Nitzschia pusilla</i> shape 1				x	x		x	x			
<i>Nitzschia pusilla</i> shape 2	x	x		x			x				
<i>Nitzschia reversa</i>	x	x	x	x			x	x			
<i>Nitzschia scalpelliformis</i>				x					x		
<i>Nitzschia sigma</i>	x	x	x	x	x		x	x	x		
<i>Nitzschia</i> sp. 140	x		x								
<i>Nitzschia</i> sp. 178			x		x						
<i>Nitzschia</i> sp. 180			x	x					x	x	
<i>Nitzschia</i> sp. 21	x	x	x	x	x	x		x	x		
<i>Nitzschia</i> sp. 30	x	x	x		x			x	x		x
<i>Nitzschia</i> sp. 40				x	x		x	x			
<i>Nitzschia</i> sp. 5	x				x	x		x			
<i>Nitzschia</i> sp. 64	x	x		x	x			x			
<i>Nitzschia</i> sp. 79	x			x				x			
<i>Nitzschia</i> sp. 88	x	x		x				x			
<i>Nitzschia thermaloides</i>	x			x			x	x	x		x
<i>Nitzschia tubicola</i>	x			x				x			



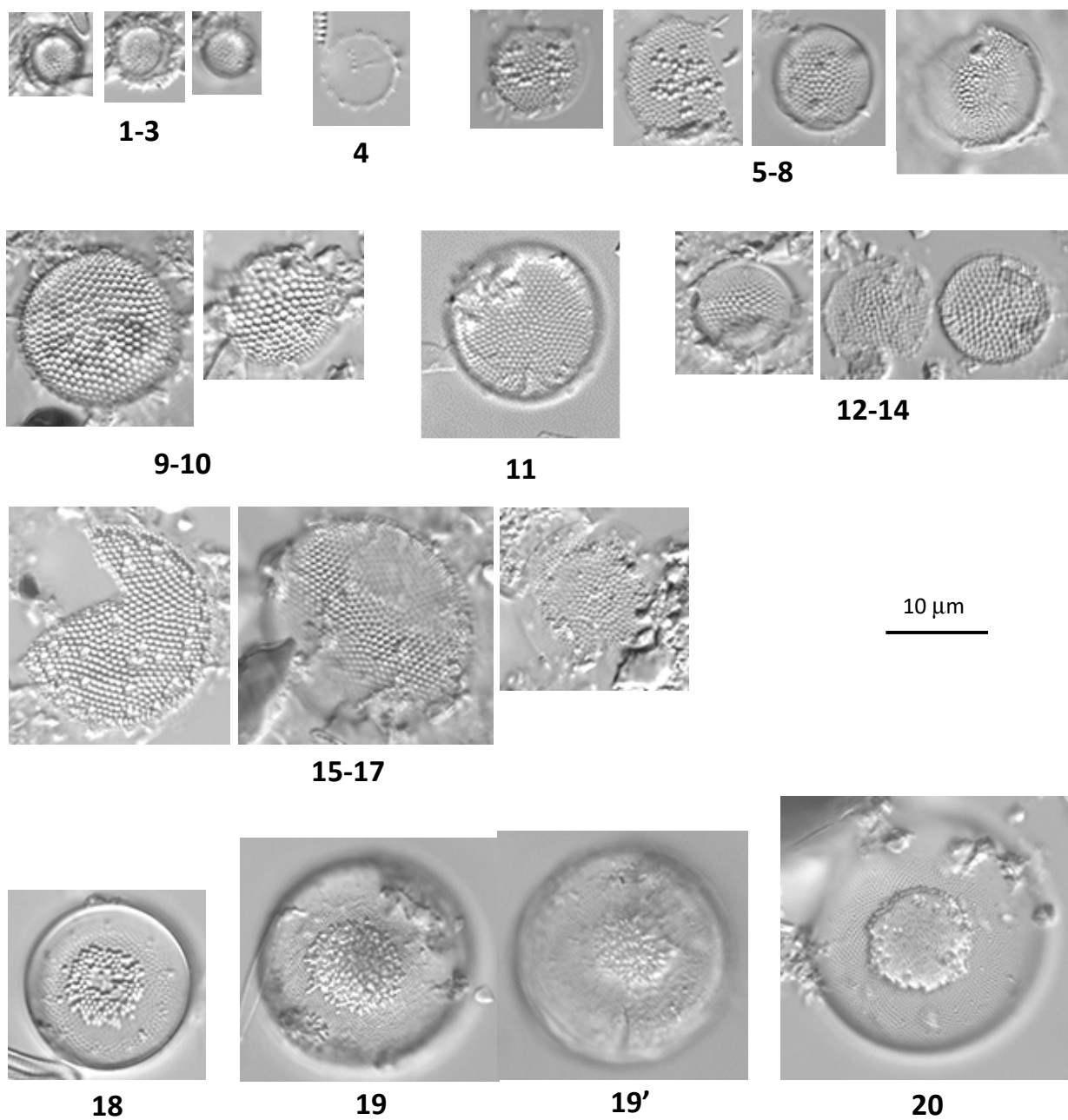
<i>Pseudostaurosira cf. brevistriata</i>	x					x					
<i>Rhabdonema arcuatum</i>	x			x			x		x		
<i>Rhoicosphenia abbreviata</i>	x	x	x	x			x	x	x	x	x
<i>Rhopalodia brebissonii</i>	x	x		x					x		
<i>Surirella brebissonii</i>	x	x		x	x	x	x		x		
<i>Surirella brebissonii var. kuetzingii</i>		x									
<i>Surirella brebissonii var. punctata</i>	x	x		x	x	x	x	x	x		
<i>Surirella brightwelli</i>	x					x		x			
<i>Tabellaria fenestrata</i>		x				x			x		
<i>Tabellaria flocculosa</i>	x	x		x	x	x		x	x		
<i>Tabularia fasciculata</i>	x	x	x	x	x	x	x	x	x	x	x
<i>Tabularia investiens</i>								x			
<i>Tabularia waernii</i>	x	x		x							
<i>Thalassionema nitzschioides</i>	x	x	x	x	x		x	x	x	x	x
<i>Thalassiosira baltica</i>	x	x			x	x		x			
<i>Thalassiosira eccentrica</i>	x			x	x			x	x		

<i>Thalassiosira guillardii</i>	x		x	x					x	x	x
<i>Thalassiosira pacifica</i>		x		x	x			x			
<i>Thalassiosira proschkiniae</i>	x	x		x				x			
<i>Thalassiosira</i> sp. 16				x	x			x			
<i>Thalassiosira</i> sp. 3	x	x		x							
<i>Tryblionella</i> sp. 1				x				x	x		
<i>Tryblionella apiculata</i>	x	x	x	x	x			x	x		
<i>Tryblionella coarcata</i>	x			x	x			x	x		
<i>Tryblionella levidensis</i>	x	x		x	x	x		x			
<i>Tryblionella punctata</i>	x	x	x	x	x			x	x		

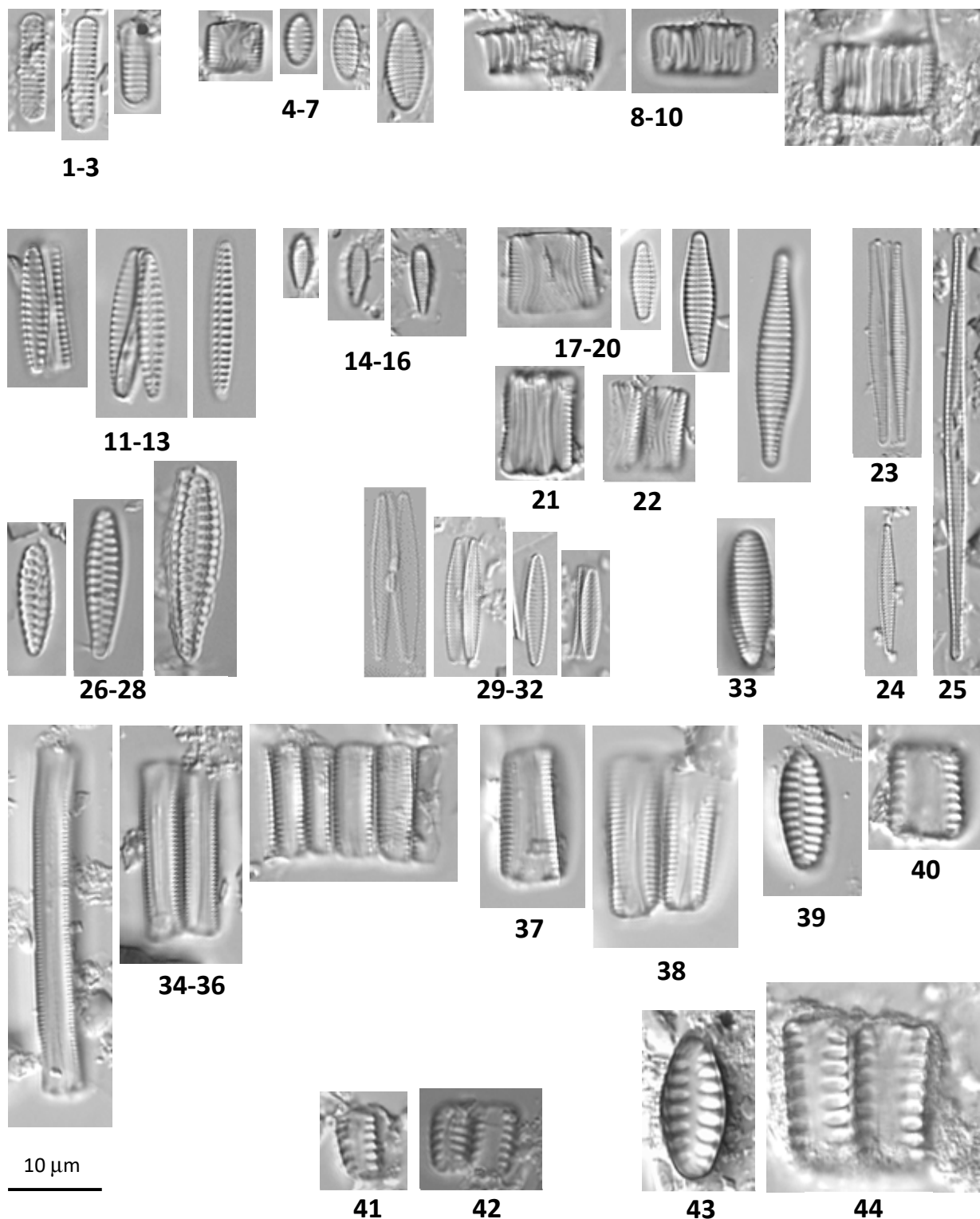




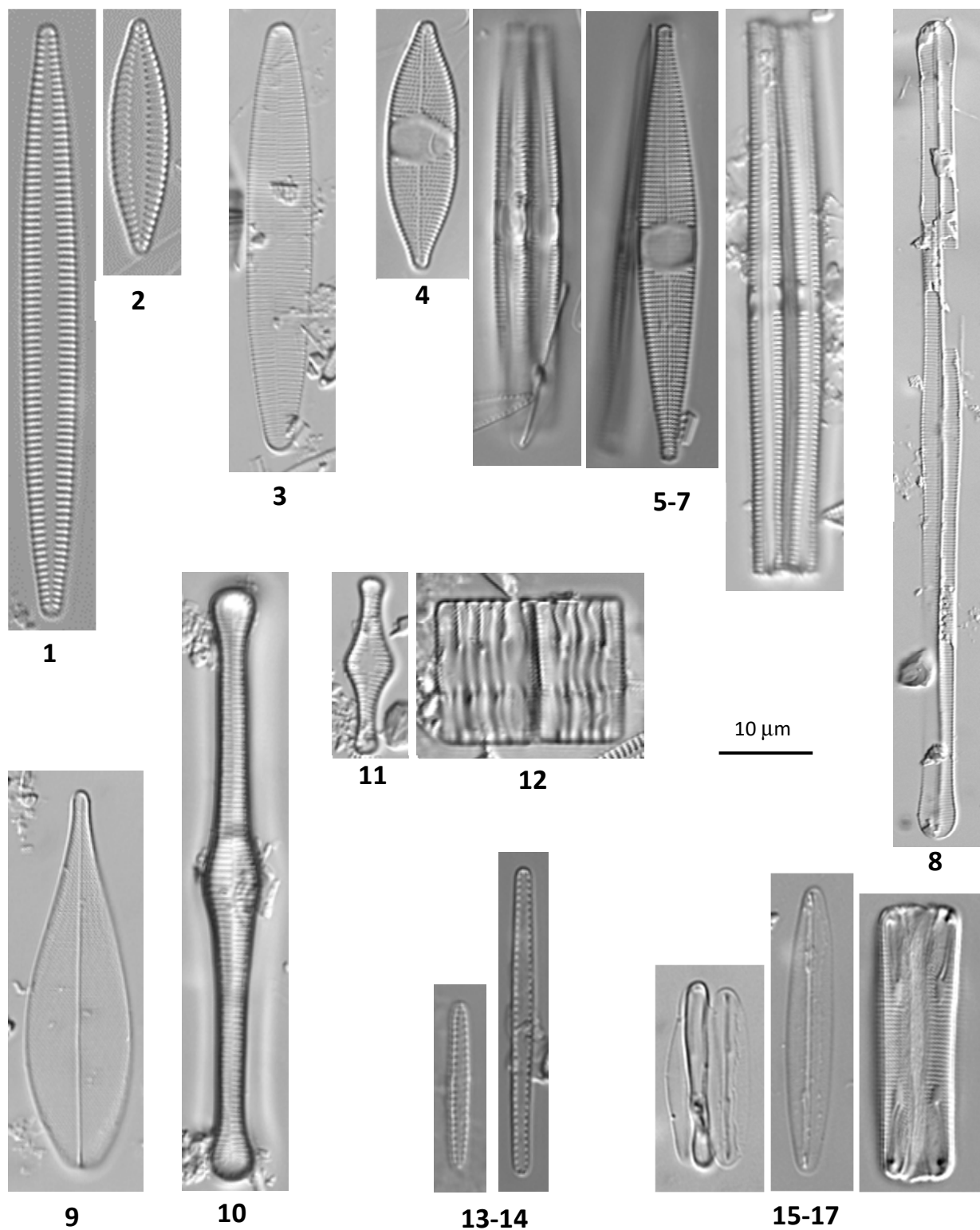
**Figure S1.** *Chaetoceros* sp. 3. 2-4 :*Melosira ambigua*. 5-6: *Melosira moniliformis*. 7- 8: *Melosira varians*. 9-10: *Melosira nummuloides*. 11-12: *Aulacoseira* sp. 3. 13: *Aulacoseira* sp. 2.



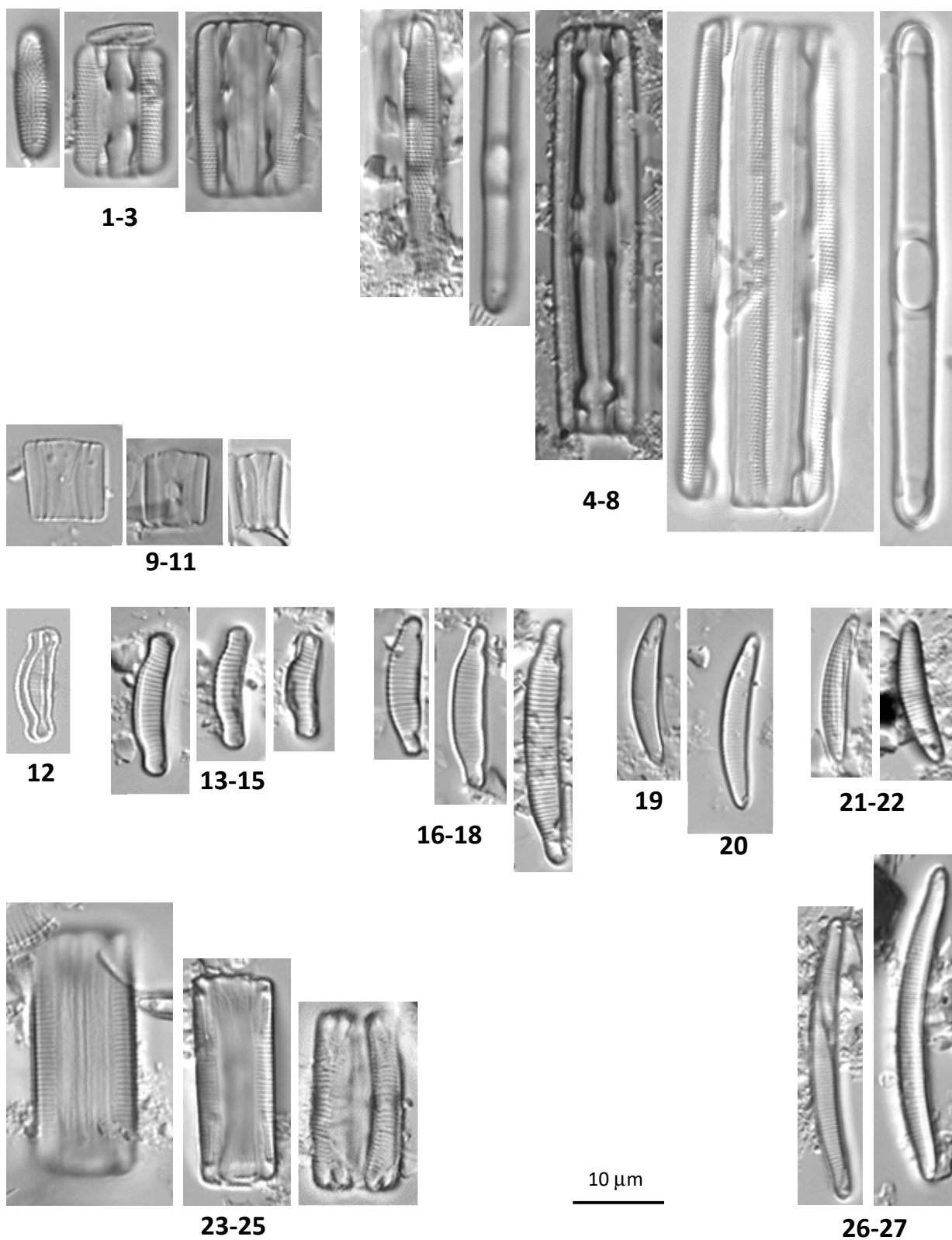
**Figure S2.** 1-3: *Thalassiosira proschkiniae*. 4: *Thalassiosira guillardii*. 5-8: *Thalassiosira pacifica*. 9-10: *Thalassiosira eccentrica*. 11: *Thalassiosira baltica*. 12-14: *Thalassiosira* sp. 16. 15-17: *Thalassiosira* sp. 3. 18-20: *Podosira stelligera*.



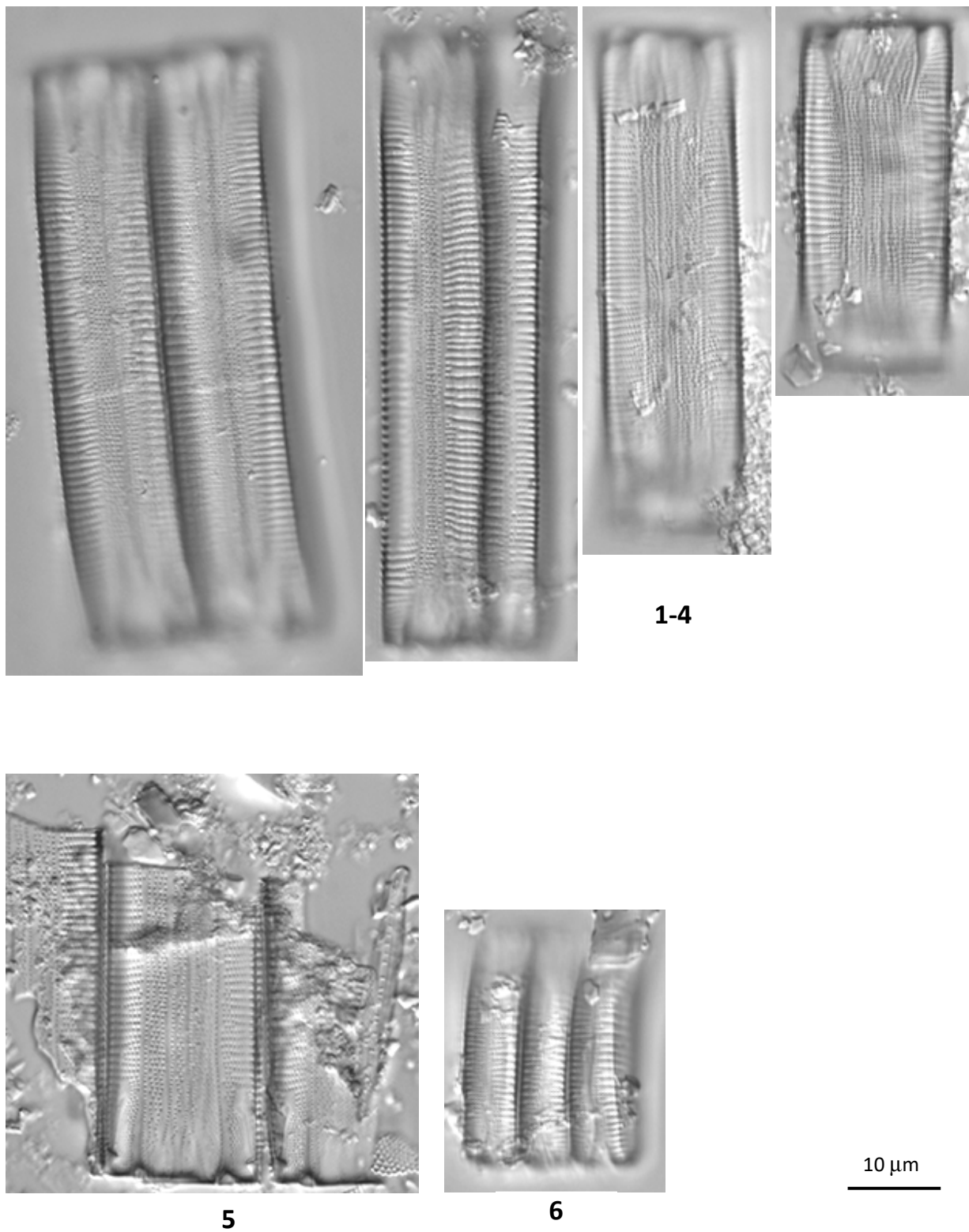
**Figure S3.** 1-3: *Fragilariopsis cylindrus*. 4-7: *Fragilariforma virescens* var. *exigua*. 8-10: *Fragilaria* sp. 38. 11-13: *Tabularia investiens*. 14-16: *Fragilariforma virescens* var. *subsalina*. 17-22: *Fragilariforma virescens* var. *exigua* shape 2. 23-25: *Tabularia waernii*. 26-28: *Opephora mutabilis*. 29-32: *Fragilaria* sp. 21. 33: *Martyana schulzii*. 34-36: **Girdle view** *Pseudostaurosira* cf. *brevistriata*. 37-38: *Fragilaria* sp. 39. 39-40: *Opephora mutabilis* shape 2. 41-42: *Opephora* sp. 30. 43-44: *Opephora martyi*.



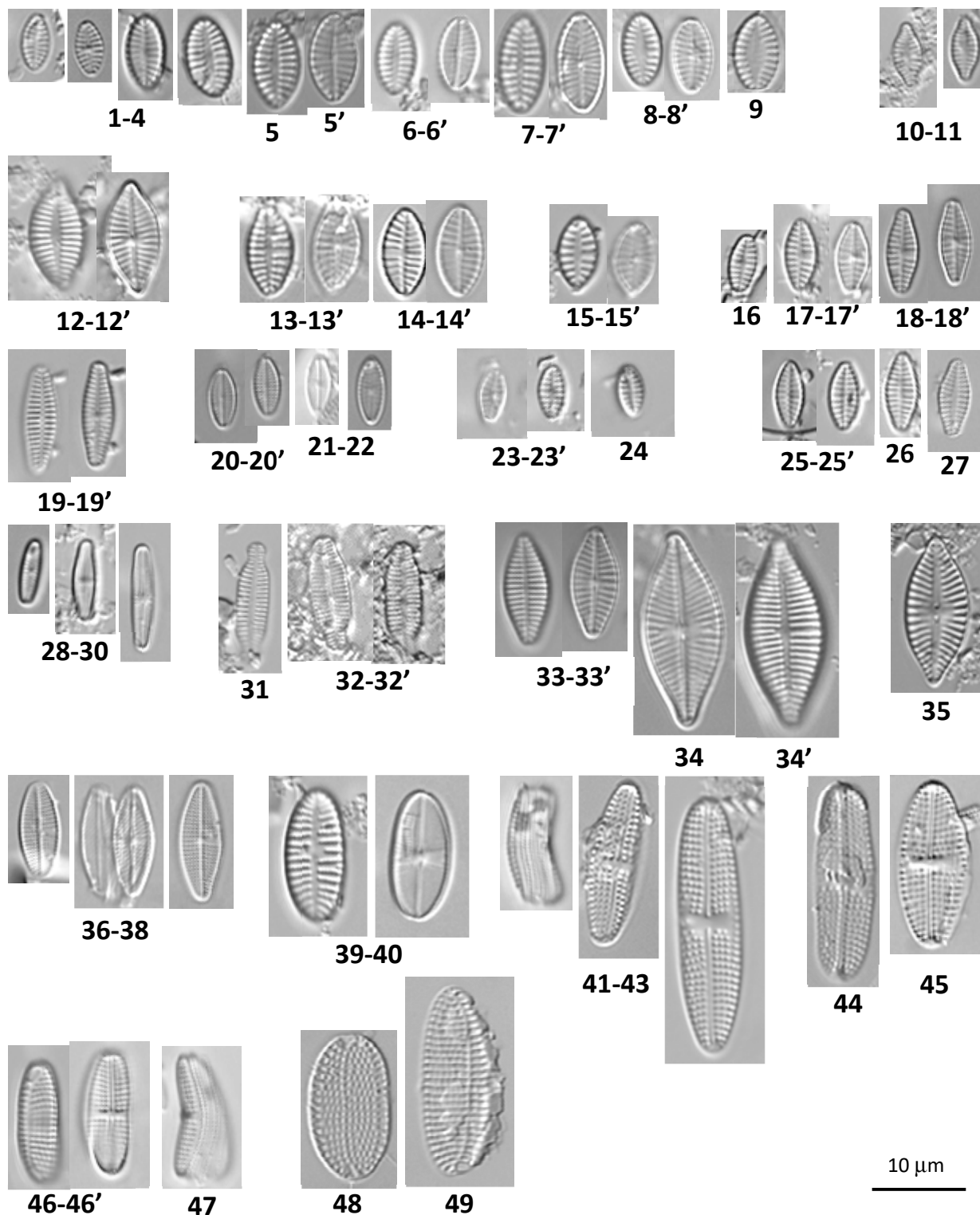
**Figure S4.** 1-2: *Tabularia fasciculata*. 3: *Fragilaria striatula*. 4-7: *Ctenophora pulchella*. 8: *Neosynedra provincialis*. 9: *Licmophora dalmatica*. 10: *Tabellaria fenestrata*. 11-12: *Tabellaria flocculosa*. 13-14: *Thalassionema nitzschioides*. 15-17: *Berkeleya rutilans*.



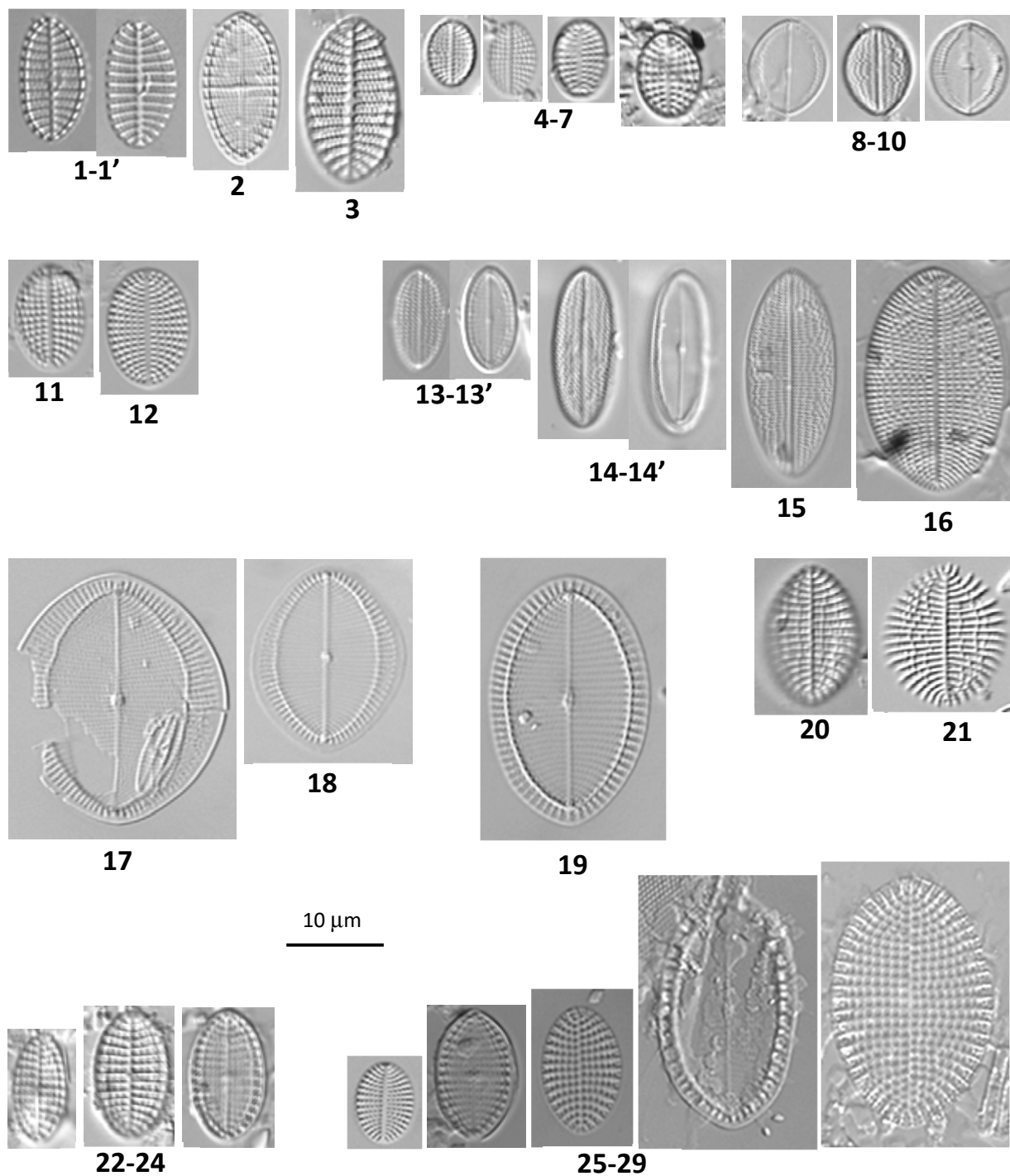
**Figure S5.** 1-3: *Grammatophora marina*. 4-8: *Grammatophora oceanica*. 9-11: Girdle view *Eunotia* group 3. 12: *Eunotia meisteri*. 13-15: *Eunotia* sp. 9. 16-18: *Eunotia incisa*. 19-20: *Eunotia* sp. 38. 21-22: *Eunotia* sp. 25. 23-25: Girdle view *Eunotia* group 2. 26-27: *Eunotia bilunaris*.



**Figure S6. 1-6: Girdle view *Eunotia* group 1.**

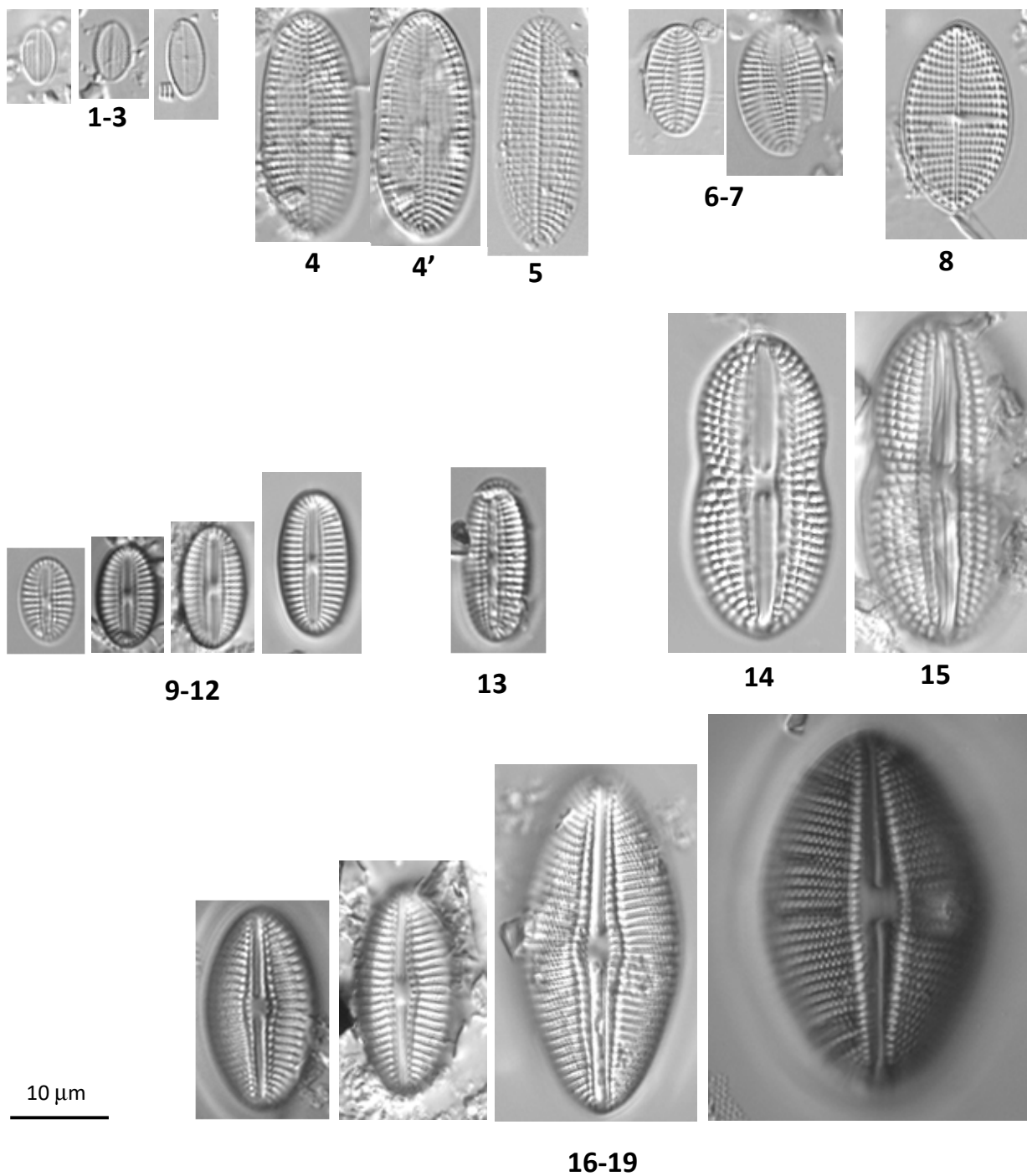


**Figure S7.** 1-9: *Planothidium* cf. *hauckiana*. 10-11: *Achnanthes minuscula*. 12-12': *Achnanthes* sp. 76. 13-14': *Achnanthes* sp. 23. 15-15': *Planothidium* sp. 39. 16-18': *Planothidium* sp. 21. 19-19': *Planothidium pericavum*. 20-22: *Achnanthes* sp. 61. 23-24: *Achnanthes* sp. 67. 25-27': *Achnanthes* cf. *ricula*. 28-30: *Achnantheidium minutissimum*. 31-32': *Achnanthes nitidiformis*. 33-34': *Achnanthes delicatula*. 35: *Achnanthes delicatula* subsp. *septentrionalis*. 36-38: *Achnanthes* cf. *punctulata*. 39-40: *Platessa oblongella*. 41-43: *Achnanthes brevipes* var. *intermedia*. 44-45: *Achnanthes brevipes* var. *intermedia* shape 2. 46-47: *Achnanthes* cf. *kuwaitensis*. 48-49: *Achnanthes* cf. *kuwaitensis* shape 2.

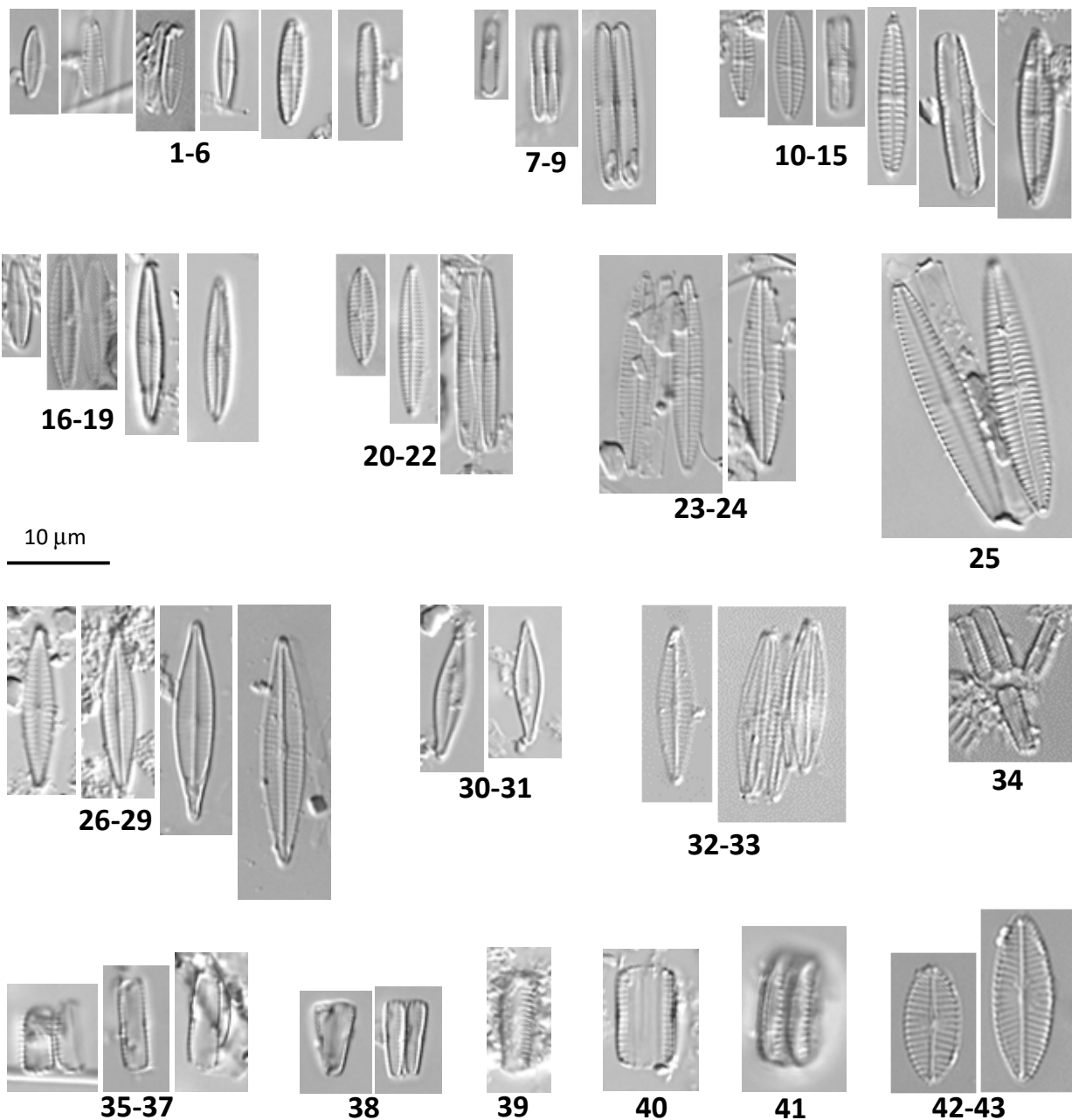


**Figure S8.** 1-3: *Cocconeis costata*. 4-7: *Cocconeis neothumensis*. 8-10: *Cocconeis* sp. 16. 11-12: *Cocconeis placentula* var. *euglypta* shape 2. 13-16: *Cocconeis placentula* var. *euglypta*. 17-18: *Cocconeis placentula* shape 2. 19: *Cocconeis placentula* shape 1. 20-21: *Cocconeis speciosa*. 22-24: *Cocconeis scutellum* var. *parva*. 25-29: *Cocconeis scutellum*.

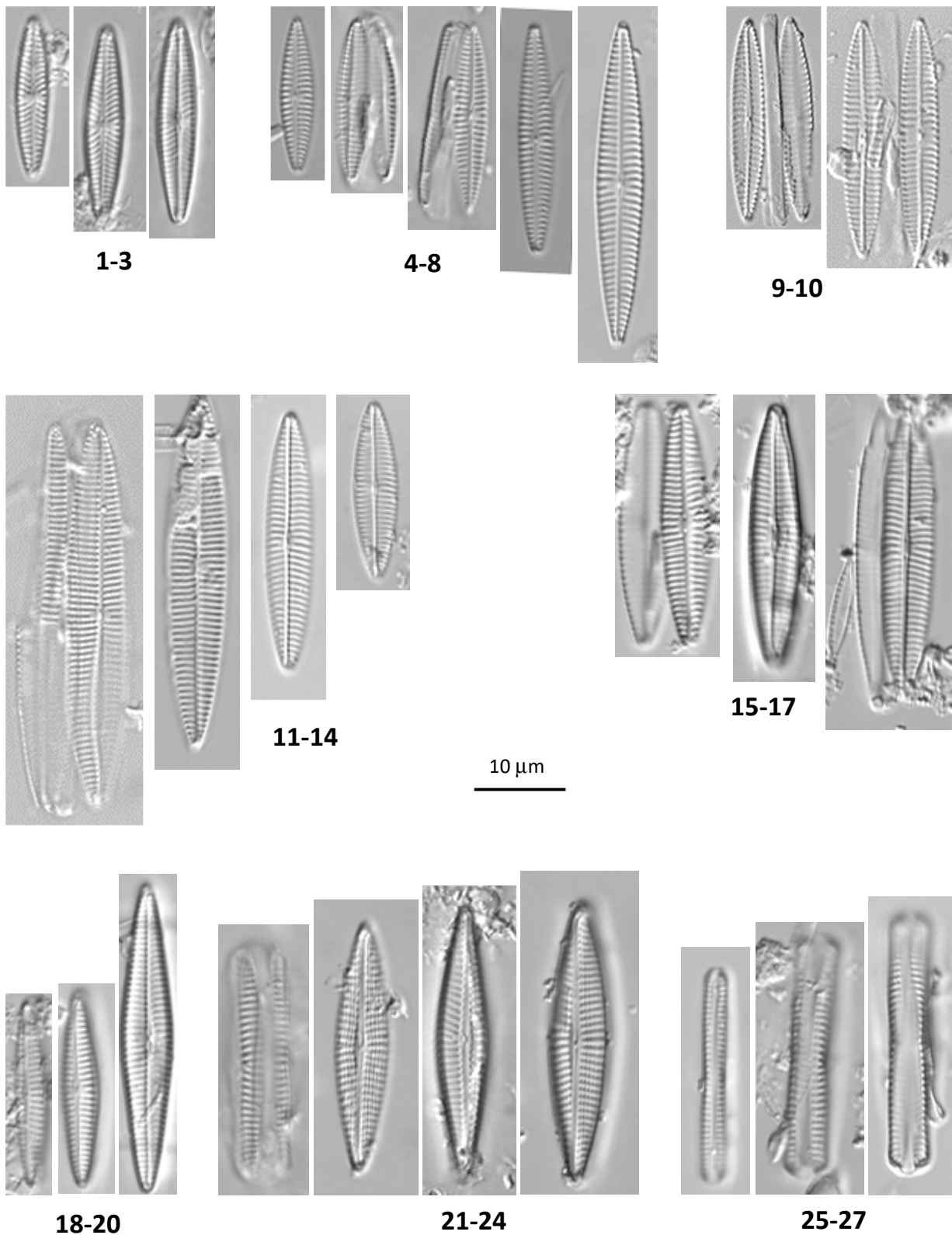




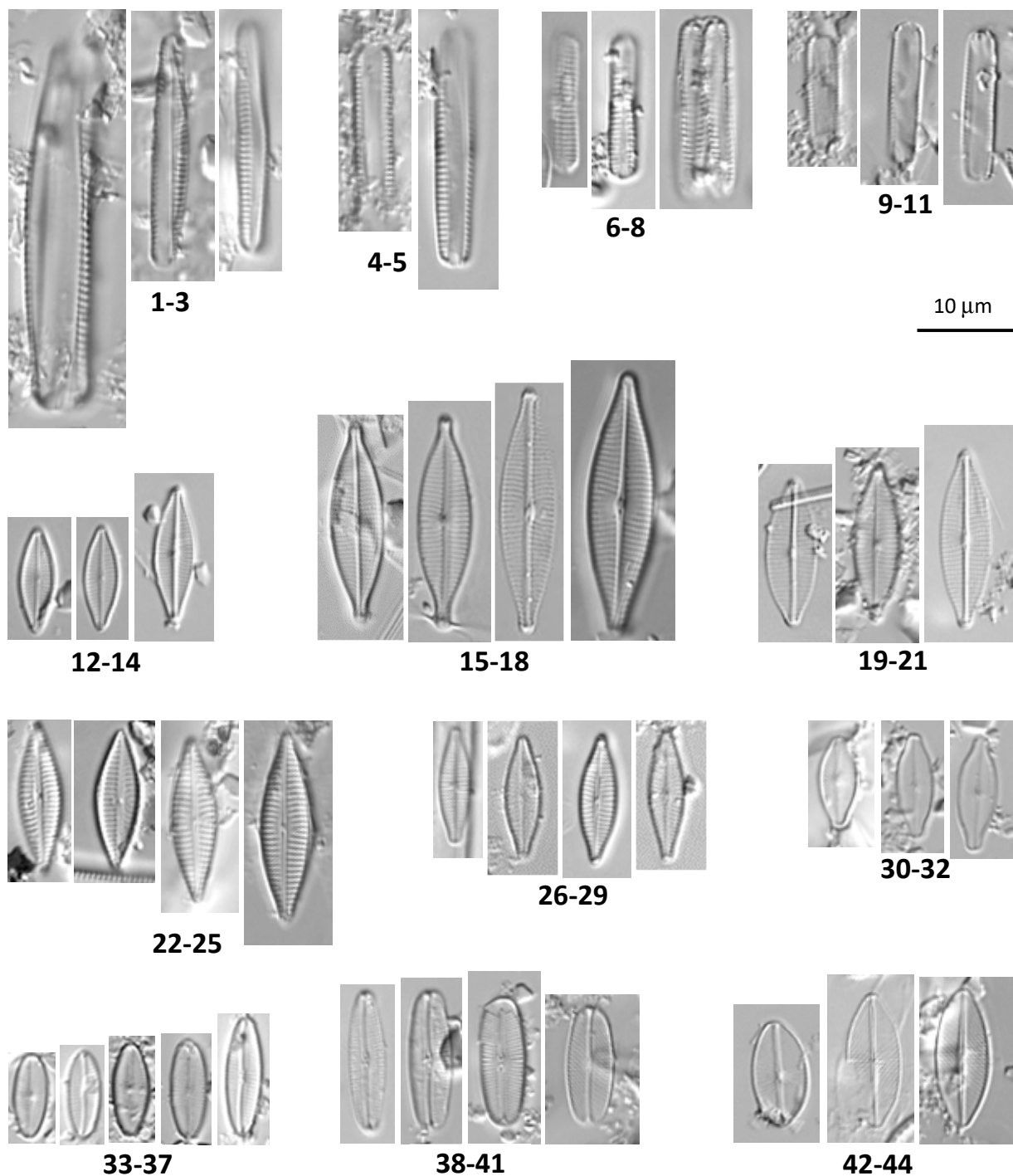
**Figure S9.** 1-3: *Cocconeis* sp. 17. 4-5: *Cocconeis* sp. 2. 6-7: *Cocconeis peltoides*. 8: *Cocconeis stauroneiformis*. 9-12: *Diploneis* cf. *puella*. 13: *Diploneis littoralis* var. *clathrata*. 14-15: *Diploneis didyma*. 16-19: *Diploneis smithii*.



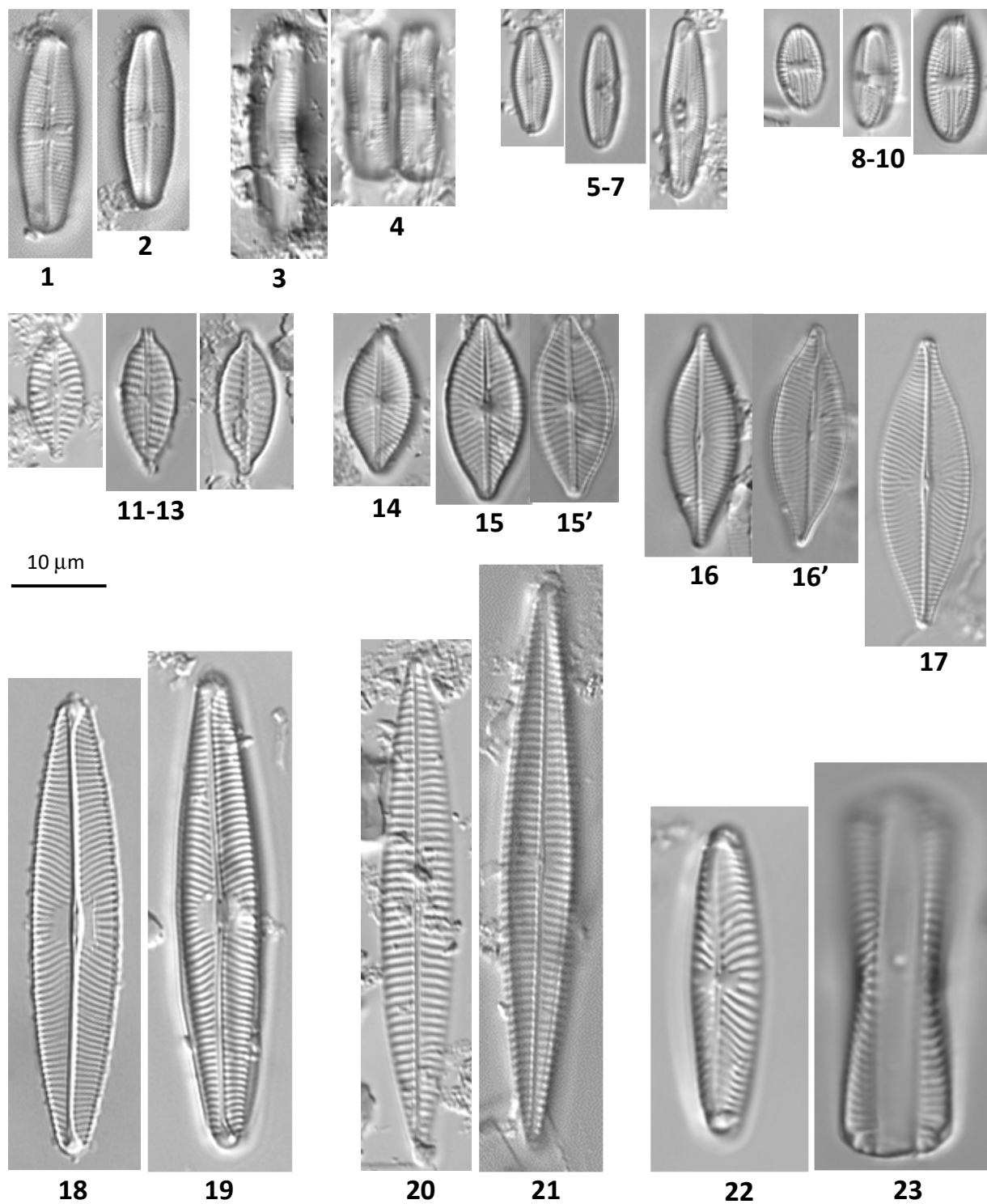
**Figure S10.** 1-6: *Navicula* sp. 41. 7-9: **Girdle view** *Navicula* group 1 (*N. perminuta*?). 10-15: *Navicula perminuta*. 16-19: *Navicula* sp. 102. 20-22: *Navicula* sp. 278. 23-24: *Navicula* sp. 227. 25: *Navicula* sp. 87. 26-29: *Navicula* sp. 196. 30-31: *Navicula* sp. 82. 32-33: *Navicula halophilioides*. 34: **Girdle view** *Navicula* group 8. 35-37: **Girdle view** *Navicula* group 7. 38: **Girdle view** *Navicula* group 6. 39: **Girdle view** *Navicula* group 11. 40: **Girdle view** *Navicula* group 10. 41: *Navicula* sp. 178. 42-43: *Navicula* cf. *germanopolonica*.



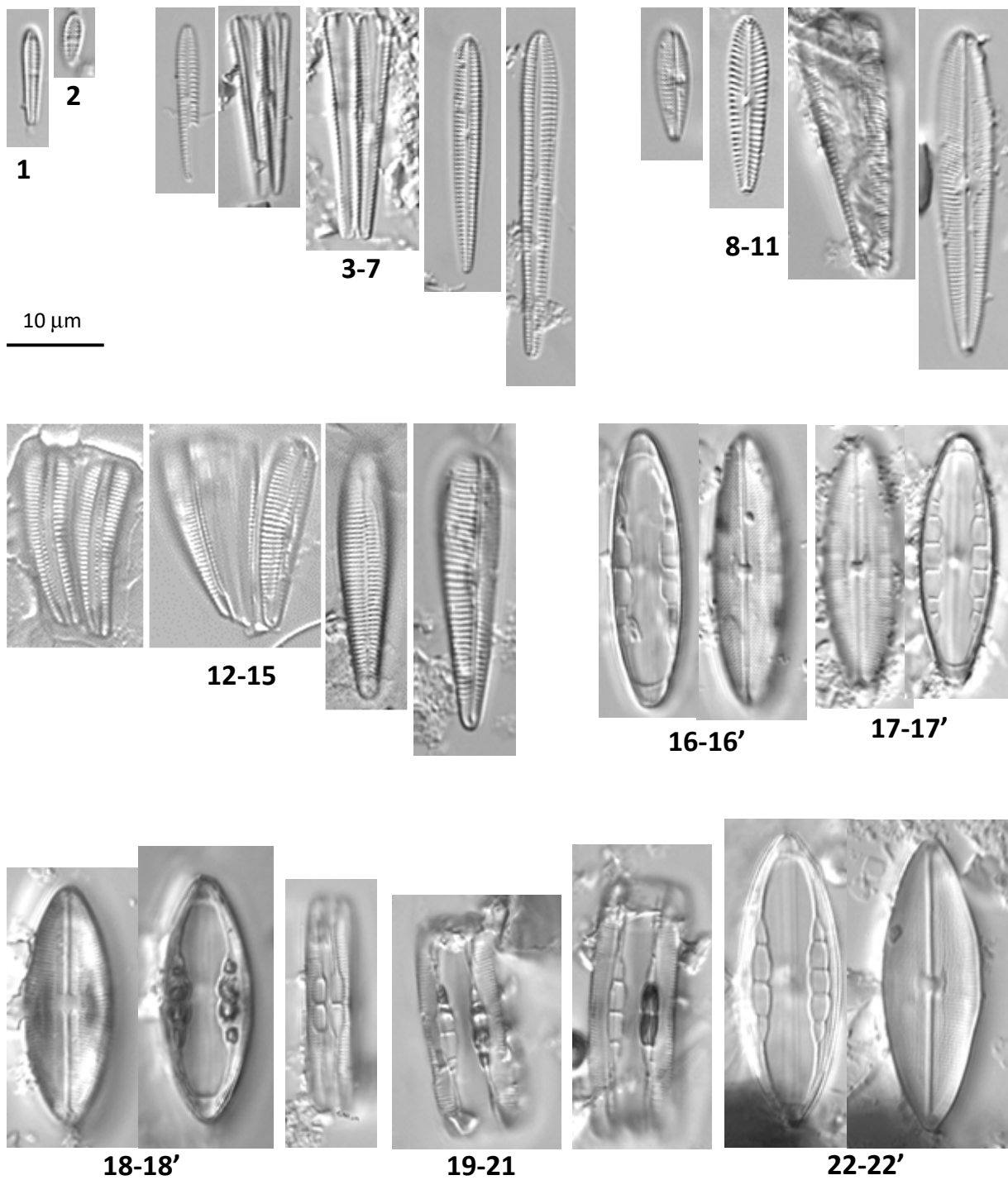
**Figure S11.** 1-3: *Navicula* cf. *cari*. 4-8: *Navicula* *ramosissima*. 9-10: *Navicula* *arenaria*. 11-14: *Navicula* *pavillardii*. 15-17: *Navicula* *parapontica*. 18-20: *Navicula* sp. 324. 21-24: *Navicula* cf. *flanatica*. 25-27: Girdle view *Navicula* group 2.



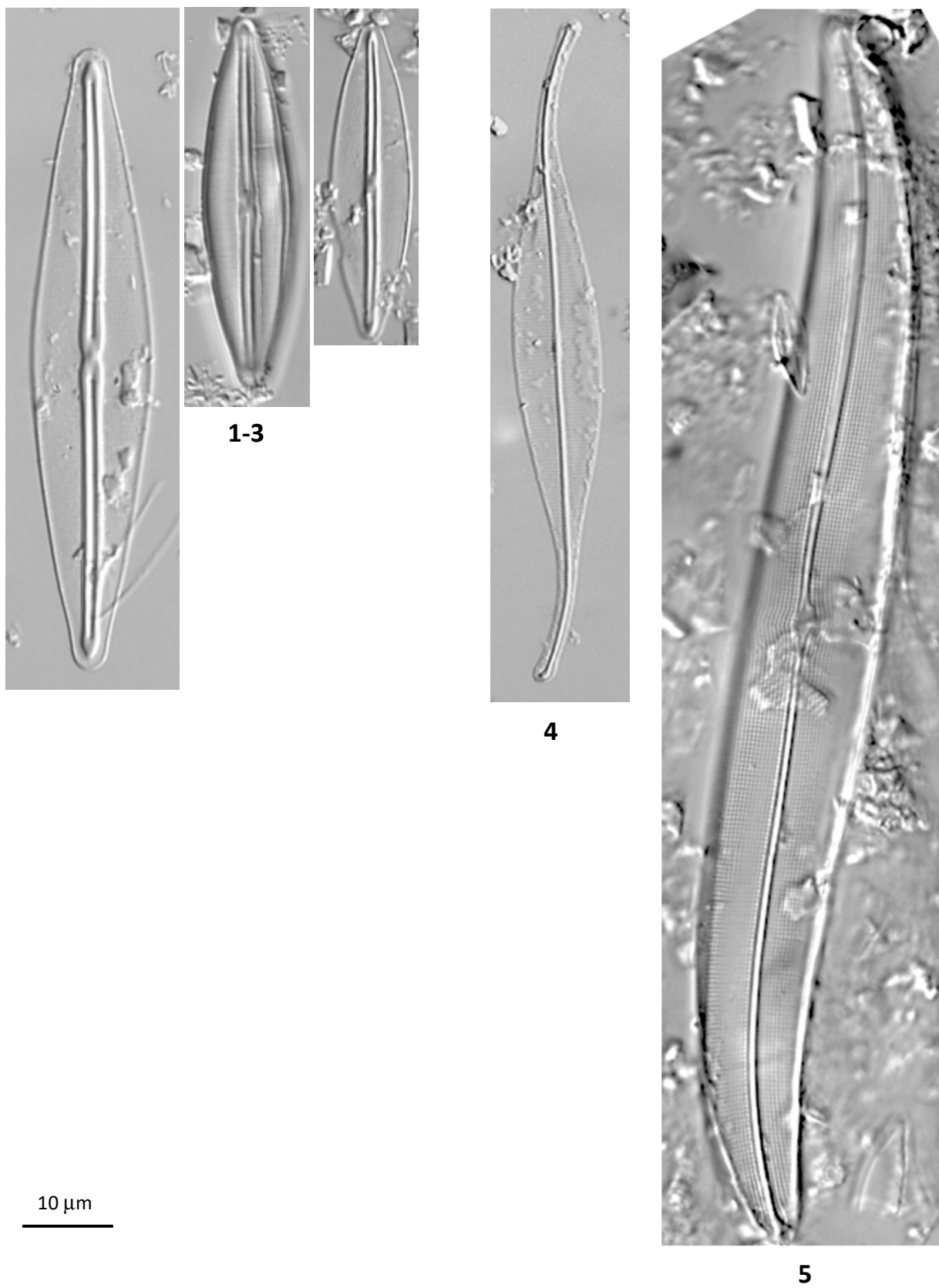
**Figure S12.** 1-3: Girdle view *Navicula* group 4. 4-5: Girdle view *Navicula* group 5. 6-8: Girdle view *Navicula* group 12. 9-11: Girdle view *Navicula* group 9. 12-14: *Navicula* sp.13. 15-18: *Navicula gregaria*. 19-21: *Navicula gregaria* shape 2. 22-25: *Navicula phyllepta* shape 2. 26-29: *Navicula phyllepta* shape 1. 30-32: *Navicula* sp. 285. 33-37: *Astartiella* sp. 149. 38-41: *Navicula* cf. *sublucidula*. 42-44: *Astartiella bremeyeri*.



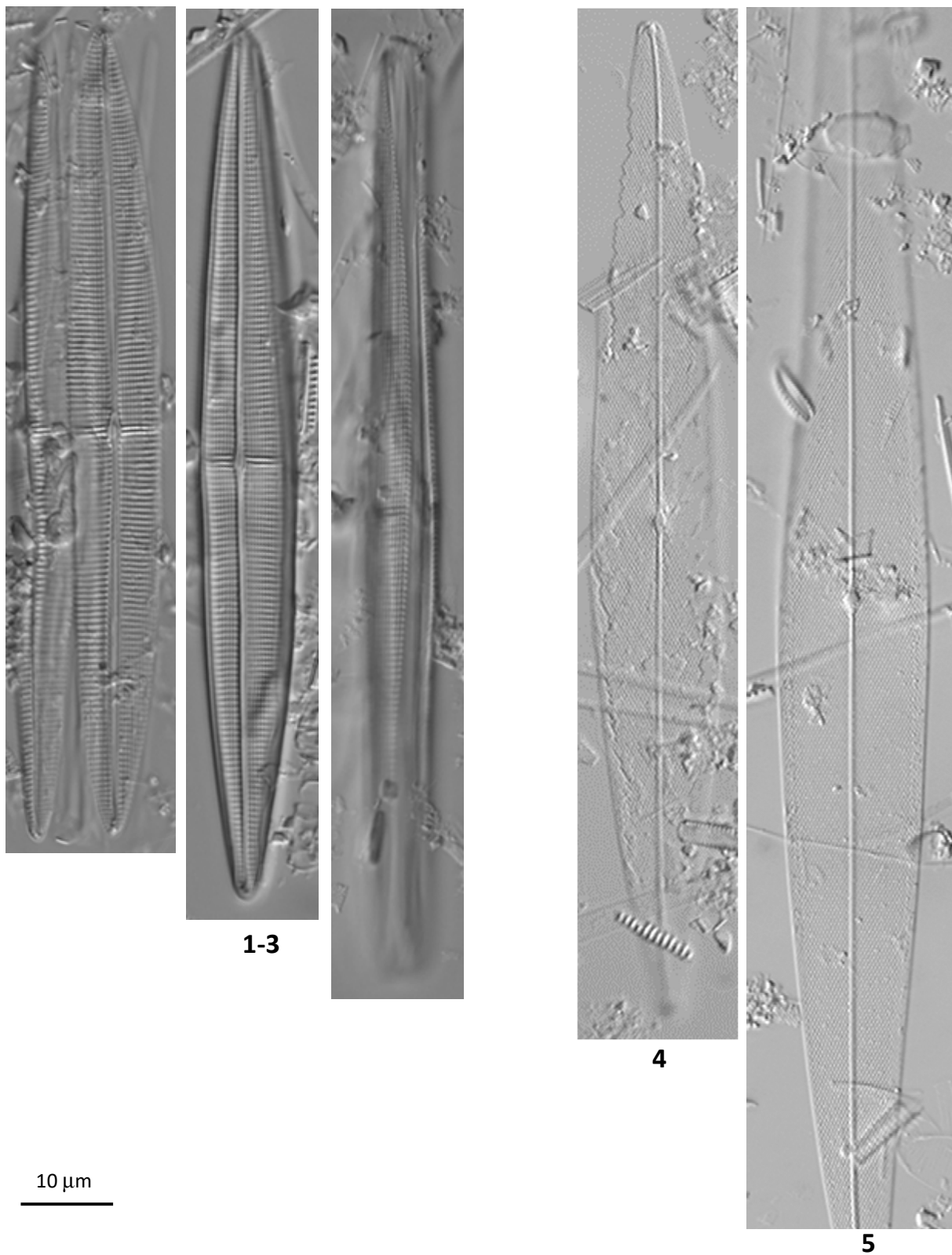
**Figure S13.** 1-2: *Dickieia subinflata*. 3-4: *Navicula* sp. 105. 5-7: *Navicula* aff. *subadnata*. 8-10: *Luticola mutica*. 11-13: *Navicula platyventris*. 14-15': *Placoneis clementis*. 16-17: *Navicula salinarum*. 18-19: *Navicula lanceolata*. 20-21: *Navicula directa*. 22-23: *Navicula* sp. 325.



**Figure S14.** 1-2: *Gomphonemopsis pseudexigua*. 3-7: *Gomphonemopsis exigua*. 8-11: *Pseudogomphonema kamtschaticum*. 12-15: *Rhoicosphenia abbreviata*. 16-16': *Mastogloia* cf. *pumila*. 18-22': *Mastogloia exigua*.

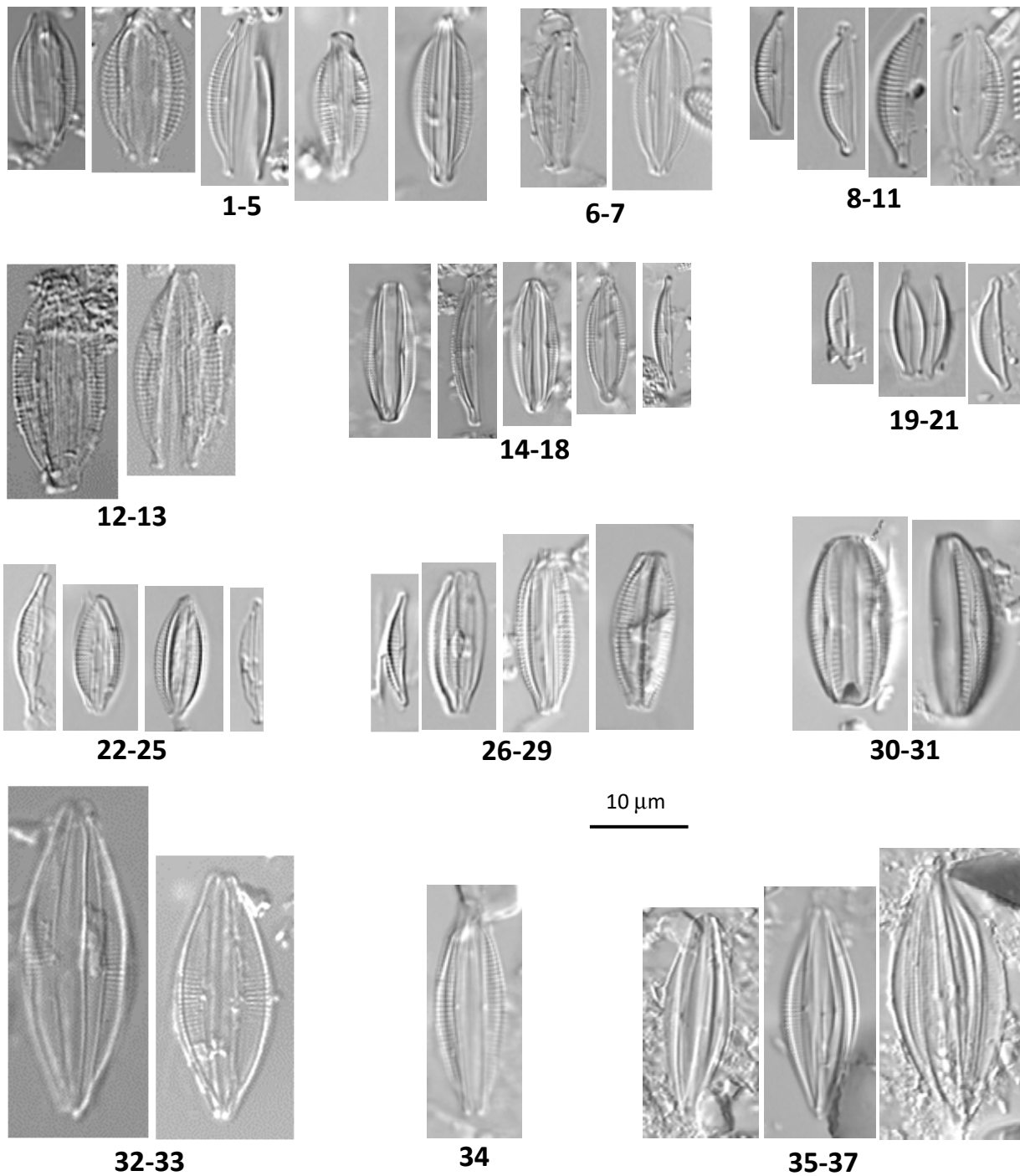


**Figure S15.** 1-3: *Frustulia saxonica*. 4: *Gyrosigma fasciola*. 5: *Gyrosigma acuminatum*.

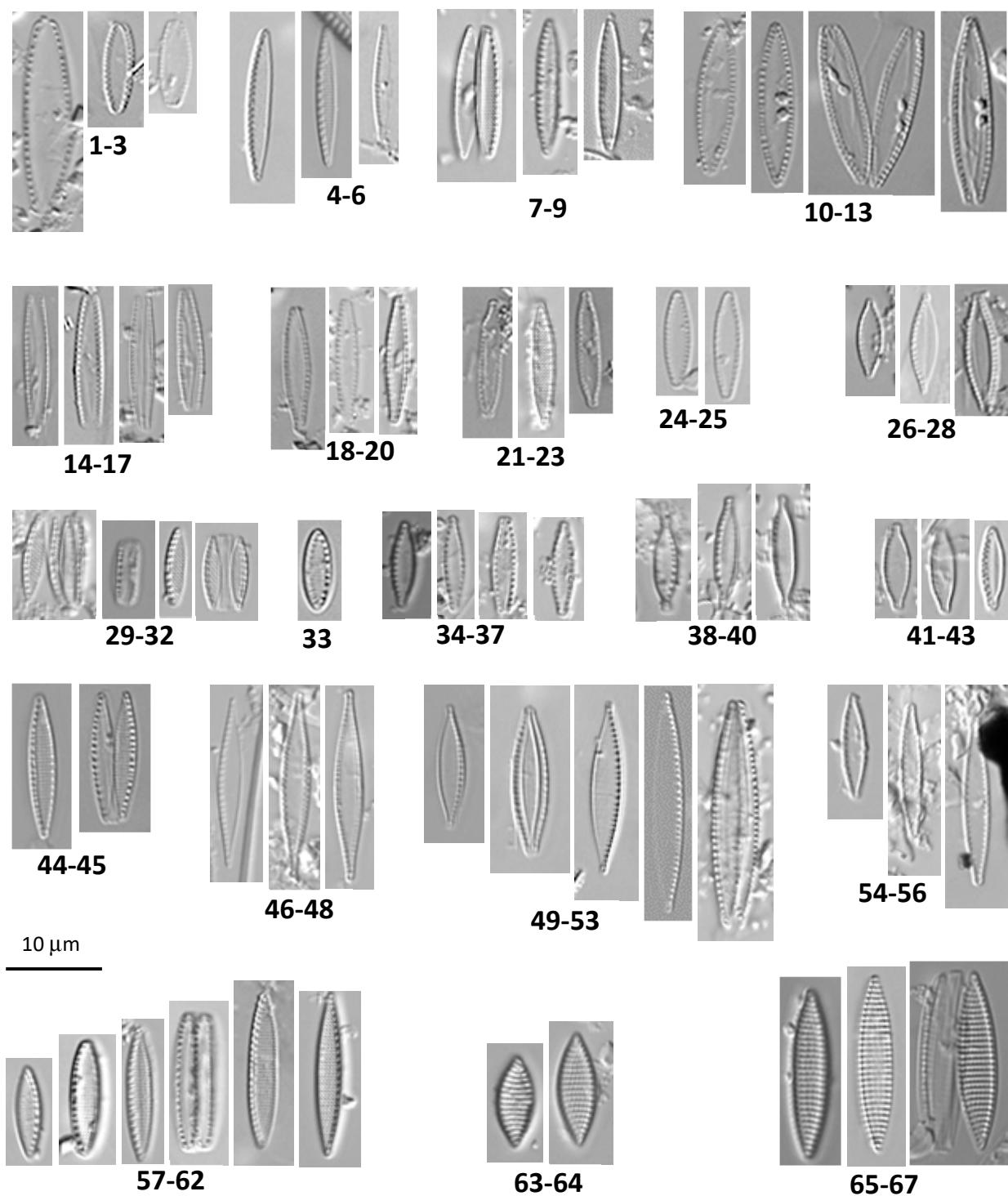


**Figure S16.** 1-3: *Haslea crucigera*. 4-5: *Pleurosigma intermedium*.

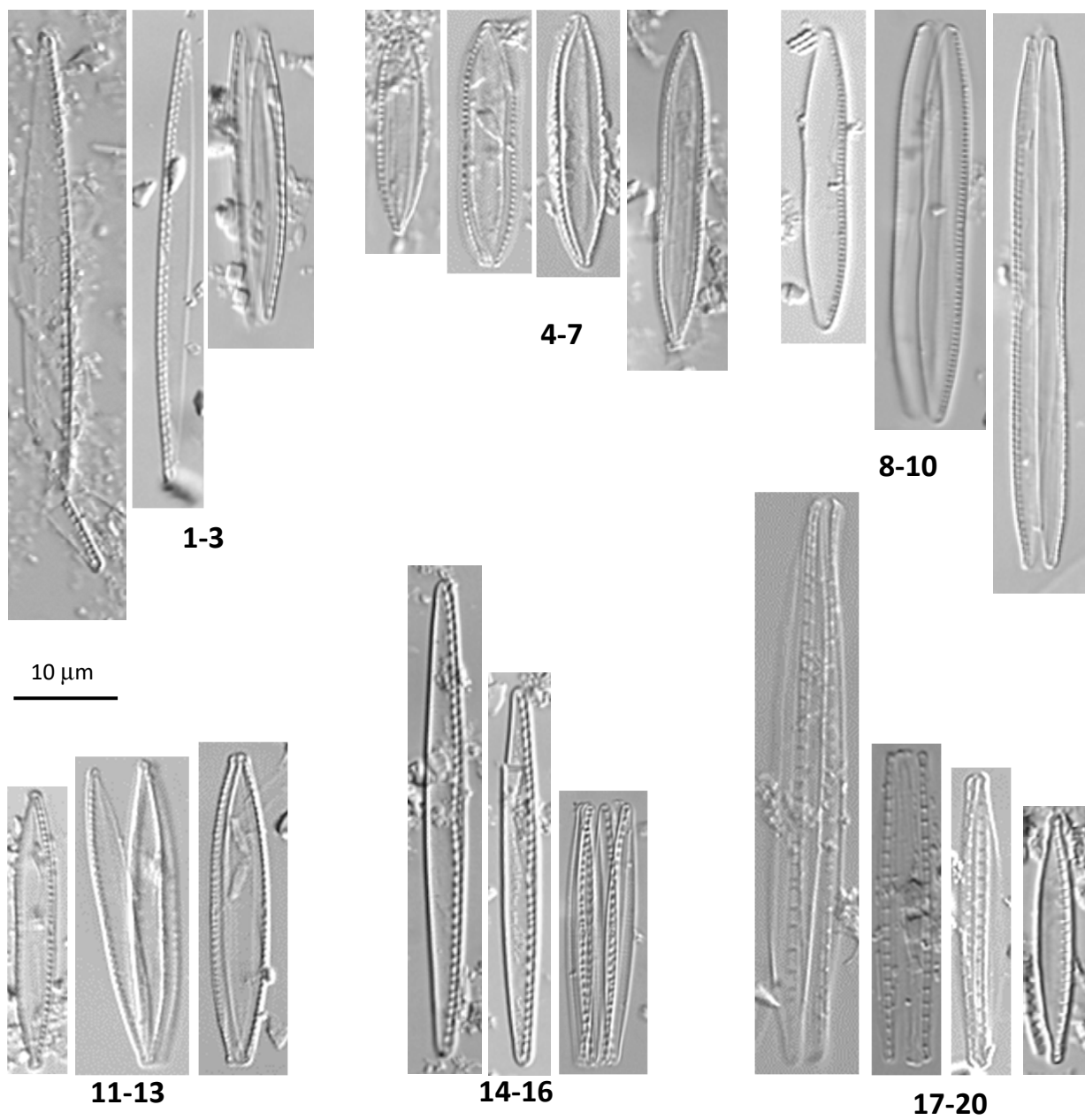




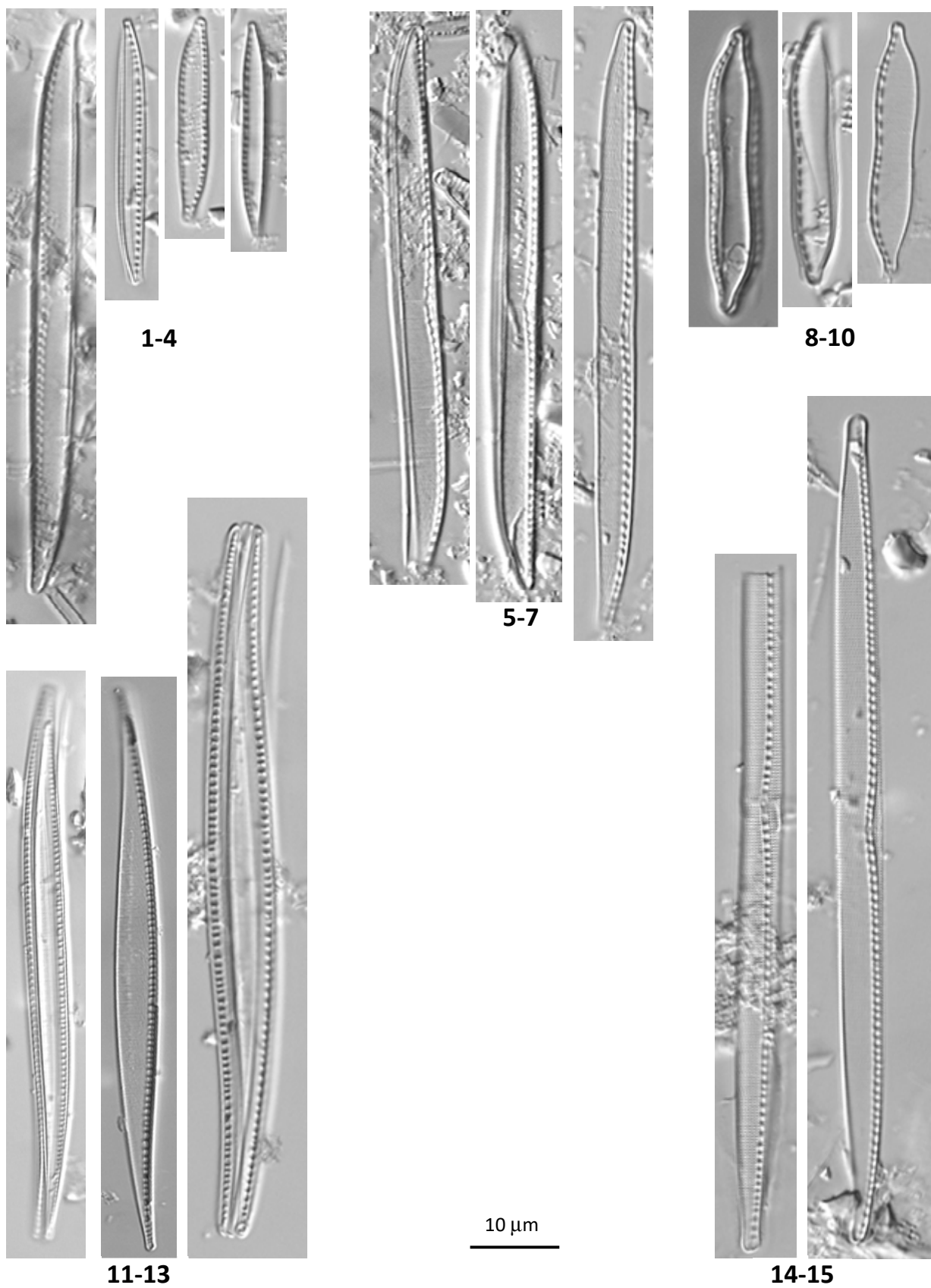
**Figure S17.** 1-5: *Amphora* sp. 8. 6-7: *Halamphora* sp. 39. 8-11: *Halamphora* cf. *tumida*. 12-13: *Amphora* sp. 7. 14-18: *Halamphora* cf. *obscura*. 19-21: *Halamphora* sp. 30. 22-25: *Halamphora* sp. 50. 26-29: *Halamphora* sp. 21. 30-31: *Amphora* cf. *inariensis*. 32-33: *Amphora* sp. 12. 34: *Halamphora* sp. 29. 35-37: *Halamphora* sp. 36.



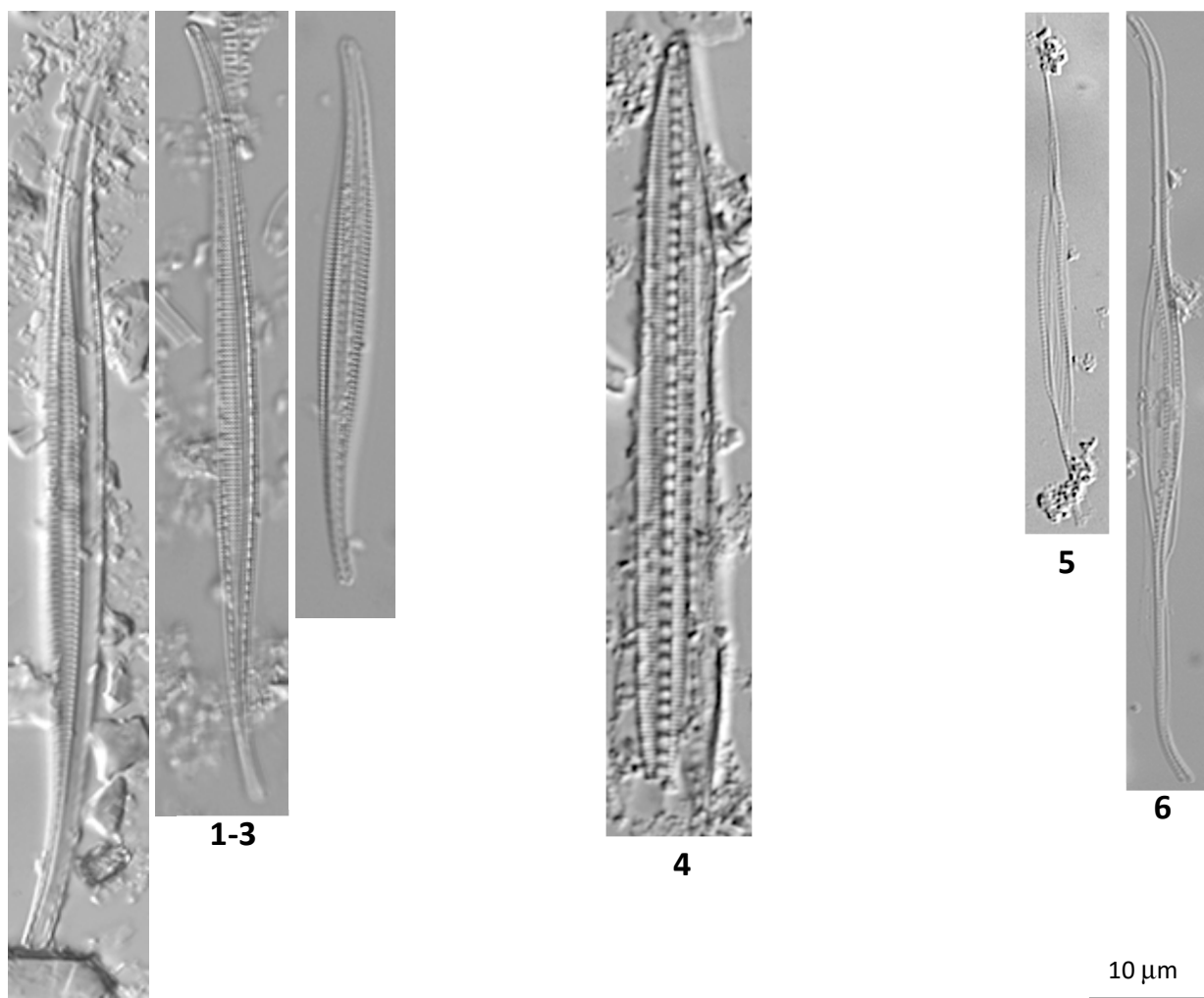
**Figure S18.** 1-3: *Nitzschia ovalis*. 4-6: *Nitzschia* sp. 140. 7-9: *Nitzschia* sp. 180. 10-13: *Nitzschia pusilla* shape 2. 14-17: *Nitzschia* sp. 30. 18-20: *Nitzschia* sp. 40. 21-23: *Nitzschia* sp. 5. 24-25: *Nitzschia pusilla* shape 1. 26-28: *Nitzschia* sp. 79. 29-32: *Nitzschia frustulum*. 33: *Nitzschia inconspicua*. 34-37: *Nitzschia* sp. 21. 38-40: *Nitzschia microcephala*. 41-43: *Nitzschia microcephala* shape 2. 44-45: *Nitzschia fonticola*. 46-48: *Nitzschia agnita*. 49-53: *Nitzschia palea*. 54-56: *Nitzschia* sp. 64. 57-62: *Nitzschia liebethuthii*. 63-64: *Tryblionella balatonis*. 65-67: *Tryblionella angustatula*.



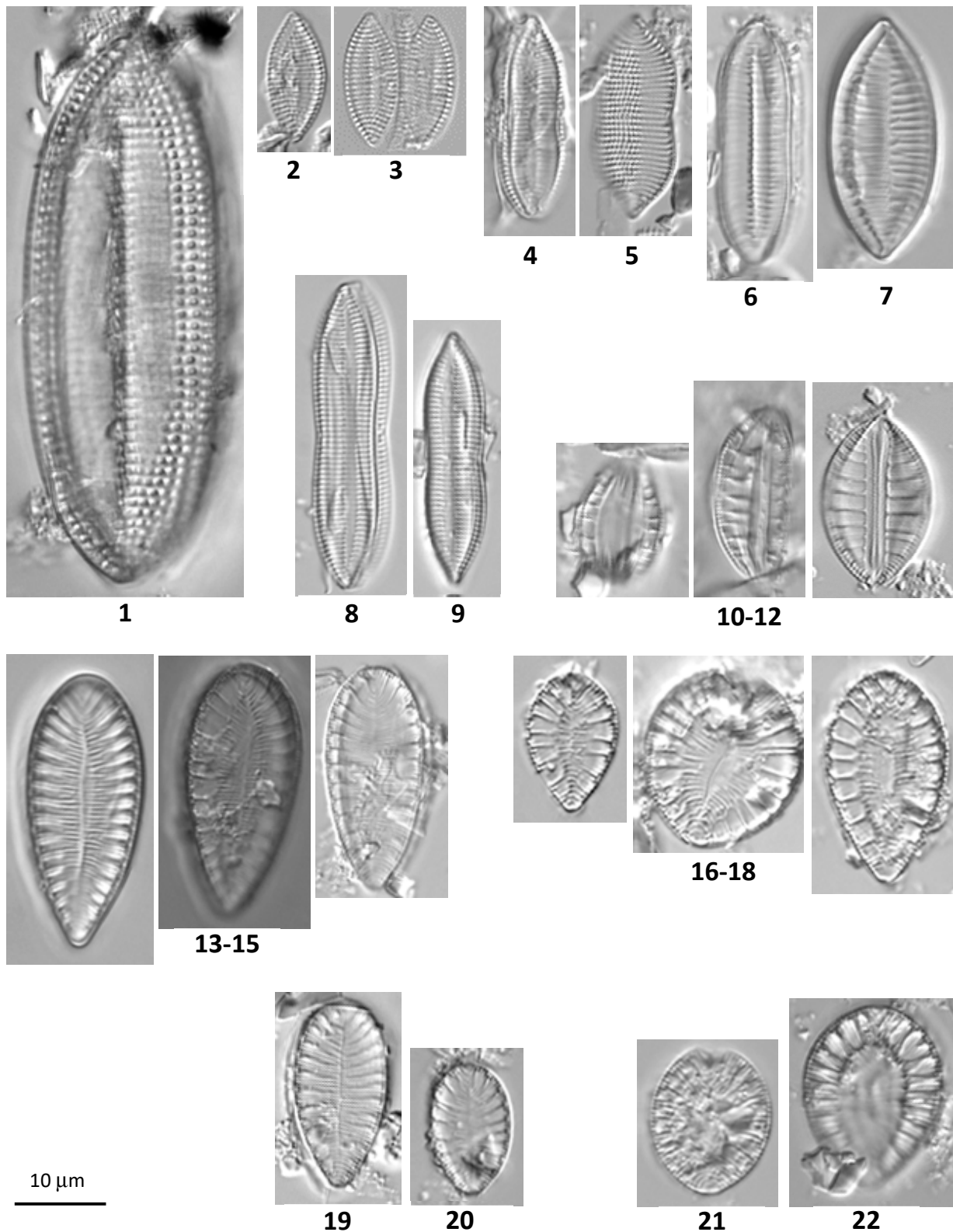
**Figure S19.** 1-3: *Nitzschia* sp. 178. 4-7: *Nitzschia capitellata*. 8-10: *Nitzschia thermaloides*. 11-13: *Nitzschia tubicola*. 14-16: *Nitzschia filiformis*. 17-20: *Nitzschia dissipata*.



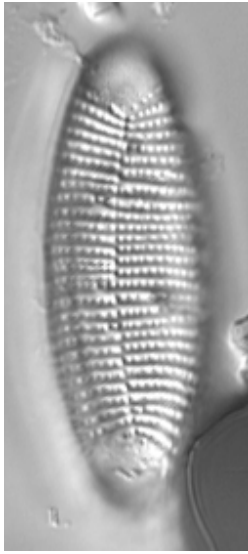
**Figure S20.** 1-4: *Nitzschia clausii*. 5-7: *Nitzschia cf. scalpelliformis*. 8-10: *Nitzschia brevissima*. 11-13: *Nitzschia sigma*. 14-15: *Nitzschia improvisa*.



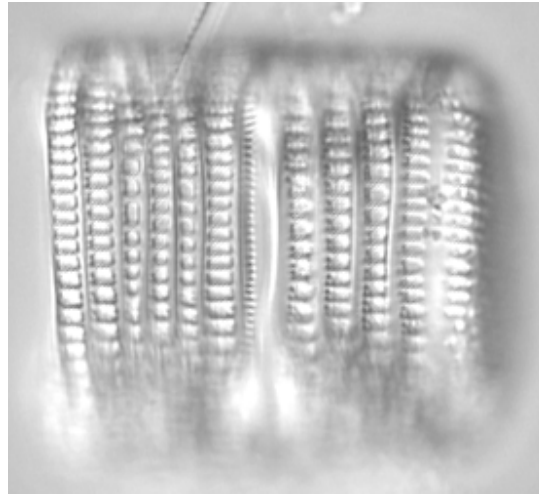
**Figure S21.** 1-3: *Nitzschia* sp. 88. 4: *Bacillaria paxillifera*. 5-6: *Nitzschia reversa*.



**Figure S22.** 1: *Tryblionella* sp. 1. 2-3: *Tryblionella punctata*. 4-5: *Tryblionella coarctata*. 6-7: *Tryblionella levidensis*. 8-9: *Tryblionella apiculata*. 10-12: *Rhopalodia brebissonii*. 13-15: *Surirella brebissonii*. 16-18: *Surirella brebissonii* var. *punctata*. 19-20: *Surirella brebissonii* var. *kuetzingii*. 21-22: *Surirella brightwellii*.

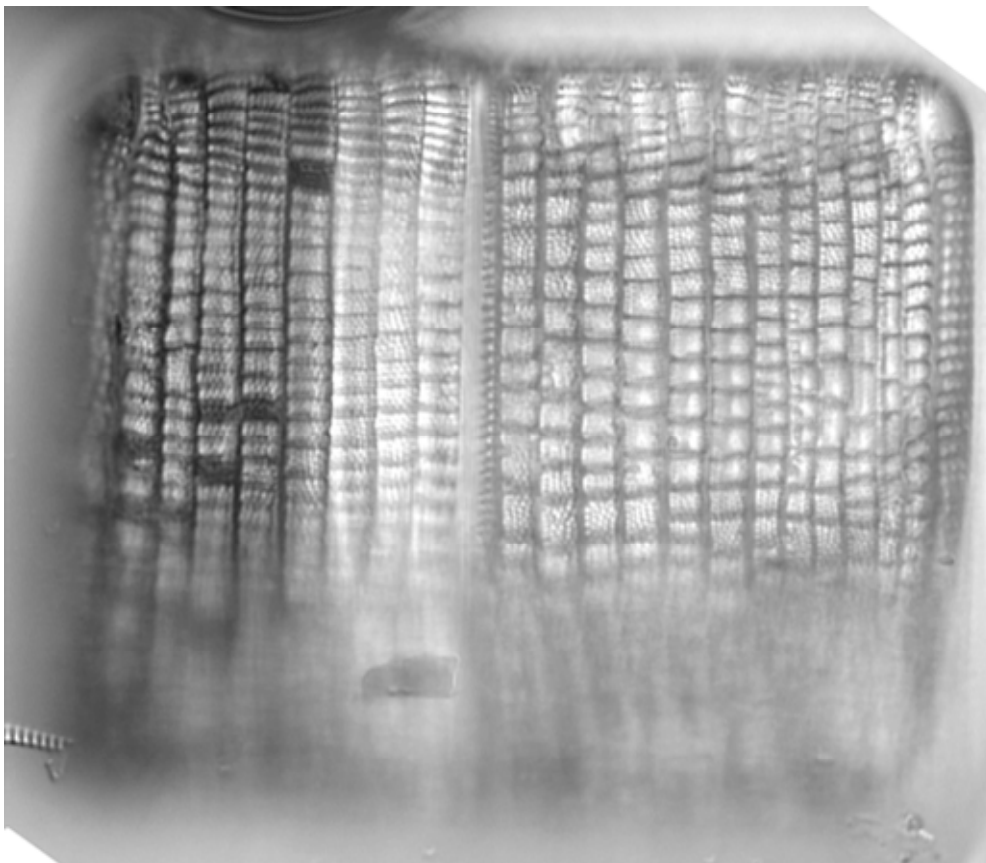


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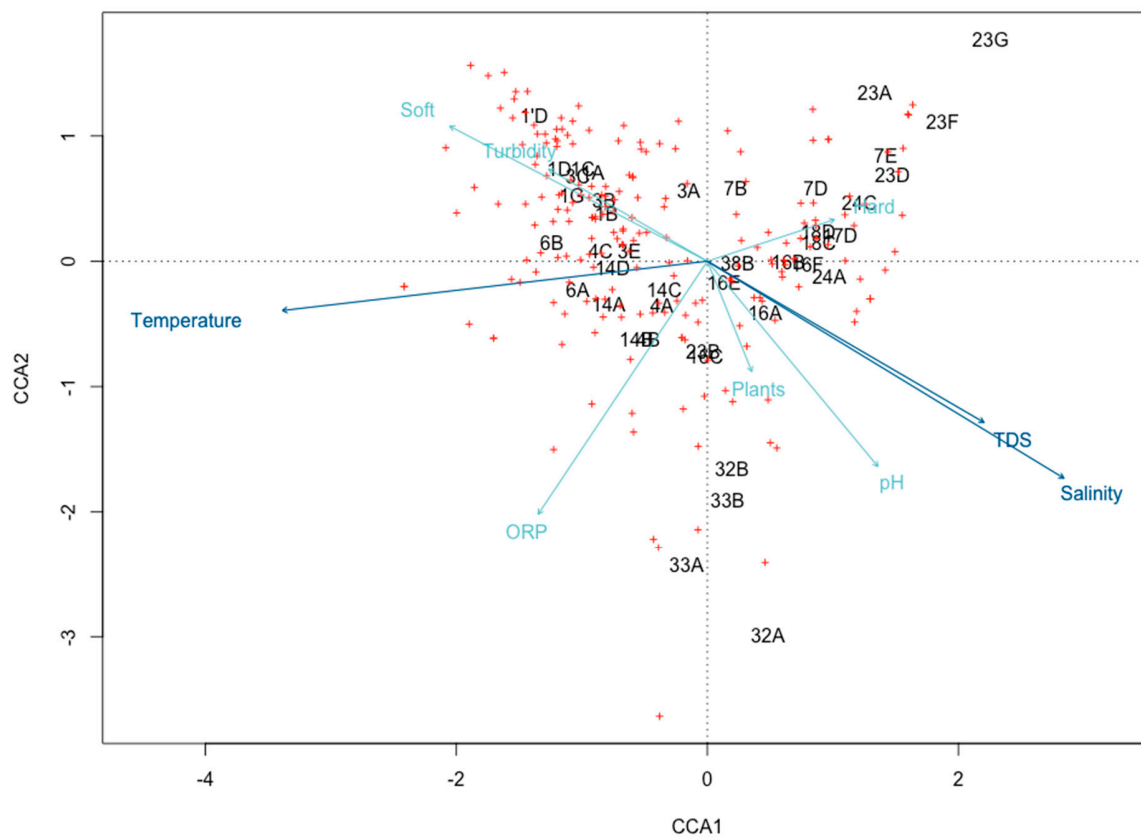
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Figure S23. 1-3: *Rhabdonema arcuatum*.



**Figure S24.** CCA showing the relationships between the environmental variables, different substrate types, sites and species with a relative abundance >1% (red cross). Variables represented by dark blue arrows are significant ( $p < 0.01$ ).