Diatom-based models for inferring water chemistry and hydrology in temporary depressional wetlands

Hydrobiologia

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Appendix 1

SIMPER results indicating the cumulative contribution of the taxa contributing most to the Bray-Curtis similarity in diatom composition within each site. These taxa contributed up to 50% of the total average similarity between surveys within each site.

S1 Average similarity 54.3%	Cum.%
Nitzschia acidoclinata Lange-Bertalot	23.3
Encyonema mesianum (Cholnoky) D.G. Mann	42.4
Eunotia bilunaris (Ehrenberg) Schaarschmidt	56.1
S2 Average similarity 58.4%	Cum.%
Nitzschia acidoclinata Lange-Bertalot	33.7
Nitzschia gracilis Hantzsch	50.4
S3 Average similarity 51%	Cum.%
Nitzschia acidoclinata Lange-Bertalot	14.5
Gomphonema spec. aff. *angustatum* (Kützing) Rabenhorst	27
Encyonema mesianum (Cholnoky) D.G. Mann	37.1
Achnanthidium minutissimum (Kützing) Czarnecki	46.5
Eunotia bilunaris (Ehrenberg) Schaarschmidt	54.1

Appendix 2

Optima and tolerances of the most common taxa for weighted averaging (WA) inference models for Na^+, alkalinity and depth. The total number of occurrences (N), the effective number of occurrences (Hill's N2) and maximum percent abundance (Max) are shown. Log-transformed tolerances were added and subtracted from the log-transformed optima and all 3 numbers back transformed to mgL^{-1} for Na^+ and alkalinity. Depth is measured in cm. Tolerance is presented as lower limit to upper limit.

				Na^+		Alkalinity		Depth	
Taxon	N	Max	N2	Optimum	Tolerance	Optimum	Tolerance	Optimum	Tolerance
Nitzschia acidoclinata Lange-Bertalot	63	18.1	54.8	4.9	1.8 - 13.6	68.1	45.1 - 102.7	62.4	33.8 - 91
Encyonema mesianum (Cholnoky) D.G. Mann	59	14.8	47.0	7.6	3.7 - 15.7	69.1	46.5 - 102.5	54.7	32.5 - 76.9
Gomphonema parvulum Kützing	55	11.1	41.1	6.4	3 - 13.6	78.7	48.7 - 127	52.2	29.0 - 75.4
Eunotia bilunaris (Ehrenberg) Schaarschmidt	60	17.6	41.0	5.4	2 - 14.7	60.8	38.7 - 95.4	60.2	33.1 - 87.3
Nitzschia gracilis Hantzsch	56	14.0	40.5	4.6	1.8 - 12	76.8	48.5 - 121.7	56.3	29.5 - 83.1
Fragilaria tenera (W.Smith) Lange-Bertalot	44	7.8	37.0	6.2	2.7 - 14.4	73.3	50.0 - 107.4	58.2	35.3 - 81.1
Achnanthidium minutissimum (Kützing) Czarnecki	46	14.9	31.9	9.5	5.1 - 17.7	83.6	55.3 - 126.4	47.0	27.0 – 67.0
Gomphonema parvulius (Lange-Bertalot & Reichardt) Lange-Bertalot& Reichardt	46	8.8	31.7	4.6	1.9 - 11.5	59.1	40.1 - 87	72.3	44.9 - 99.7
Gomphonema exilissimum (Grunow) Lange-Bertalot & Reichardt	36	3.9	31.5	3.5	1.3 - 9.4	60.3	40.2 - 90.5	72.3	44.8 - 99.8
Gomphonema spec. aff. *angustatum* (Kützing) Rabenhorst	43	11.7	31.1	3.3	1.3 - 8.5	58.6	43 - 79.9	77.5	53.6 - 101.4
Nitzschia fruticosa Hustedt	37	13.9	24.4	6.2	2.3 -16.2	82.7	53.9 - 127.0	47.4	25.3 - 69.6
Navicula tridentula Krasske	35	4.4	27.4	5.0	1.6 - 16.1	64.8	43.9 - 95.7	58.6	27- 90.2
Nitzschia palea var. debilis (Kützing) Grunow	32	3.2	29.0	3.7	1.4 - 9.8	57.6	45.8 - 72.4	71.8	49.8- 93.8
Gomphonema parvulum (Kützing) Kützing sensu lato	32	4.4	27.1	8.8	4.6 - 16.6	78.7	48.7 - 127	52.5	29.8 - 75.2
Gomphonema spiculoides H.P.Gandhi	31	6.6	24.3	7.8	3.9 - 15.8	56.2	39.2 - 80.6	63.2	36.3 - 90.1
Gomphonema auritum A. Braun ex Kützing	30	11.6	18.7	4.2	1.8 - 9.4	49.9	36 - 69.2	76.0	53.5 - 98.4
Gomphonema parvulum (Kützing) Kützing sensu lato Nr.2	28	4.0	24.1	7.7	3.6 - 16.7	66.9	46.1 - 97.0	58.4	33.8 - 83.1
Nitzschia acicularis (Kützing) W.M.Smith	27	9.8	18.8	5.2	2.2 - 12.4	75.9	52.5 - 109.8	61.8	39.9 - 83.6

Gomphonema gracile Ehrenberg	27	5.4	20.8	6.5	3.0 - 14.2	54.8	37.1 - 81.0	68.4	43.6 - 93.2
Brachysira neoexilis Lange-Bertalot	23	5.0	19.0	12.0	7.3 - 19.8	68.7	47.0 - 100.5	43.8	23.2 - 64.4
Nitzschia palea (Kützing) W.Smith	22	4.4	17.1	3.9	1.3 - 11.3	67.7	44.0 - 104.1	60.2	38.3 - 82.1
Gomphonema exilissimum (Grunow) Lange-Bertalot & Reichardt sensu lato	20	5.8	16.9	2.7	1.1 - 7.0	54.9	42.7 - 70.6	83.1	61.8 - 104.5
Pinnularia subgibba Krammer var. *subgibba*	19	3.6	15.3	7.2	2.9 - 17.8	66.0	39.6 - 110.0	56.5	27.5 - 85.4
Gomphonema spec. aff. *stonei* Reichardt ssp.	17	4.6	13.7	3.0	1.1 - 8.4	48.9	36.1 - 66.3	71.6	47.7 - 95.6
Pinnularia spec. aff. *graciloides* Hustedt	15	2.2	13.8	8.6	3.1 - 24.1	69.0	44.3 - 107.6	44.2	15.6 - 72.8
Gomphonema Ehrenberg spec. Nr. 3	15	4.0	12.4	4.0	1.8 - 8.8	52.2	40.2 - 67.9	79.3	58.8 - 99.8
Ulnaria acus (Kützing) Aboal	12	4.4	9.7	3.6	2.3 - 5.7	86.7	58.4 - 128.8	56.5	39.5 - 73.4
Gomphonema pseudobohemicum Lange-Bertalot& Reichardt	12	7.1	9.4	7.0	3.8 - 12.8	61.0	41.2 - 90.2	66.4	40.9 - 91.8
Gomphonema cf. *parvulum* (Kützing) Kützing	12	3.2	11.0	4.5	1.8 - 11.2	97.3	55.8 - 169.5	48.6	27.6 - 69.7
Achnanthidium saprophilum (Kobayasi et Mayama) Round & Bukh.	11	6.4	7.4	11.4	5.8 - 22.3	91.7	67.0 - 125.6	45.8	26.7 - 64.9
Nitzschia subacicularis Hustedt	11	5.8	10.4	10.7	7.8 - 14.9	83.3	65.5 - 105.9	52.7	38.1 - 67.3
Gomphonema spec. aff. *bohemicum* Reichelt & Fricke	11	7.2	8.6	4.8	2.7 - 8.3	47.3	41.1 - 54.3	84.0	68.8 - 99.1
Hantzschia amphioxys (Ehrenberg) Grunow	10	2.0	9.3	7.9	3.3 - 19.0	115.5	63.9 - 208.7	38.1	18.6 - 57.7
Eunotia minor (Kützing) Grunow	9	2.2	8.4	10.3	6.3 - 17.0	113.9	64.0 - 202.9	38.4	20.1 - 56.7
Gomphonema spec. aff. *angustatum* (Kützing) Rabenhorst spp. 2	8	4.8	5.8	3.1	1.8 - 5.5	51.3	37.8 - 69.6	76.7	58.9 - 94.6
Pinnularia viridiformis Krammer var. *minor* Krammer	8	1.4	7.9	5.6	1.9 - 16.5	85.7	41.0 - 179.4	43.6	21.7 - 65.6
Pinnularia pseudogibba Krammer	8	2.0	7.6	9.4	4.4 - 20.1	65.2	52.3 - 81.3	42.5	23.2 - 61.8
Gomphonema Ehrenberg spec. Nr. 4	8	3.5	7.3	11.0	8.3 - 14.7	85.5	74.5 - 98.0	50.4	41.0 - 59.8
Rhopalodia gibba (Ehrenberg) O. Muller	7	4.8	5.6	7.9	6.5 - 9.7	70.1	65.4 - 75.2	63.7	56.9 - 70.6
Pinnularia spec. aff. *tirolensis* (Metzeltin & Krammer) Krammer	7	2.2	6.2	3.0	0.8 - 11.1	55.7	34.3 - 90.3	65.5	29.0 - 102.0
Navicula cryptocephala Kützing	7	2.2	6.3	4.0	1.8 - 8.8	109.4	61.8 - 193.7	41.6	26.1 - 57.2
Sellaphora joubaudii (Germain) Aboal	6	2.6	5.3	11.3	3.5 - 36.7	85.9	48.7 - 151.6	29.4	5.5 - 53.3
Gomphonema spec. aff. *angustatum* (Kützing) Rabenhorst spp. 5	6	3.7	4.4	6.2	3.0 - 12.6	50.3	42.5 - 59.4	77.6	52.2- 103.0
Pinnularia subcapitata Gregory var. *elongata* Krammer	5	2.0	4.6	6.6	2.6 - 17.3	83.3	41.8 - 166.2	51.6	21.4 - 81.7
Pinnularia acrospheria W. Smith	5	1.0	5.0	9.4	7.5 - 11.8	52.4	45.3 - 60.5	57.7	38.5 - 76.9
Pinnularia Ehrenberg spec. Nr. 1	5	1.0	5.0	5.9	4.6 - 7.5	64.0	49.1 - 83.4	68.3	54.8 - 81.8
Gomphonema spec. aff. *angustatum* (Kützing) Rabenhorst spp. 4	5	3.3	4.1	4.0	2.4 - 6.6	86.9	67.3 - 112.3	53.8	39.3 - 68.4
Gomphonema spec. aff. *angustatum* (Kützing) Rabenhorst spp. 3	5	2.8	4.5	9.4	6.6 - 13.4	71.7	58.6 - 87.8	48.6	38.7 - 58.4

Gomphonema Ehrenberg spec. Nr. 2	5	1.7	4.7	9.2	6.3 - 13.4	70.7	51.0 - 98.0	54.4	39.9 - 68.9
Gomphonema Ehrenberg spec. Nr. 8	5	1.4	4.9	3.3	1.4 - 7.8	71.3	52.7 - 96.5	56.4	33.2 - 79.6

Appendix 3 Pearson correlation coefficients between the most common taxa and the best performance WA model variables. Significance of each comparison is indicated by *P ≤ 0.05, ** P ≤ 0.01 and *** P ≤ 0.001.

	Na^+		Depth		Alkalinity	
Nitzschia acidoclinata Lange-Bertalot	-0.19		0.10		0.09	
Encyonema mesianum (Cholnoky) D.G.Mann	**0.67**	***	**-0.43**	***	0.12	
Gomphonema parvulum Kützing	**0.29**	*	**-0.47**	***	**0.52**	***
Eunotia bilunaris (Ehrenberg) Schaarschmidt	0.04		-0.06		**-0.32**	*
Nitzschia gracilis Hantzsch	-0.18		**-0.26**	*	**0.43**	***
Fragilaria tenera (W.Smith) Lange-Bertalot	0.21		-0.14		**0.25**	*
Achnanthidium minutissimum (Kützing) Czarnecki	**0.63**	***	**-0.55**	***	**0.52**	***
Gomphonema parvulius (Lange-Bertalot & Reichardt) Lange-Bertalot & Reichardt	-0.13		**0.41**	***	**-0.30**	*
Gomphonema exilissimum (Grunow) Lange-Bertalot& Reichardt	**-0.43**	***	**0.41**	***	**-0.25**	*
Gomphonema spec. aff. *angustatum* (Kützing) Rabenhorst	**-0.48**	***	**0.60**	***	**-0.31**	*
Nitzschia fruticosa Hustedt	0.13		**-0.42**	***	**0.39**	***
Navicula tridentula Krasske	-0.05		-0.09		-0.07	
Nitzschia palea var. debilis (Kützing) Grunow	**-0.33**	**	**0.36**	***	**-0.33**	**
Gomphonema parvulum (Kützing) Kützing sensu lato	**0.47**	***	**-0.29**	*	0.12	
Gomphonema spiculoides H.P.Gandhi	**0.33**	**	0.05		**-0.33**	**
Gomphonema auritum A.Braun ex Kützing	-0.16		**0.36**	**	**-0.45**	***
Gomphonema parvulum (Kützing) Kützing sensu lato Nr.2	**0.32**	**	-0.09		-0.01	
Nitzschia acicularis (Kützing) W.M.Smith	-0.004		0.01		0.19	
Gomphonema gracile Ehrenberg	0.16		0.19		**-0.33**	**