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Supplementary material

Bioaccumulation, oxidative stress and cellular damage in the intertidal gastropod *Bembicium nanum* exposed to a metal contamination gradient

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Table S1. Measured values and certified reference values (µg g^{-1} dry mass) for certified reference material 1556b samples that were digested and analysed with metal samples

Element	Measured value	Certified value
Mn	17 ± 1	18.5 ± 0.2
Fe	178 ± 15	206 ± 7
Cu	66 ± 5	72 ± 2
Zn	1285 ± 122	1424 ± 46
As	7.1 ± 0.4	7.65 ± 0.65
Cd	2.4 ± 0.3	2.48 ± 0.08

Table S2. Metal concentrations (µg g^{-1} dry mass) in *B. nanum* whole tissue for organisms sampled at Port Kembla, Shellharbour and Kiama

Mean and standard error values are calculated from combined data for organisms sampled September 2010, November 2011, January 2012 and March 2012 (n = 22) (% mol indicates the mean percentage of the total molar concentration of the metal burden for the site)

	Port Kembla		Shellharbour		Kiama	
	Mean ± s.e.	% mol	Mean ± s.e.	% mol	Mean ± s.e.	% mol
Mn	86 ± 10	6.6	59 ± 13	11.8	41 ± 8	8.9
Fe	351 ± 38	26.5	251 ± 32	48.9	169 ± 20	36.1
Cu	839 ± 83	55.7	71 ± 11	12.1	152 ± 23	28.5
Zn	148 ± 10	9.5	128 ± 6	21.2	125 ± 11	22.8
As	30 ± 4	1.7	40 ± 9	5.9	22 ± 2	3.5
Cd	1.21 ± 0.24	0	1.61 ± 0.25	0.1	1.75 ± 0.24	0.2

Table S3. Mann–Whitney U-tests comparing concentrations of Fe, Cu, Zn, As, Mn and Cd in digestive tracts and mantle complex tissue of *B. nanum* sampled from Port Kembla, Shellharbour and Kiama

Data used are from combined replicates from November 2011, January 2012 and March 2012 (n = 12)

	Port Kembla			Shellharbour			Kiama		
	U	*Z*	*P*	*U*	*Z*	*P*	*U*	*Z*	*P*
Fe	12	–3.464	0.001	27	–2.598	0.005	58	–0.808	0.210
Cu	3	–3.984	0.000	67	–0.289	0.386	69	–0.173	0.432
Zn	0	–4.157	0.000	0	–4.157	0.000	12	–3.464	0.001
As	5	–3.868	0.000	11	–3.522	0.000	5	–3.868	0.000
Mn	0	–4.157	0.000	0	–4.157	0.000	0	–4.157	0.000
Cd	60	–0.693	0.244	45	–1.559	0.060	65	–.404	0.343

Table S4. Manganese concentration in digestive tract (dig) and mantle complex tissue (tis) of *B. nanum* sampled from Port Kembla, Shellharbour and Kiama (all is the three sites combined)

Data are for combined replicates from November 2011, January 2012 and March 2012 (n = 12)

	Mean ± s.e.	Min.	Max.
Mn_{dig} (All)	213 ± 139	26	486
Mn_{tis} (All)	10 ± 6	3	33
Mn_{whole} (All)	79 ± 49	11	190
Mn_{dig} (PK)	284 ± 124	143	486
Mn_{tis} (PK)	12 ± 8	5	33
Mn_{whole} (PK)	100 ± 41	48	190
Mn_{dig} (S)	200 ± 157	26	452
Mn_{tis} (S)	8 ± 3	3	14
Mn_{whole} (S)	76 ± 57	11	181
Mn_{dig} (K)	156 ± 112	56	393
Mn_{tis} (K)	11 ± 6	4	29
Mn_{whole} (K)	59 ± 40	24	142

Table S5. Arsenic concentration in digestive tract (dig) and mantle complex tissue (tis) of *B. nanum* sampled from Port Kembla, Shellharbour and Kiama (all is the three sites combined)

Data are for combined replicates from November 2011, January 2012 and March 2012 (n = 12)

	Mean ± s.e.	Min.	Max.
As_{dig} (All)	47 ± 46	19	267
As_{tis} (All)	18 ± 5	10	30
As_{whole} (All)	28 ± 16	14	93
As_{dig} (PK)	60 ± 66	20	267
As_{tis} (PK)	20 ± 6	13	30
As_{whole} (PK)	33 ± 20	17	93
As_{dig} (S)	42 ± 41	19	168
As_{tis} (S)	19 ± 4	12	25
As_{whole} (S)	28 ± 17	16	80
As_{dig} (K)	37 ± 21	19	83
As_{tis} (K)	15 ± 4	10	24
As_{whole} (K)	23 ± 9	14	44

Table S6. Iron Concentration in digestive tract (dig) and mantle complex tissue (tis) of *B. nanum* sampled from Port Kembla, Shellharbour and Kiama (all is the three sites combined)

Data are for combined replicates from November 2011, January 2012 and March 2012 (n = 12)

	Mean ± s.e.	Min.	Max.
Fe_{dig} (All)	456 ± 276	96	1455
Fe_{tis} (All)	239 ± 109	74	491
Fe_{whole} (All)	313 ± 151	106	853
Fe_{dig} (PK)	648 ± 293	365	1455
Fe_{tis} (PK)	285 ± 124	145	491
Fe_{whole} (PK)	405 ± 176	215	853
Fe_{dig} (S)	466 ± 241	169	879
Fe_{tis} (S)	221 ± 110	73	434
Fe_{whole} (S)	307 ± 131	141	572
Fe_{dig} (K)	255 ± 118	96	417
Fe_{tis} (K)	212 ± 82	105	355
Fe_{whole} (K)	228 ± 85	106	345

Table S7. Zinc concentration in digestive tract (dig) and mantle complex tissue (tis) of *B. nanum* sampled from Port Kembla, Shellharbour and Kiama (all is the three sites combined)

Data are for combined replicates from November 2011, January 2012 and March 2012 (n = 12)

	Mean ± s.e.	Min	Max
Zn_{dig} (All)	242 ± 134	100	730
Zn_{tis} (All)	77 ± 42	50	312
Zn_{whole} (All)	131 ± 49	76	293
Zn_{dig} (PK)	325 ± 195	156	730
Zn_{tis} (PK)	72 ± 14	57	99
Zn_{whole} (PK)	150 ± 57	95	284
Zn_{dig} (S)	238 ± 49	158	311
Zn_{tis} (S)	66 ± 11	50	86
Zn_{whole} (S)	126 ± 19	95	152
Zn_{dig} (K)	163 ± 51	99	252
Zn_{tis} (K)	93 ± 69	62	311
Zn_{whole} (K)	116 ± 58	76	293

Table S8. Copper concentration in digestive tract (dig) and mantle complex tissue (tis) of *B. nanum* sampled from Port Kembla, Shellharbour and Kiama (all is the three sites combined)

Data are for combined replicates from November 2011, January 2012 and March 2012 (n = 12)

	Mean ± s.e.	Min.	Max.
Cu_{dig} (All)	612 ± 765	7	2770
Cu_{tis} (All)	211 ± 220	31	881
Cu_{whole} (All)	341 ± 390	26	1609
Cu_{dig} (PK)	1518 ± 619	729	2770
Cu_{tis} (PK)	478 ± 178	218	881
Cu_{whole} (PK)	812 ± 319	403	1609
Cu_{dig} (S)	108 ± 95	19	338
Cu_{tis} (S)	75 ± 32	31	149
Cu_{whole} (S)	87 ± 52	32	217
Cu_{dig} (K)	210 ± 347	7	1184
Cu_{tis} (K)	79 ± 63	31	267
Cu_{whole} (K)	122 ± 125	26	460