

Table S1: Limits of quantification (LOQ, in italics) and average recovery rates (in %) obtained for the certified reference materials used in the analyses of major and trace chemical elements. The symbol “—” appears when the element was not determined nor quantified in the samples. (NC) = Not Certified for the element. Elements are listed in alphabetical order within each broad type of elements (i.e. major vs. trace elements).

	Major elements						
	Ca	K	Mg	Na	P	Sr	
<i>LOQ (mg kg⁻¹ dm):</i>	10	40	10	10	10	0.02	
TORT-3 (lobster hepatopancreas, NRCC)	(NC)	(NC)	(NC)	(NC)	(NC)	99	
DOLT-5 (dogfish liver, NRCC)	95	106	84	111	90	100	
	Trace elements						
	Ag	As	Cd	Co	Cu	Fe	Hg
<i>LOQ (mg kg⁻¹ dm):</i>	0.01	0.09	0.01	0.02	0.11	1.5	0.015
IAEA-142 (mussel homogenate, IAEA)	(NC)	(NC)	(NC)	(NC)	(NC)	(NC)	97
IAEA-407 (whole fish homogenate, IAEA)	89	120	97	80	90	105	100
DORM-4 (fish protein, NRCC)	103	114	105	108	95	103	—
DOLT-5 (dogfish liver, NRCC)	86	106	94	90	91	101	—
SRM-2976 (mussel tissue, NIST)	95	108	104	94	92	95	—
	Mn	Mo	Pb	Se	V	Zn	
	<i>LOQ (mg kg⁻¹ dm):</i>	0.03	0.02	0.08	0.14	0.04	1.2
IAEA-142 (mussel homogenate, IAEA)	(NC)	(NC)	(NC)	(NC)	(NC)	(NC)	
IAEA-407 (whole fish homogenate, IAEA)	103	(NC)	83	90	103	103	
DORM-4 (fish protein, NRCC)	142	100	88	101	100	103	
DOLT-5 (dogfish liver, NRCC)	94	95	130	83	96	101	
SRM-2976 (mussel tissue, NIST)	98	(NC)	95	94	89	102	

* Indicative value on the certificate.

Table S2: Synthesis of data (levels) and dispersion indexes calculated (see 2.5) for the 4 biological parameters and 19 chemical elements measured on the community of micronekton collected in the twilight zone of the Bay of Biscay, NE Atlantic : taxon Mean values \pm Standard Deviations (SD), minimum/maximum (min/max) values and Median values (N =6 for crustaceans and N =33 for fish); Variation Coefficient (VC); Relative Interquartile Coefficient (RIC); Fold-Change (FC) values; min/max values for the Species Relative Difference with the Taxon (Species RDT). Elements are listed in alphabetical order within each broad type of elements (i.e. major vs. trace elements).

Biological parameters (levels in ‰ for $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ and in kJ g^{-1} dry mass (dm) for ED)							
		$\delta^{13}\text{C}$	$\delta^{15}\text{N}$	C:N ratio	ED		
Crustaceans	Mean \pm SD	-19.52 \pm 0.38	9.33 \pm 0.68	3.63 \pm 0.75	19.8 \pm 4.2		
	(min/max)	(-19.90/-18.79)	(8.05/10.05)	(3.26/5.15)	(16.7/28.0)		
	Median	-19.57	9.48	3.35	18.0		
	VC (%)	2	7	21	21		
	RIC	0.008	0.025	0.017	0.134		
	FC value	0.9	1.2	1.6	1.6		
	Species RDT (min/max)	-1.0/1.0	-1.2/1.1	-1.1/1.4	-1.1/1.4		
Fish	Mean \pm SD	-19.57 \pm 0.41	10.69 \pm 0.89	3.98 \pm 1.18	20.0 \pm 2.2		
	(min/max)	(-20.30/-18.26)	(9.17/12.23)	(3.17/8.50)	(17.2/25.1)		
	Median	-19.59	10.52	3.34	19.3		
	VC (%)	2	8	30	11		
	RIC	0.027	0.129	0.379	0.174		
	FC value	1.0	1.3	2.0	1.3		
	Species RDT (min/max)	-1.0/1.0	-1.1/1.1	-1.3/1.6	-1.1/1.2		
Major elements (levels in mg kg^{-1} dm)							
		Ca	K	Mg	Na	P	Sr
Crustaceans	Mean \pm SD	24 264 \pm 7 983	13 127 \pm 1 924	2 979 \pm 696	15 610 \pm 2 584	11 136 \pm 1 855	407.2 \pm 128.4
	(min/max)	(9 676/31 608)	(10 028/14 569)	(1 850/3 565)	(10 419/17 056)	(7 926/12 507)	(174.7/538.2)
	Median	24 484	14 225	3 289	16 783	11 970	416.5
	VC (%)	33	15	23	17	17	32
	RIC	0.235	0.155	0.265	0.051	0.177	0.224
	FC value	3.3	1.5	1.9	1.6	1.6	3.1
	Species RDT (min/max)	-2.5/1.3	-1.3/1.1	-1.6/1.2	-1.5/1.1	-1.4/1.1	-2.3/1.3
Fish	Mean \pm SD	27 372 \pm 9 737	16 788 \pm 4 295	2 429 \pm 615	21 126 \pm 7 364	17 578 \pm 4 247	110.7 \pm 33.9
	(min/max)	(14 478/57 992)	(7 846/22 697)	(1 113/3 660)	(7 361/30 718)	(10 243/28 891)	(44.5/188.3)
	Median	25940	17518	2537	22672	17088	106.1
	VC (%)	36	26	25	35	24	31
	RIC	0.435	0.380	0.343	0.655	0.277	0.485

	FC value	3.4	2.3	2.2	3.0	2.3	2.6	
	Species RDT (min/max)	-1.9/1.8	-1.7/1.3	-1.7/1.3	-2.1/1.4	-1.5/1.5	-1.8/1.5	
Trace elements (levels in mg kg⁻¹ dm)								
		Ag	As	Cd	Co	Cu	Fe	Hg
Crustaceans	Mean ± SD	0.77 ± 0.47	50.08 ± 27.96	8.67 ± 5.25	0.24 ± 0.18	62.53 ± 29.98	124.1 ± 68.5	0.265 ± 0.105
	(min/max)	(0.38/1.39)	(18.12/77.17)	(1.26/12.30)	(0.08/0.52)	(25.07/97.63)	(58.8/219.5)	(0.184/0.469)
	Median	0.58	54.04	11.84	0.18	70.05	106.0	0.236
	VC (%)	61	56	61	74	48	55	40
	RIC	1.358	0.909	0.620	1.423	0.651	1.019	0.246
	FC value	3.5	4.1	9.6	5.2	3.5	3.1	2.6
	Species RDT (min/max)	-2.0/1.8	-2.8/1.5	-6.9/1.4	-2.4/2.1	-2.5/1.4	-1.8/1.8	-1.4/1.8
Fish	Mean ± SD	0.02 ± 0.03	18.34 ± 18.85	0.71 ± 1.07	0.14 ± 0.10	2.95 ± 2.22	154.9 ± 137.9	0.401 ± 0.397
	(min/max)	(0.00/0.015)	(3.32/62.85)	(0.03/5.03)	(0.02/0.42)	(0.90/10.83)	(36.2/650.8)	(0.051/1.802)
	Median	0.01	8.27	0.32	0.14	2.06	130.8	0.285
	VC (%)	146	103	150	69	75	89	99
	RIC	1.017	1.676	2.445	1.141	1.019	1.091	1.396
	FC value	21.6	14.6	72.7	9.2	8.7	7.0	15.2
	Species RDT (min/max)	-4.2/5.2	-4.8/3.1	-21.3/3.4	-5.0/1.8	-3.2/2.7	-3.2/2.2	-4.5/3.4
Trace elements (continued)								
		Mn	Mo	Pb	Se	V	Zn	
Crustaceans	Mean ± SD	4.65 ± 1.81	2.86 ± 1.56	0.09 ± 0.08	2.29 ± 0.49	0.54 ± 0.90	57.9 ± 24.1	
	(min/max)	(3.03/7.31)	(1.33/5.34)	(0.04/0.26)	(1.40/2.91)	(0.08/2.37)	(31.1/103.1)	
	Median	3.99	2.65	0.06	2.36	0.19	54.7	
	VC (%)	39	54	91	22	167	42	
	RIC	0.645	0.781	0.516	0.058	1.110	0.151	
	FC value	2.2	3.3	5.4	2.1	24.5	3.3	
	Species RDT (min/max)	-1.4/1.6	-1.8/1.9	-1.9/2.8	-1.6/1.3	-5.6/4.4	-1.9/1.8	
Fish	Mean ± SD	4.52 ± 2.48	1.90 ± 1.88	0.08 ± 0.05	2.30 ± 0.49	0.27 ± 0.33	54.7 ± 27.4	
	(min/max)	(1.23/12.07)	(0.06/7.71)	(0.02/0.24)	(1.35/3.02)	(0.04/1.77)	(17.2/152.6)	
	Median	4.02	1.48	0.06	2.34	0.19	50.7	
	VC (%)	55	99	69	21	126	50	
	RIC	0.808	1.626	0.745	0.404	0.767	0.432	
	FC value	3.9	40.6	6.8	1.7	24.8	4.2	
	Species RDT (min/max)	-2.3/1.7	-16.3/2.5	-2.2/3.1	-1.4/1.3	-5.6/4.4	-2.2/1.9	

Table S3: Numerical results of the hierarchical clustering analysis performed (see 2.5), using Ward's minimum variance method and including 20 variables corresponding to a concentration per unit mass measured on whole organisms (i.e. energy density (ED) among biological parameters, 6 major chemical elements and 13 trace elements including both essential and non-essential elements). Energy density in kJ g⁻¹ dry mass (dm), major and trace chemical elements in mg kg⁻¹ dm. Species full names are listed in Table 1. Elements are listed in alphabetical order within each broad type of elements (i.e. major vs. trace elements).

Proportion of the variance explained by each variable in the definition of groups (in bold, variables with proportion ≥ 50%)						
Cu (95%) > Ag (93%) > Na (83%) > Sr = Cd (82%) > K (78%) > P (76%) > As (75%) > Mg (72%) > Ca (65%) > ED (64%) > Pb (63%) > Se (62%) > V (51%) > Co (45%) > Fe (42%) > Mo (26%) > Zn (25%) > Hg (19%) > Mn (17%)						
Species composition of groups	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6
	<i>P. sivado</i> (n=3/3)	<i>E. figueirai</i> (n=1/1) <i>S. robusta</i> (n=1/1) <i>S. debilis</i> (n=1/1)	<i>S. koefoedi</i> (n=1/1) <i>X. copei</i> (n=3/3)	<i>M. punctatum</i> (n=3/3) <i>N. kroeyeri</i> (n=3/3) <i>A. risso</i> (n=2/3)	<i>A. olfersii</i> (n=3/3) <i>A. carbo</i> (n=3/3) <i>L. crocodilus</i> (n=3/3)	<i>S. beanii</i> (n=5/5) <i>C. sloani</i> (n=3/3) <i>S. boa</i> (n=3/3) <i>A. risso</i> (n=1/3)
	<u>ED = 17.3</u>	ED = 22.3	ED = 18.8	ED = 23.3	ED = 18.8	ED = 19.1
	Ca = 24283 K = 14257 Mg = 3492 Na = 16919 P = 12459 Sr = 406.8	Ca = 24245 K = 11998 Mg = 2466 Na = 14301 <u>P = 9813</u> Sr = 407.6	<u>Ca = 15984</u> K = 20757 Mg = 2604 Na = 25514 P = 15969 Sr = 138.0	Ca = 20598 <u>K = 10764</u> <u>Mg = 1632</u> <u>Na = 11709</u> P = 13163 <u>Sr = 74.2</u>	Ca = 39214 K = 16550 Mg = 2376 Na = 18372 P = 22595 Sr = 135.3	Ca = 26804 K = 19659 Mg = 2941 Na = 28007 P = 17296 Sr = 107.3
Mean values for the groups, with:						
i) in bold, parameters for which the group has the highest value	Ag = 0.39 As = 75.1 Cd = 12.19	Ag = 1.16 As = 25.1 Cd = 5.13	Ag = 0.04 As = 51.7 Cd = 0.77	Ag = 0.05 <u>As = 7.45</u> <u>Cd = 0.08</u>	Ag = 0.02 As = 24.1 Cd = 0.36	<u>Ag = 0.01</u> As = 10.2 Cd = 1.38
ii) in italics and underlined, parameters for which the group has the lowest value	<u>Co = 0.10*</u> Cu = 86.6 <u>Fe = 70.0</u> Hg = 0.248 <u>Mn = 3.36</u> Mo = 1.63 <u>Pb = 0.05*</u> Se = 2.37 V = 0.10 Zn = 55.6	Co = 0.39 Cu = 38.5 Fe = 178.3 Hg = 0.283 Mn = 5.94 Mo = 4.10 Pb = 0.13 Se = 2.21 V = 0.98 Zn = 60.2	Co = 0.21 Cu = 2.13 Fe = 87.0 Hg = 0.262 Mn = 4.80 Mo = 1.67 Pb = 0.20 Se = 2.81 V = 1.00 Zn = 79.4	Co = 0.11 Cu = 5.04 Fe = 91.4 <u>Hg = 0.191</u> Mn = 3.94 <u>Mo = 1.20</u> Pb = 0.06 Se = 2.16 <u>V = 0.10*</u> <u>Zn = 35.7</u>	Co = 0.10 Cu = 2.74 Fe = 88.5 Hg = 0.386 Mn = 3.49 Mo = 1.27 Pb = 0.05 Se = 2.77 V = 0.14 Zn = 48.2	<u>Co = 0.17</u> <u>Cu = 1.99</u> Fe = 269.7 Hg = 0.600 Mn = 5.58 Mo = 2.93 Pb = 0.07 <u>Se = 1.87</u> V = 0.23 Zn = 64.0

* Lowest value for this group when 3 decimals are considered.

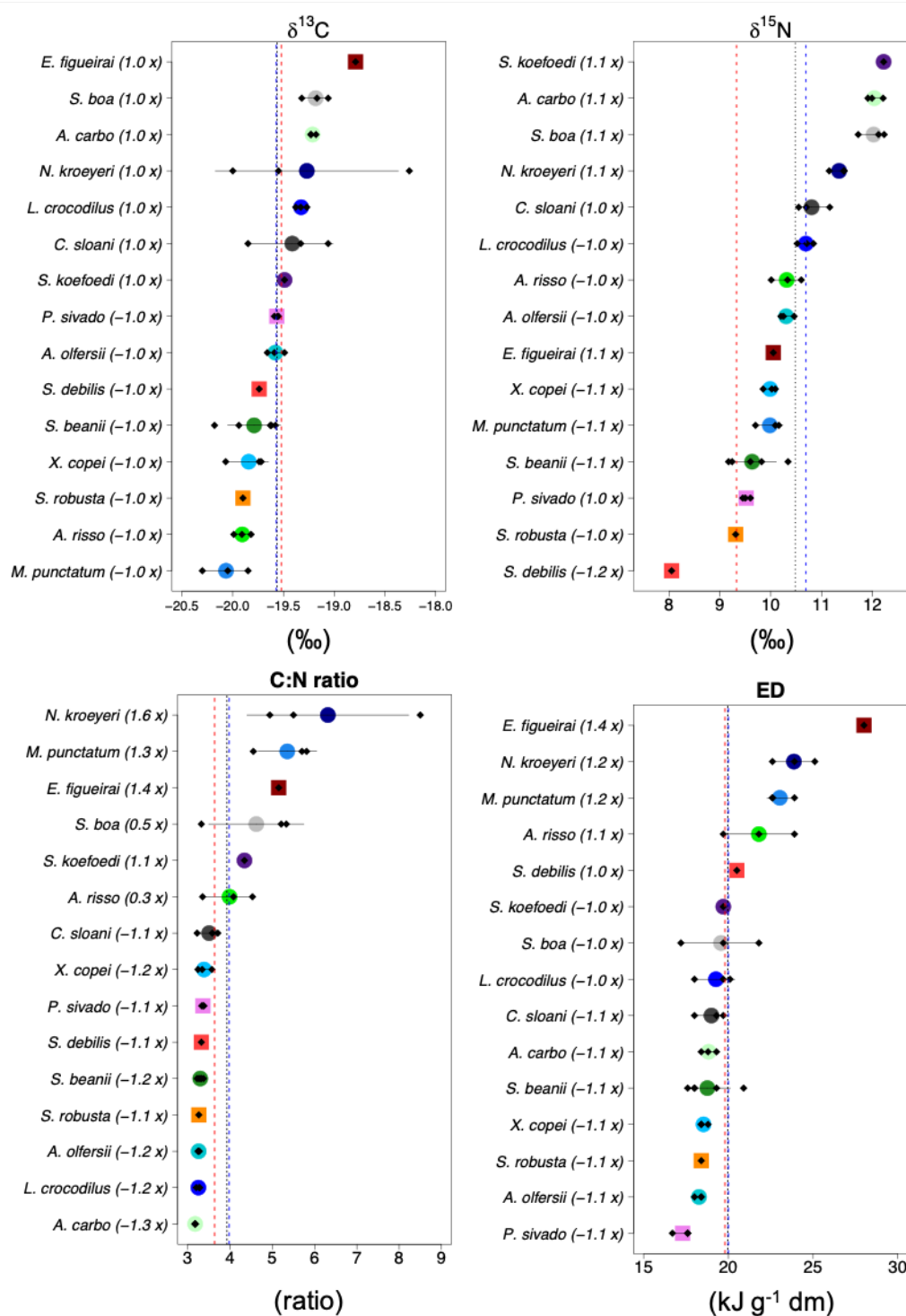


Figure S1: Spectra of the measured values for the 4 biological parameters considered, with species classified in the order of increasing mean per species (\pm standard deviation) and then in the order of the Species Relative difference with the Taxon (Species RDT), in brackets (see 2.5). The dotted black line corresponds to the mean value including both crustaceans and fish (individual sample data, $N=39$), and dashed red and blue lines to mean values for crustaceans ($N=6$) and fish ($N=33$), respectively. Crustaceans are represented by squares and fish by circles, as on Figure 1. Species full names are listed in Table 1.

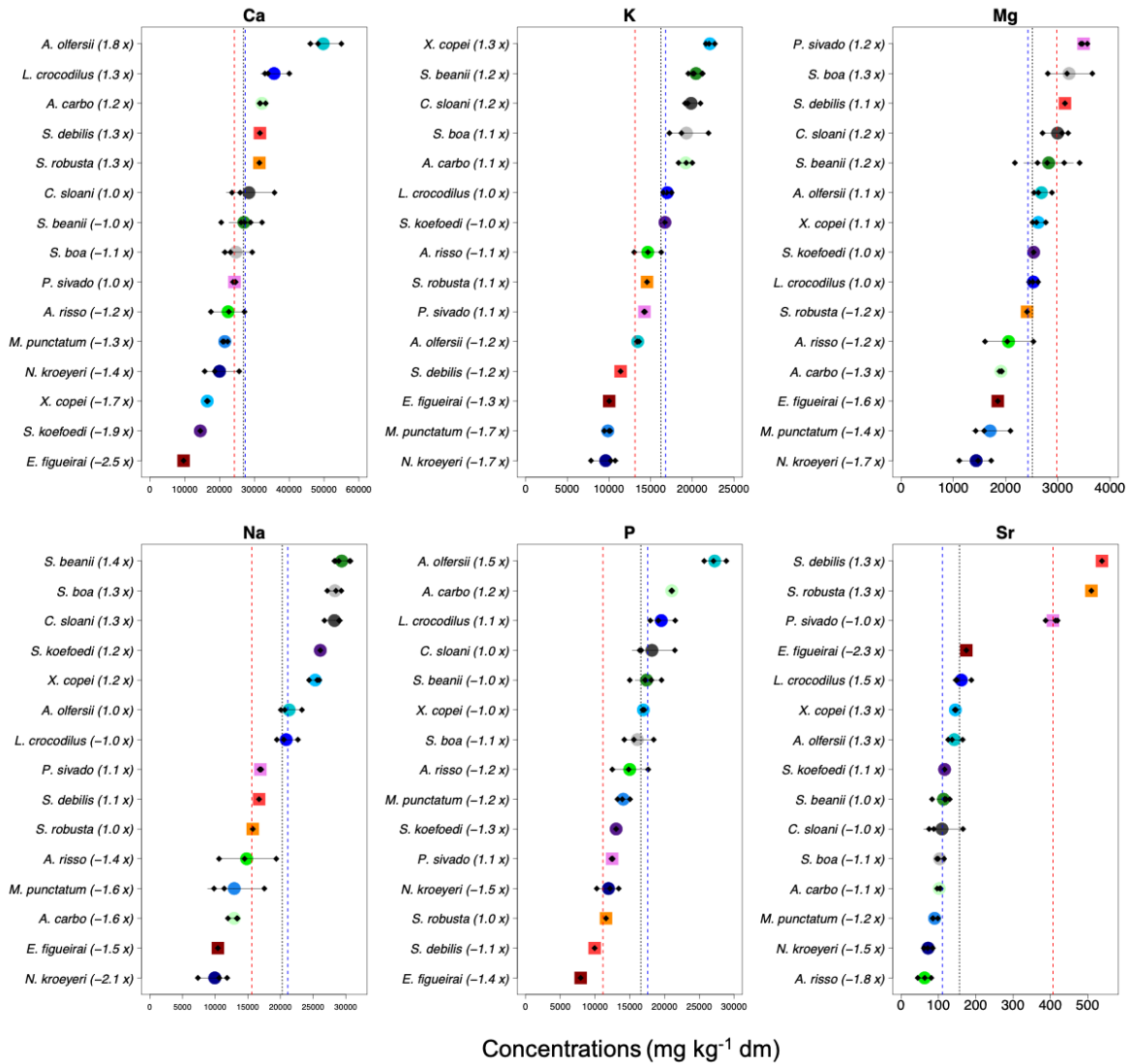


Figure S2: Spectra of the measured values for the 6 major elements considered, with species classified in the order of increasing mean per species (\pm standard deviation) and then in the order of the Species Relative difference with the Taxon (Species RDT), in brackets (see 2.5). The dotted black line corresponds to the mean value including both crustaceans and fish (individual sample data, $N = 39$), and dashed red and blue lines to mean values for crustaceans ($N = 6$) and fish ($N = 33$), respectively. Crustaceans are represented by squares and fish by circles, as on Figure 1. Species full names are listed in Table 1.

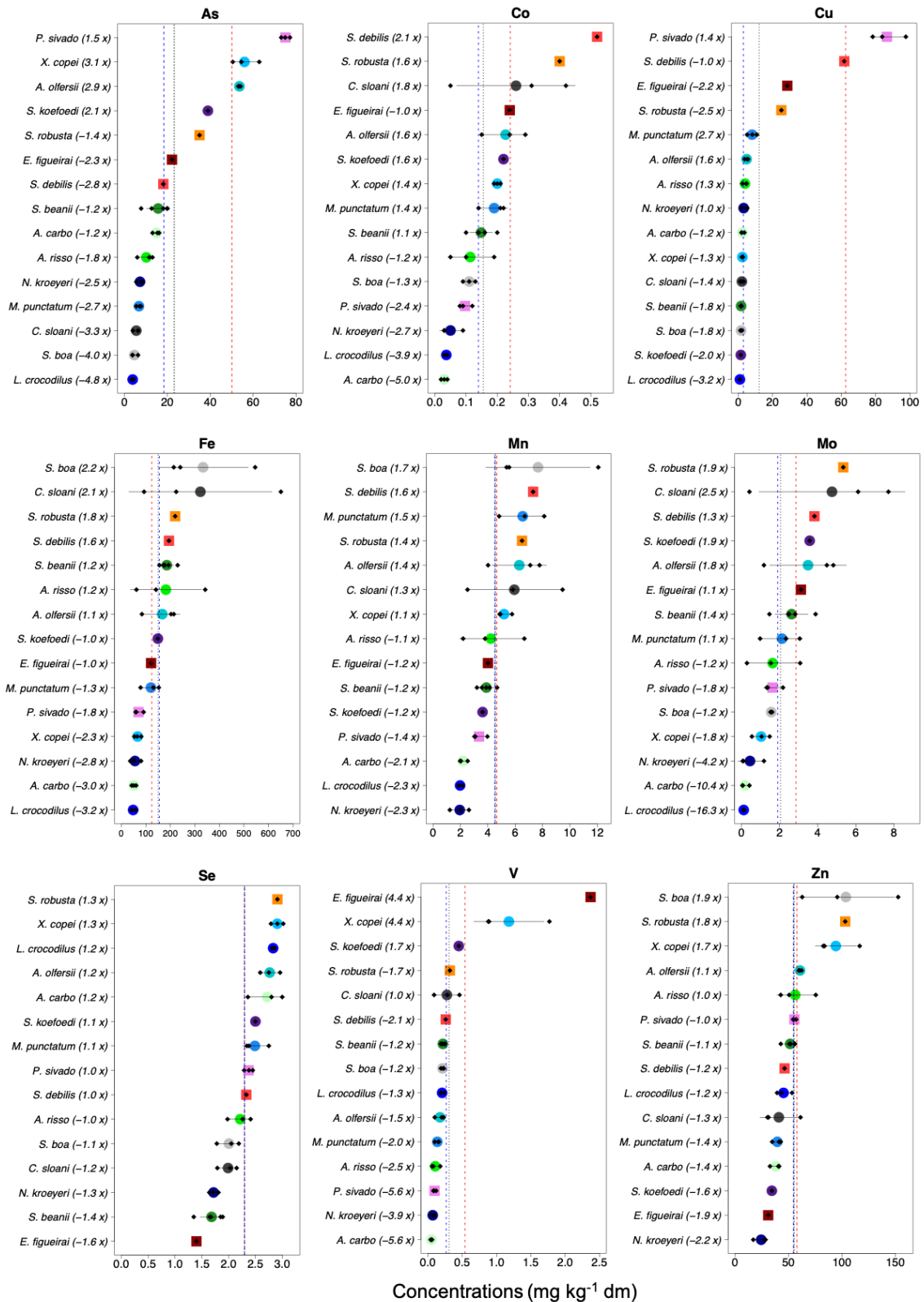


Figure S3: Spectra of the measured values for the 9 trace essential elements considered, with species classified in the order of increasing mean per species (\pm standard deviation) and then in the order of the Species Relative difference with the Taxon (Species RDT), in brackets (see 2.5). The dotted black line corresponds to the mean value including both crustaceans and fish (individual sample data, N =39), and dashed red and blue lines to mean values for crustaceans (N =6) and fish (N =33), respectively. Crustaceans are represented by squares and fish by circles, as on Figure 1. Species full names are listed in Table 1.

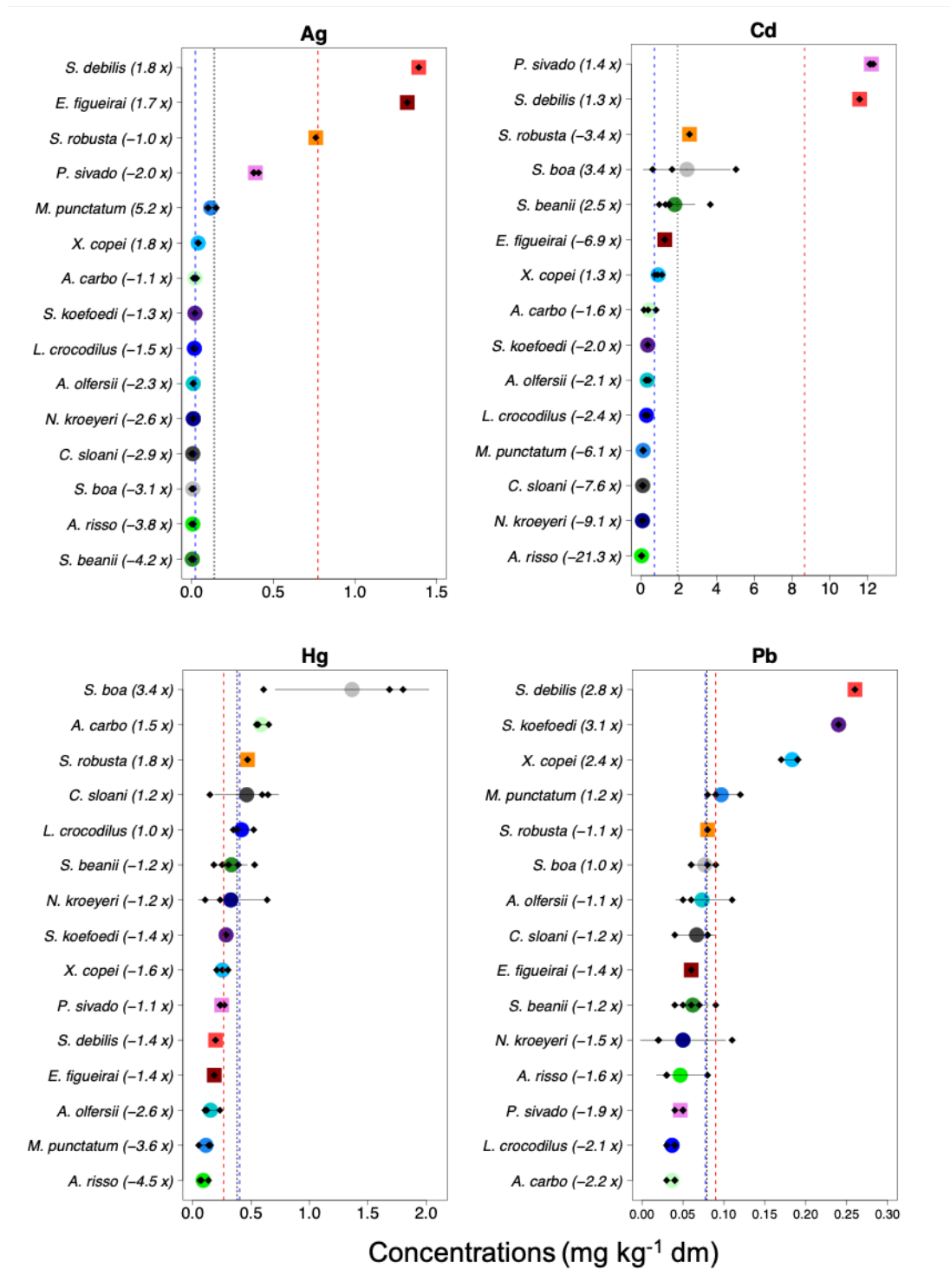


Figure S4: Spectra of the measured values for the 4 trace non-essential elements considered, with species classified in the order of increasing mean per species (\pm standard deviation) and then in the order of the Species Relative difference with the Taxon (Species RDT), in brackets (see 2.5). The dotted black line corresponds to the mean value including both crustaceans and fish (individual sample data, N=39), and dashed red and blue lines to mean values for crustaceans (N=6) and fish (N=33), respectively. Crustaceans are represented by squares and fish by circles, as on Figure 1. Species full names are listed in Table 1.