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Supplement of

Rare earth elements in oyster shells: provenance discrimination and potential vital effects

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Supplement Figure S1 – Picture from the Baie des Veys rearing site.

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This picture shows the freshly implemented *Crassostrea gigas* and *Ostrea edulis* bags on oyster tables, next to one another.

Supplement Table S1 – Quality assurance: certified reference material

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A total of 22 measurements of the BCR-2 basalt reference material have been performed for this study to address the quality of the measurements by LA-ICP-MS. The values are indicated below.

La	24.2957	25.3058	25.0690	25.5478	24.9511	24.7224	24.8380	24.8347	25.2556	25.7947	25.7741	25.7954	25.1247	24.4167	25.1572	24.8928	25.4779	25.7475	25.4751	24.5332	24.4126	24.0641
Ce	51.8448	54.3902	56.5603	55.2400	54.2901	52.9865	50.6877	52.2842	53.3296	52.8364	53.9721	54.3498	53.0642	53.6355	52.5953	53.1375	53.5574	54.0159	53.1211	54.7381	54.0940	52.9243
Pr	6.4161	6.6396	6.5903	6.6933	6.7186	6.5474	6.2842	6.3479	6.5324	6.5845	6.6712	6.6445	6.5356	6.7186	6.5284	6.4325	6.5323	6.6700	6.4597	6.4588	6.4564	6.3971
Nd	27.6150	28.2644	28.5236	29.2309	29.1816	28.4382	27.4694	28.1593	28.4758	29.5044	28.6128	28.6380	28.2635	28.7205	28.3555	27.5664	28.5524	28.5883	27.7396	27.9169	27.6081	27.2994
Sm	6.2436	6.3813	6.4659	6.3958	6.4288	6.3493	6.2223	6.3458	6.4419	6.6506	6.5165	6.4522	6.4366	6.1684	6.3377	6.1972	6.4339	6.5630	6.3497	6.2732	6.1950	6.1361
Eu	1.8247	1.8855	1.9283	1.9102	1.8796	1.8654	1.8492	1.8393	1.9072	1.9150	1.9023	1.8880	1.8794	1.8226	1.8550	1.8678	1.8881	1.9084	1.8654	1.8739	1.8850	1.8510
Gd	6.1317	6.3629	6.3164	6.5721	6.3882	6.3223	6.2042	6.1593	6.3485	6.4816	6.4705	6.4782	6.3301	6.2993	6.3707	6.2075	6.4963	6.5536	6.3263	6.2374	6.1974	6.0496
Tb	0.9339	0.9489	0.9454	0.9678	0.9706	0.9671	0.9046	0.9090	0.9542	0.9690	0.9754	0.9744	0.9392	0.9835	0.9476	0.9378	0.9845	0.9903	0.9540	0.9409	0.9316	0.9085
Dy	6.0981	6.2150	6.1856	6.3199	6.3883	6.3190	6.1048	6.1418	6.2837	6.4188	6.4237	6.3694	6.1701	6.4866	6.2697	6.0826	6.4882	6.4193	6.1921	6.1148	5.9198	5.9648
Ho	1.2001	1.2282	1.2252	1.2566	1.2295	1.2231	1.2003	1.2127	1.2674	1.2995	1.2704	1.2580	1.2413	1.2306	1.2362	1.2344	1.2788	1.2841	1.2527	1.2125	1.2023	1.1925
Er	3.3468	3.4568	3.4711	3.5225	3.4764	3.4493	3.3224	3.3375	3.5051	3.5992	3.5898	3.5483	3.4971	3.5021	3.4885	3.4434	3.5733	3.5900	3.5161	3.3852	3.4052	3.3104
Y	31.4587	32.3494	31.9576	32.5076	32.5670	32.4271	31.4186	32.4185	33.3097	33.5834	32.8959	33.0287	32.6357	31.5167	31.9106	32.2697	33.2090	33.1196	32.5903	31.5066	31.7899	31.0894

GeoReM preferred values (GeoReM: Jochum et al., 2005):

La	20 – 31 µg/g, 135 values (compiled: 24.9 – 25.08 µg/g, 3 values)
Ce	46 – 66 µg/g, 136 values (compiled: 52.9 – 53.12 µg/g, 3 values)
Pr	6 – 15 µg/g, 132 values (compiled: 6.7 – 6.827 µg/g, 3 values)
Nd	25.5 – 37 µg/g, 165 values (compiled: 28 – 28.7 µg/g, 3 values)
Sm	5.9 – 10 µg/g, 161 values (compiled: 6.547 – 6.7 µg/g, 3 values)
Eu	1.688 – 2.43 µg/g, 132 values (compiled: 1.96 – 2 µg/g, 3 values)
Gd	5.66 – 10 µg/g, 134 values (compiled: 6.75 – 6.811 µg/g, 3 values)
Tb	0.86 – 2 µg/g, 127 values (compiled: 1.07 – 1.077 µg/g, 3 values)
Dy	5.54 – 10 µg/g, 133 values (compiled: 6.41 – 6.424 µg/g, 2 values)
Ho	1.1 – 2 µg/g, 127 values (compiled: 1.28 – 1.33 µg/g, 3 values)
Er	3.07 – 6 µg/g, 132 values (compiled: 3.66 – 3.67 µg/g, 2 values)
Y	28.13 – 52 µg/g, 127 values (compiled: 36.07 – 37 µg/g, 3 values)

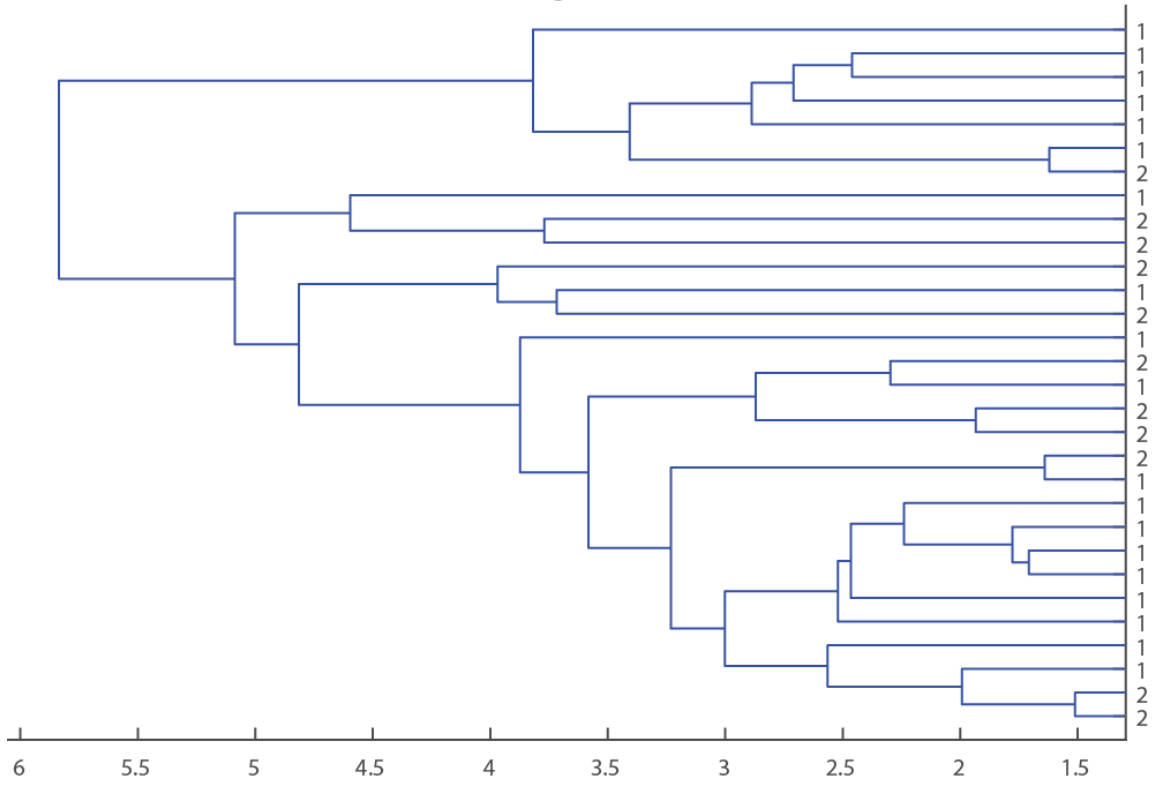
Jochum, K.P., Nohl, U., Herwig, K., Lammel, E., Stoll, B., and Hofmann, A.W.: GeoReM: A new Geochemical database for reference materials and isotopic standards, Geostand. Geoanalytical Res., 29, 333-338, doi 10.1111/j.1751-908X.2005.tb00904.x, 2005.

Supplement Figure S2 – Seasonal differences in REE and Y incorporation in *Crassostrea gigas* and *Ostrea edulis* shells.

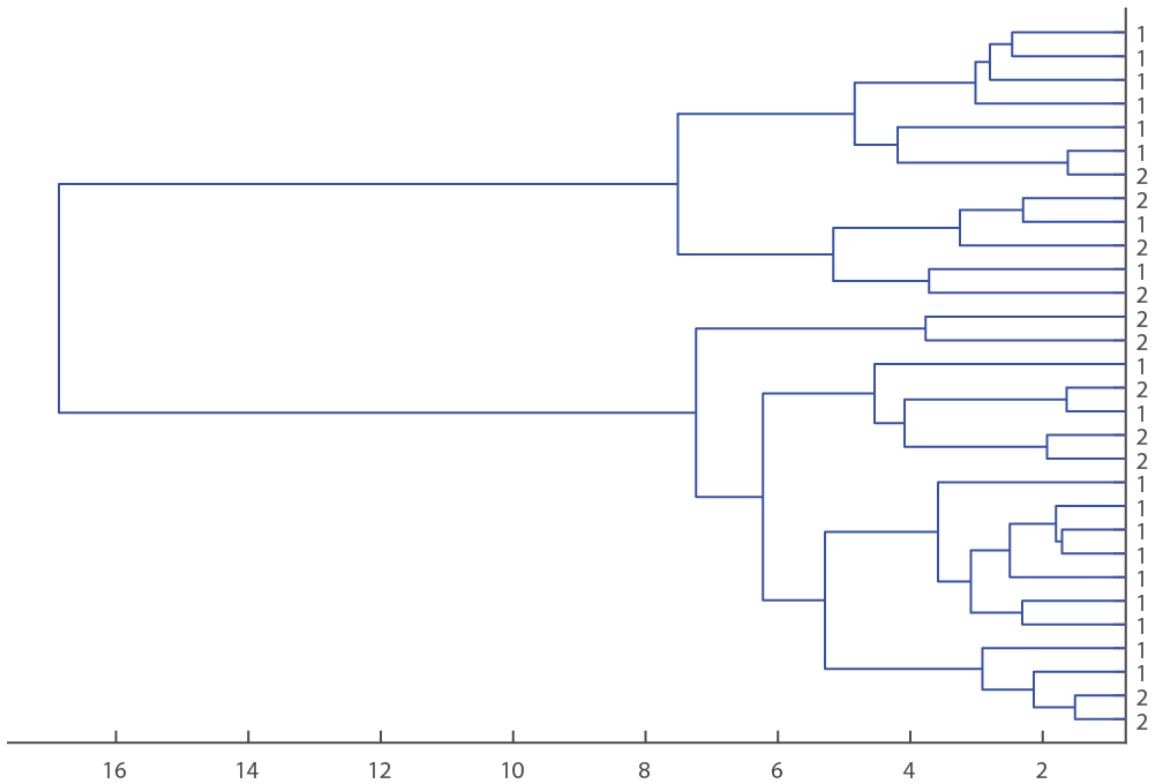
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The dendrograms indicate for each species (*C. gigas* and *O. edulis*) and for two sites (Baie des Veys, Normandy, English Channel; and Marennes-Oléron, Charente-Maritime, Atlantic Ocean) that seasonal clusters do not exist in REE and Y concentrations in the shell. For both methods for calculating distances (average and Ward), no clear separation exists between winter (1) and summer (2) periods.

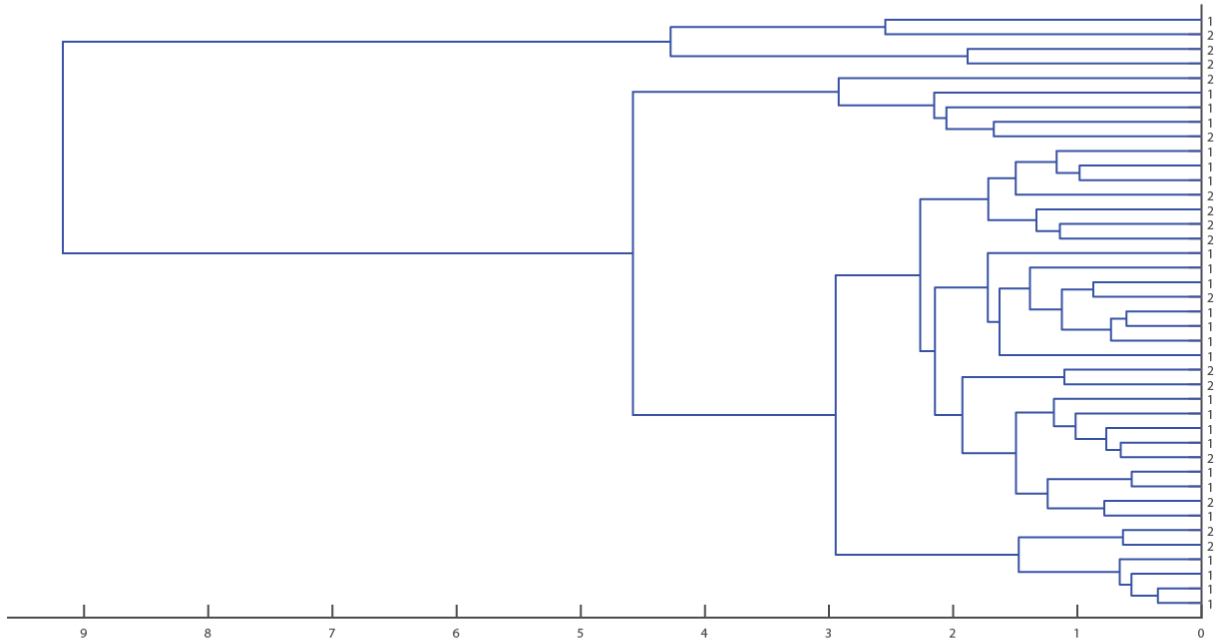
Crassostrea gigas from Baie des Veys -
seasonal differences on REE and Y incorporation
Average method



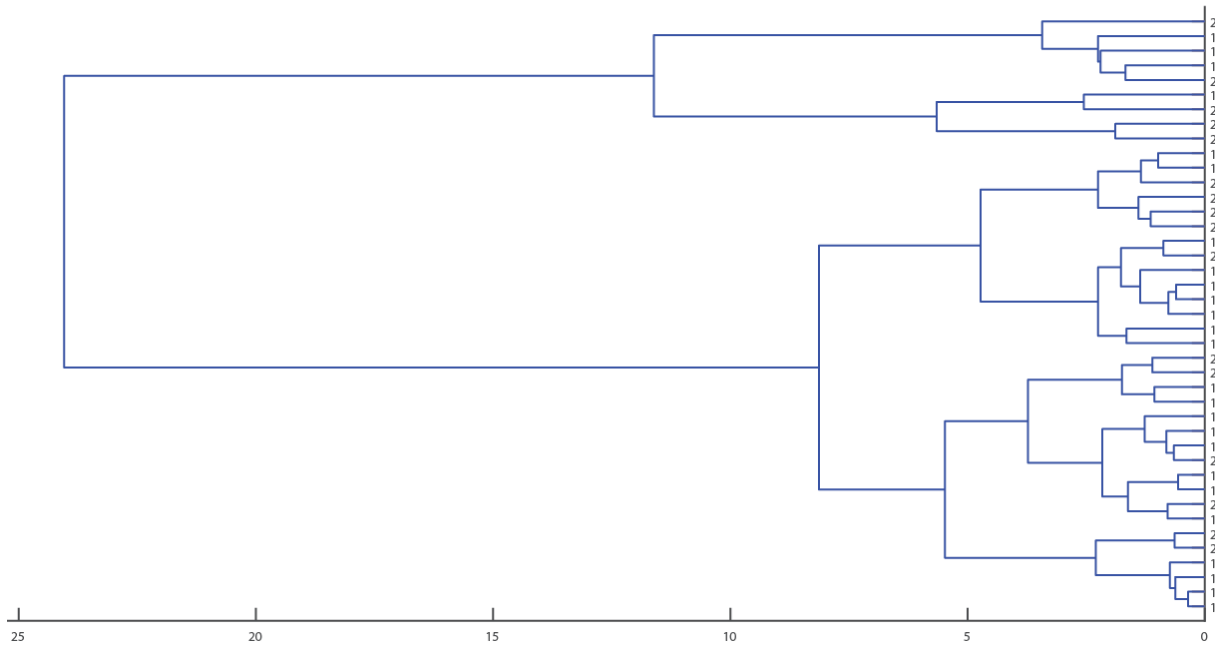
Crassostrea gigas from Baie des Veys -
seasonal differences on REE and Y incorporation
Ward method



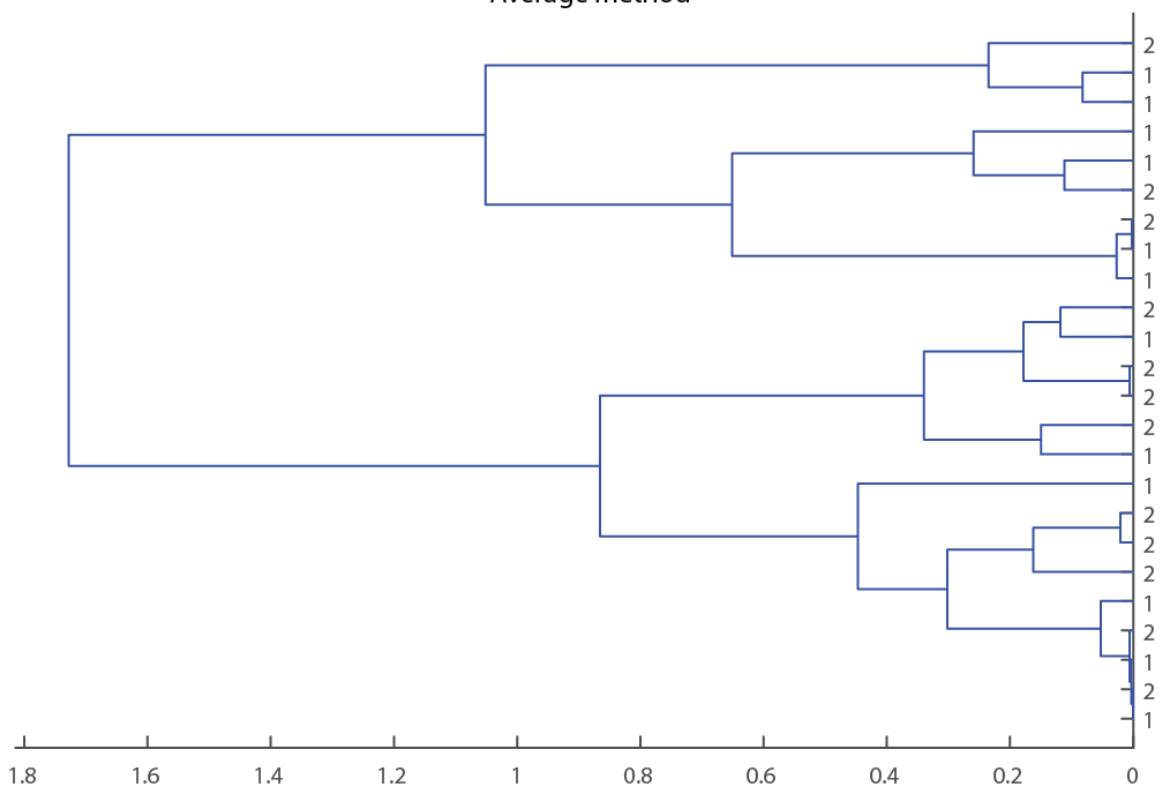
Ostrea edulis from Baie des Veys -
seasonal differences on REE and Y incorporation
Average method



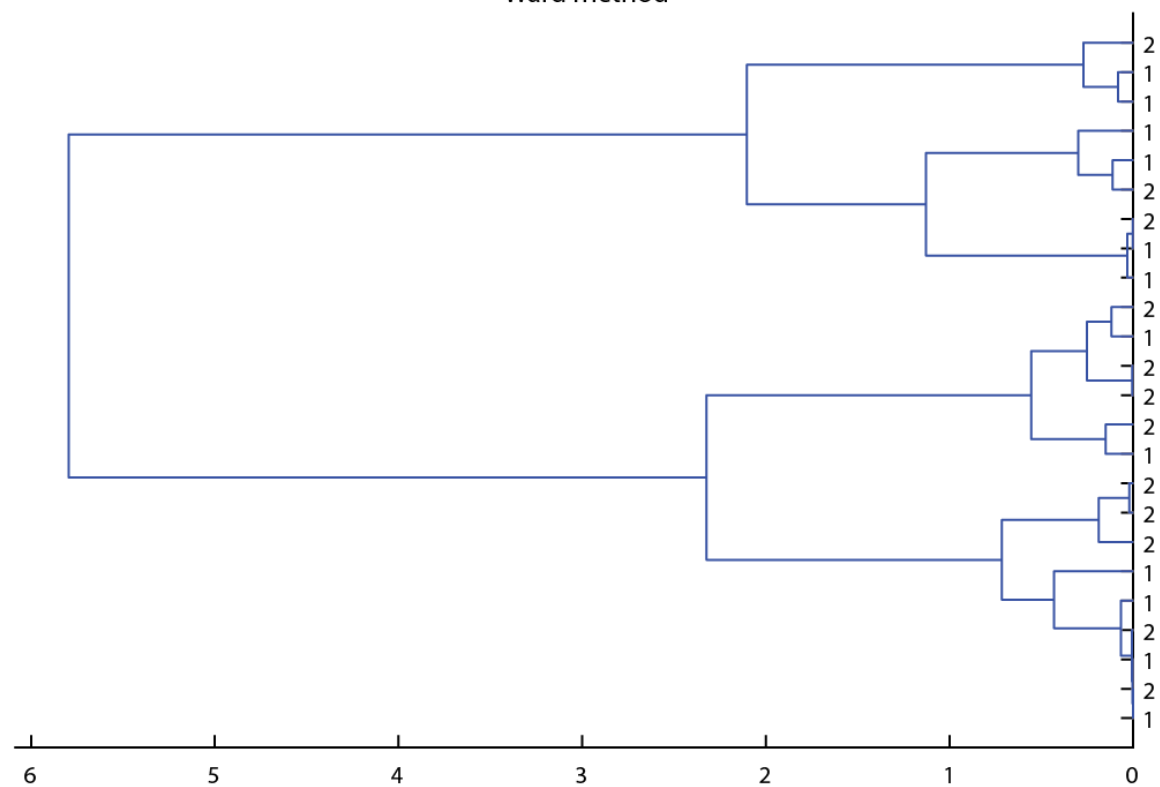
Ostrea edulis from Baie des Veys -
seasonal differences on REE and Y incorporation
Ward method



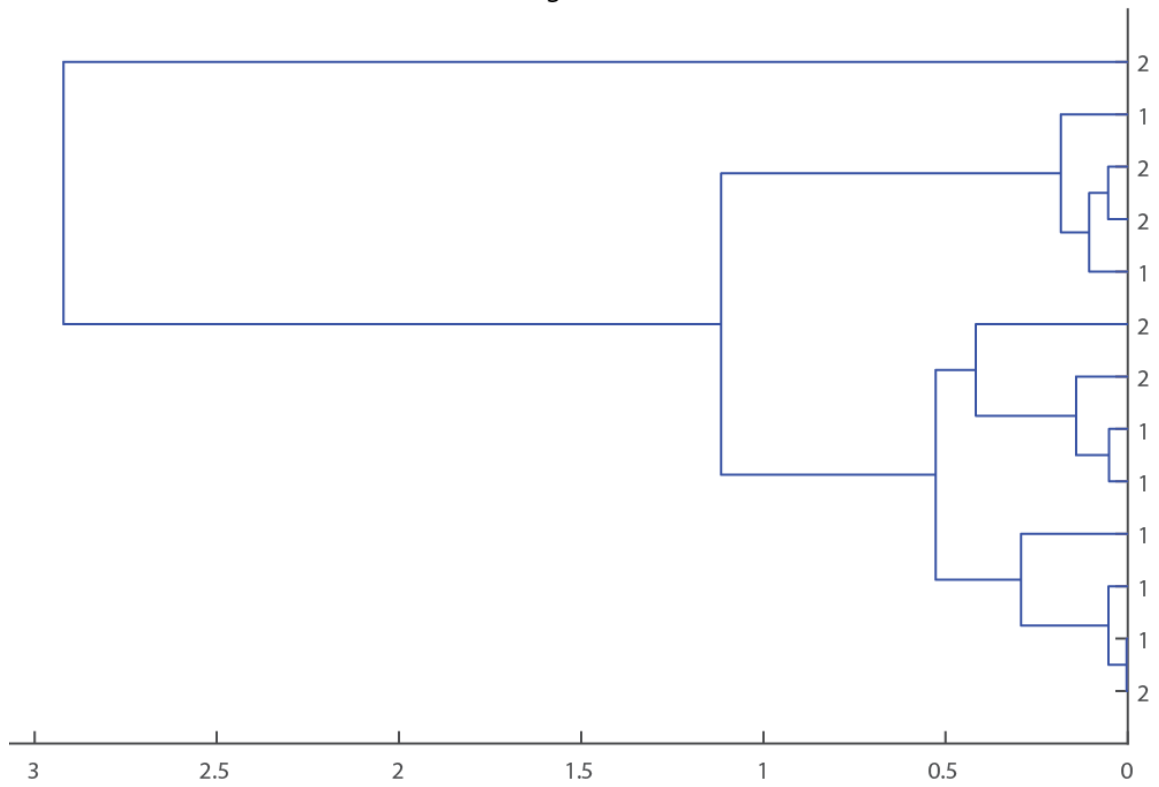
Crassostrea gigas from Marennes-Oléron -
 seasonal differences on REE and Y incorporation
 Average method



Crassostrea gigas from Marennes-Oléron -
 seasonal differences on REE and Y incorporation
 Ward method



Ostrea edulis from Marennes-Oléron -
seasonal differences on REE and Y incorporation
Average method



Ostrea edulis from Marennes-Oléron -
seasonal differences on REE and Y incorporation
Ward method

