

Supplementary Information

Table 1. Persistence in top 10 ranks for target classes. Values are numbers of genera that were ranked in the top 10 in a PaleoDB bin that remained in those ranks in the next bin (Fig. 1).

Transition	Ma	Bivalves	Brachiopods	Cephalopods	Echinoids	Gastropods	Trilobites
Cambrian 2-							
Cambrian 3	-513.0		3				1
Cambrian 3-							
Cambrian 4	-501.0		2				0
Cambrian 4-							
Ordovician 1	-490.0		1				0
Ordovician 1-							
Ordovician 2	-479.0		1	1			0
Ordovician 2-							
Ordovician 3	-466.0		1	0		1	0
Ordovician 3-							
Ordovician 4	-460.5		3	2		3	0
Ordovician 4-							
Ordovician 5	-449.5	7	6	4		7	4
Ordovician 5-							
Silurian 1	-443.7	5	1	1		3	0
Silurian 1-							
Silurian 2	-428.2	5	4	1		3	4
Silurian 2-							1
Devonian 1	-418.1	4	5	1		4	
Devonian 1-							2
Devonian 2	-409.1	5	1	1		8	
Devonian 2-							3
Devonian 3	-391.9	7	2	1		4	
Devonian 3-							
Devonian 4	-383.7	6	3	4		2	
Devonian 4-							
Devonian 5	-376.1	4	4	0		3	
Devonian 5-							
Carboniferous 1	-360.7	4	3	2		7	
Carboniferous 1-							
Carboniferous 2	-349.5	5	4	1		4	
Carboniferous 2-							
Carboniferous 3	-336.0	6	5	4		4	
Carboniferous 3-							
Carboniferous 4	-318.1	4	6	1		7	
Carboniferous 4-							
Carboniferous 5	-305.0	5	7	1		6	
Carboniferous 5-							
Permian 1	-299.0	5	6	0		4	
Permian 1-							
Permian 2	-284.0	7	2	0		5	
Permian 2-							
Permian 3	-272.5	5	3	0		7	
Permian 3-							
Permian 4	-260.5	4	3	0		5	
Permian 4-							
Triassic 1	-251.0	2	0	0		3	

Triassic 1-						
Triassic 2	-245.0	3	1	0		2
Triassic 2-						
Triassic 3	-228.0	3	3	0		2
Triassic 3-						
Triassic 4	-216.5	1	3	1		5
Triassic 4-						
Jurassic 1	-199.6	2	2	0		2
Jurassic 1-						
Jurassic 2	-189.6	6	5	3		4
Jurassic 2-						
Jurassic 3	-183.0	6	6	0		3
Jurassic 3-						
Jurassic 4	-171.6	4	0	0		4
Jurassic 4-						
Jurassic 5	-164.7	5	3	1	5	2
Jurassic 5-						
Jurassic 6	-150.8	5	1	0	5	4
Jurassic 6-						
Cretaceous 1	-145.5	7	4	3	3	3
Cretaceous 1-						
Cretaceous 2	-136.4	6	4	5	3	6
Cretaceous 2-						
Cretaceous 3	-125.0	7	5		3	6
Cretaceous 3-						
Cretaceous 4	-112.0	5	6		3	6
Cretaceous 4-						
Cretaceous 5	-99.6	4			5	4
Cretaceous 5-						
Cretaceous 6	-93.5	4			7	3
Cretaceous 6-						
Cretaceous 7	-83.5	3			6	4
Cretaceous 7-						
Cretaceous 8	-70.6	3			3	8
Cretaceous 8-						
Cenozoic 1	-65.5	1			8	2
Cenozoic 1-						
Cenozoic 2	-55.8	6			5	4
Cenozoic 2-						
Cenozoic 3	-40.4	6			6	7
Cenozoic 3-						
Cenozoic 4	-33.9	4			4	2
Cenozoic 4-						
Cenozoic 5	-23.0	5				4
Cenozoic 5-						
Cenozoic 6	-11.6	6				5

Table 2. Persistence in top 20 ranks for combined and individual target classes. Values are numbers of genera that were ranked in the top 20 in a PaleoDB bin that remained in those ranks in the next bin (Fig. 1).

Transition	All	Bivalves	Brachiopods	Cephalopods	Echinoids	Gastropods	Trilobites
Cambrian 2- Cambrian 3	2		9				2
Cambrian 3- Cambrian 4	0		6				0
Ordovician 1 Ordovician 1-	0		4				0
Ordovician 1- Ordovician 2	0		2	2			0
Ordovician 2- Ordovician 3	2		1	3		4	0
Ordovician 3- Ordovician 4	5		5	7		4	2
Ordovician 4- Ordovician 5	12	12	11	12		15	10
Ordovician 5- Silurian 1	1	6	3	3		5	4
Silurian 1- Silurian 2	6	8	6	3		10	6
Silurian 2- Devonian 1	6	10	7	1		7	6
Devonian 1- Devonian 2	4	12	5	2		14	6
Devonian 2- Devonian 3	5	12	4	2		9	5
Devonian 3- Devonian 4	8	16	10	11		5	
Devonian 4- Devonian 5	11	14	9	1		5	
Devonian 5- Carboniferou s 1	9	13	9	3		10	
Carboniferou s 1- Carboniferou s 2	6	19	9	8		7	
Carboniferou s 2- Carboniferou s 3	10	14	9	7		7	
Carboniferou s 3- Carboniferou s 4	3	13	7	3		13	
Carboniferou s 4- Carboniferou s 5	5	15	11	1		20	
Carboniferou s 5-Permian 1	10	9	12	0		13	

Plotnick & Wagner

Greatest Hits

Permian 1-						
Permian 2	7	14	9	1		15
Permian 2-						
Permian 3	10	15	12	0		12
Permian 3-						
Permian 4	8	9	8	0		10
Permian 4-						
Triassic 1	0	3	2	1		3
Triassic 1-						
Triassic 2	1	6	3	1		8
Triassic 2-						
Triassic 3	2	8	6	1		9
Triassic 3-						
Triassic 4	3	9	10	2		7
Triassic 4-						
Jurassic 1	6	6	5	1		6
Jurassic 1-						
Jurassic 2	5	14	12	4		11
Jurassic 2-						
Jurassic 3	3	11	11	1		4
Jurassic 3-						
Jurassic 4	3	9	4	1		10
Jurassic 4-						
Jurassic 5	11	13	7	2	18	10
Jurassic 5-						
Jurassic 6	7	11	5	1	13	10
Jurassic 6-						
Cretaceous 1	5	12	15	4	14	9
Cretaceous 1-						
Cretaceous 2	7	9	12	10	10	11
Cretaceous 2-						
Cretaceous 3	3	13	11		9	9
Cretaceous 3-						
Cretaceous 4	3	9	14		9	11
Cretaceous 4-						
Cretaceous 5	6	6			8	7
Cretaceous 5-						
Cretaceous 6	4	7			13	5
Cretaceous 6-						
Cretaceous 7	7	8			7	6
Cretaceous 7-						
Cretaceous 8	7	8			3	9
Cretaceous 8-						
Cenozoic 1	4	4			11	2
Cenozoic 1-						
Cenozoic 2	11	11			10	14
Cenozoic 2-						
Cenozoic 3	12	14			14	13
Cenozoic 3-						
Cenozoic 4	9	11			10	5
Cenozoic 4-						
Cenozoic 5	11	10				10
Cenozoic 5-						
Cenozoic 6	11	12				14

Figure 1. Cumulative percentage of occurrences by rank for Paleobiology Database time bins: A. Cenozoic 5 bivalves. B. Ordovician 5 brachiopods. Arrows indicate cutoffs for top 10 and top 20.

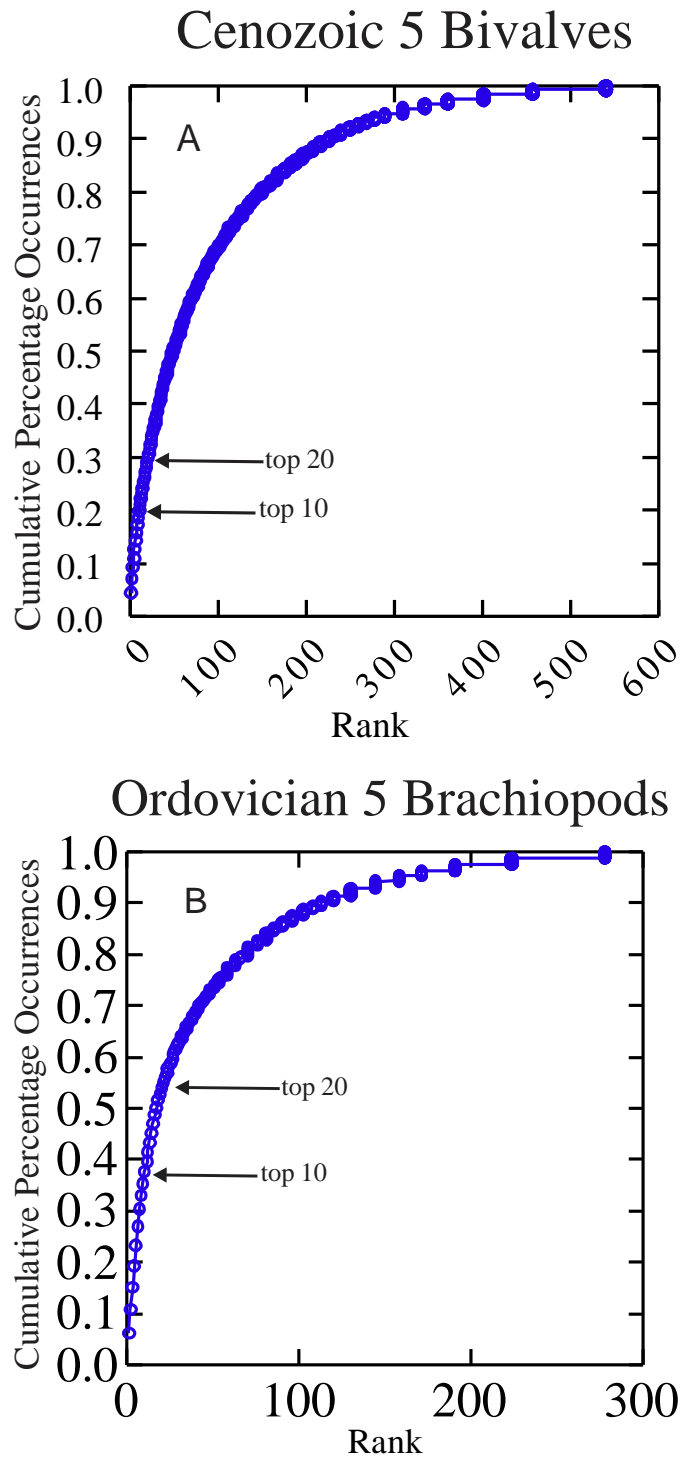
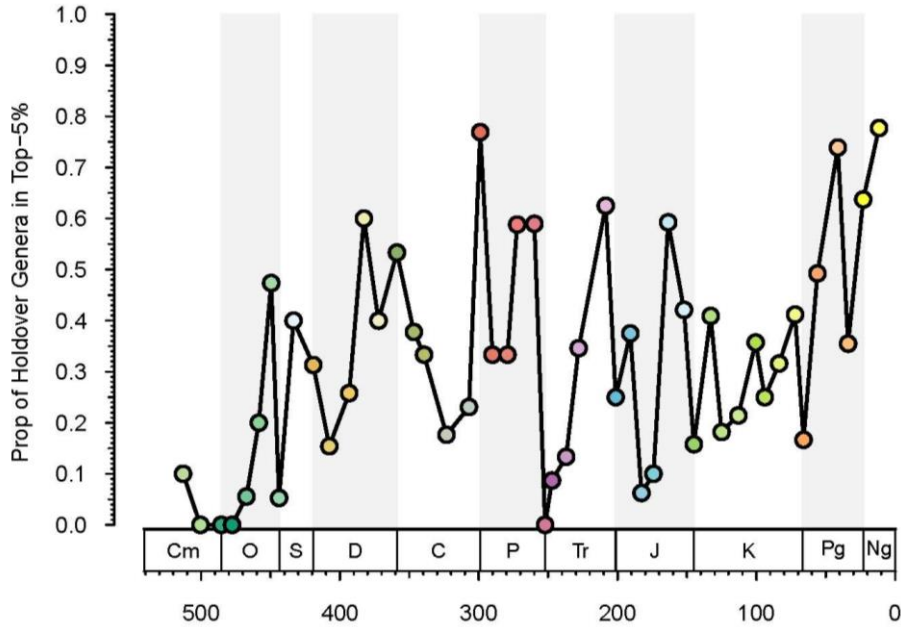


Figure 2. A: Proportion of genera in top 5% of occurrences that are holdovers in that rank in the next PaleoDB bin. Compare to Fig. 2A. B. Biplot of proportion of holdovers in top 5% versus holdovers in top 20. $\tau = 0.788$; $p < 0.001$.

A



B

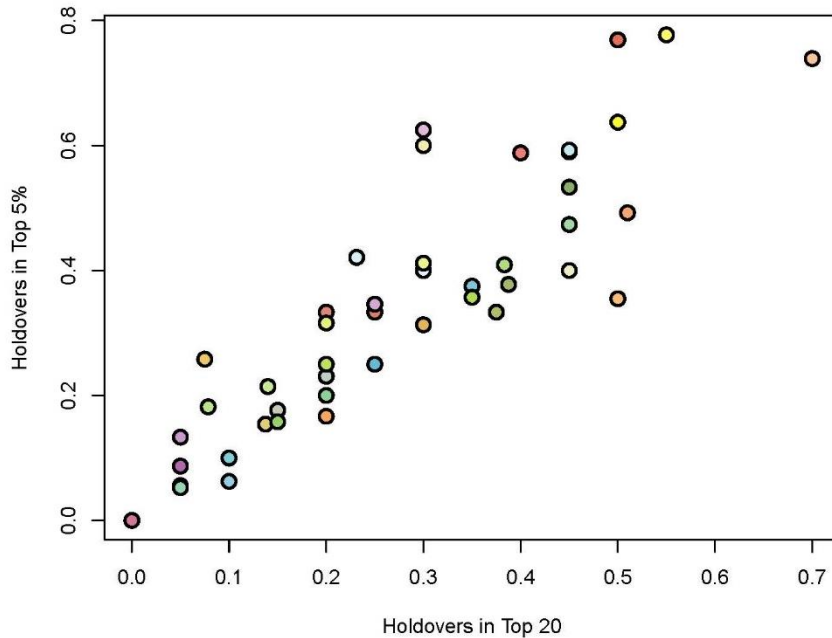


Figure 3. Kendall's correlations between species richness and occurrences. This is based only on genera occupying 1+ collections. All correlations are significant at $p \ll 0.001$.

