

Table S7: Partition scheme 1 (C-Ana1) of Clarke's et al. matrix under anatomical criterion.

Partition	Description	Characters
1	cranial plus axial plus pelvic	1-71, 155-205
2	pectoral	72-154

Table S8: Partition scheme 2 (C-Ana3) of Clarke's et al. matrix under anatomical criterion.

Partition	Description	Characters
1	cranial plus axial	1-71
2	pectoral	72-154
3	pelvic	155-205

Table S9: Partition scheme 3 (C-Ana3) of Clarke's et al. matrix under anatomical criterion.

Partition	Description	Characters
1	cranial	1-52
2	axial	53-71
3	pectoral	72-154
4	pelvic	155-205

Table S10: Characters of Clarke's et al. matrix with respective unbiased homoplasy value (those showing a # sign are non-informative).

Character	Homoplasy values	Character	Homoplasy values	Character	Homoplasy values	Character	Homoplasy values
1	0.40	53	0.40	105	0.40	157	0.4
2	0.40	54	0.00	106	0.57	158	0.25
3	0.25	55	0.00	107	0.00	159	0.4
4	0.40	56	0.25	108	0.00	160	0.00
5	0.50	57	0.00	109	0.00	161	0.00
6	#	58	0.25	110	0.25	162	0.4
7	0.40	59	0.63	111	0.00	163	0.00
8	0.00	60	0.00	112	0.00	164	0.00
9	0.00	61	0.25	113	0.40	165	0.25
10	0.00	62	0.00	114	0.40	166	0.00
11	0.00	63	0.25	115	0.25	167	0.00
12	0.00	64	0.00	116	0.25	168	0.00
13	0.25	65	0.25	117	0.00	169	0.00
14	0.00	66	0.00	118	0.00	170	0.25
15	0.25	67	0.00	119	0.40	171	0.25
16	0.00	68	0.00	120	0.00	172	#
17	0.00	69	0.25	121	0.00	173	0.25
18	0.25	70	0.25	122	0.25	174	0.00
19	0.00	71	0.00	123	0.25	175	0.00
20	0.25	72	0.00	124	0.25	176	0.00
21	0.00	73	0.25	125	0.25	177	#
22	0.25	74	0.00	126	0.00	178	0.25
23	0.00	75	0.00	127	0.40	179	0.00
24	0.00	76	0.57	128	0.00	180	0.25
25	0.00	77	#	129	0.00	181	0.00
26	#	78	0.50	130	0.25	182	0.25
27	0.00	79	0.25	131	#	183	0.25
28	0.00	80	#	132	#	184	0.00
29	0.00	81	0.25	133	0.00	185	0.4
30	0.25	82	0.57	134	0.40	186	0.25
31	0.00	83	0.00	135	0.25	187	0.4
32	0.25	84	0.25	136	0.25	188	0.00
33	0.25	85	0.40	137	0.00	189	#
34	0.00	86	0.00	138	0.00	190	0.00
35	0.00	87	0.25	139	0.00	191	0.4
36	0.00	88	0.25	140	0.40	192	0.00
37	#	89	0.25	141	0.00	193	0.00
38	0.25	90	0.00	142	0.00	194	0.00
39	0.25	91	0.25	143	0.25	195	0.00
40	#	92	0.25	144	0.25	196	0.00
41	0.00	93	0.00	145	0.25	197	0.25
42	0.25	94	0.25	146	0.00	198	0.4
43	0.50	95	0.25	147	0.25	199	0.00
44	0.25	96	0.00	148	0.40	200	0.67
45	0.00	97	0.40	149	0.40	201	0.00
46	#	98	0.40	150	0.40	202	0.00
47	#	99	0.25	151	0.00	203	0.00
48	0.25	100	0.25	152	0.00	204	0.00
49	0.00	101	0.25	153	0.25	205	0.5
50	#	102	0.00	154	#		
51	0.00	103	0.57	155	0.00		
52	0.00	104	0.25	156	0.00		

Table S11: Partition scheme (C-Hom) of Clarke's et al. matrix under homoplasy criterion.

Partition	f	Characters
1	0.00	8-12, 14, 16, 17, 19, 21, 23-25, 27-29, 31, 34, 35, 36, 41, 45, 49, 51, 52, 54, 55, 57, 60, 62, 64, 66-68, 71, 72, 74, 75, 83, 86, 90, 93, 96, 102, 107-109, 111, 112, 117, 118, 120, 121, 126, 128, 129, 133, 137-139, 141, 142, 146, 151, 152, 155, 156, 160, 161, 163, 164, 166-169, 174-176, 179, 181, 184, 188, 190, 192-196, 199, 201-204
2	0.25	3, 13, 15, 18, 20, 22, 30, 32, 33, 38, 39, 42, 44, 48, 56, 58, 61, 63, 65, 69, 70, 73, 79, 81, 84, 87-89, 91, 92, 94, 95, 99-101, 104, 110, 115, 116, 122-125, 130, 135, 136, 143-145, 147, 153, 158, 165, 170, 171, 173, 178, 180, 182, 183, 186, 197
3	0.40	1, 2, 4, 7, 53, 85, 97, 98, 105, 113, 114, 119, 127, 134, 140, 148-150, 157, 159, 162, 185, 187, 191, 198
4	0.50	5, 43, 78, 205
5	0.57	76, 82, 103, 106
6	0.63	59
7	0.67	200
8	non-informative characters	6, 26, 37, 40, 46, 47, 50, 77, 80, 131, 132, 154, 172, 177, 189

Table S12: Partition scheme 1 (C-ParFin1) of Clarke's et al. matrix under Partition Finder. See Supplementary Material PF2 schemes for details.

Partition	Characters
1	1, 9, 12, 15, 23, 24, 28, 32, 37, 44, 53, 55, 59, 62, 63, 67, 69, 70, 72, 76, 77, 79, 82, 87, 106, 114, 118, 119, 135, 137, 140, 141, 144, 151, 155, 160, 162, 173, 178, 183, 185, 188, 191, 195-199, 205
2	2-8, 10, 11, 13, 14, 16-22, 25-27, 29-31, 33-36, 38-43, 45-52, 54, 56-58, 60, 61, 64-66, 68, 71, 73-75, 78, 80, 81, 83-86, 88-105, 107-113, 115, 116, 117, 120-134, 136, 138, 139, 142, 143, 145-150, 152-154, 156-159, 161, 163-172, 174-177, 179-182, 184, 186, 187, 189, 190, 192-194, 200-204

Table S13: Partition scheme 2 (C-ParFin2) of Clarke's et al. matrix under Partition Finder. See Supplementary Material PF2 schemes for details.

Partition	Characters
1	1, 9, 12, 15, 23, 24, 28, 32, 37, 44, 53, 55, 59, 62, 63, 67, 69, 70, 72, 76, 77, 79, 82, 87, 106, 114, 118, 119, 135, 137, 140, 141, 144, 151, 155, 160, 162, 173, 178, 183, 185, 188, 191, 195-199, 205
2	2, 4, 5, 7, 11, 14, 16-18, 21, 25, 30, 31, 33, 34, 38, 39, 42, 43, 48, 52, 54, 56, 60, 71, 74, 75, 78, 88, 91, 93-95, 97-99, 102, 103, 107, 108, 110, 113, 115, 120, 126, 128, 139, 143, 146, 148, 150, 152, 153, 159, 164, 165, 167, 169, 170, 175, 180-182, 193, 194, 200, 202, 203
3	3, 13, 19, 22, 29, 41, 51, 65, 81, 83, 89, 92, 100, 101, 109, 112, 117, 127, 129, 133, 149, 156-158, 161, 163, 168, 171, 187, 192
4	6, 8, 10, 20, 26, 27, 35, 36, 40, 45-47, 49, 50, 57, 58, 61, 64, 66, 68, 73, 80, 84-86, 90, 96, 104, 105, 111, 116, 121-125, 130-132, 134, 136, 138, 142, 145, 147, 154, 166, 172, 174, 176, 177, 179, 184, 186, 189, 190, 201, 204

Table S14: Partition scheme 3 (C-ParFin3) of Clarke’s et al. matrix under Partition Finder. See Supplementary Material PF2 schemes for details.

Partition	Characters
1	1, 9, 23, 32, 59, 70, 135, 151, 160, 162, 185, 188
2	2, 4, 5, 7, 11, 14, 16-18, 21, 25, 30, 31, 33, 34, 38, 39, 42, 43, 48, 52, 54, 56, 60, 71, 74, 75, 78, 88, 91, 93, 94, 95, 97, 98, 99, 102, 103, 107, 108, 110, 113, 115, 120, 126, 128, 139, 143, 146, 148, 150, 152, 153, 159, 164, 165, 167, 169, 170, 175, 180-182, 193, 194, 200, 202, 203
3	3, 13, 19, 22, 26, 29, 41, 46, 50, 51, 65, 80, 81, 83, 89, 92, 100, 101, 109, 112, 117, 127, 129, 131-133, 149, 154, 156-158, 161, 163, 168, 171, 172, 177, 187, 189, 192
4	6, 8, 10, 20, 27, 35, 36, 40, 45, 47, 49, 57, 58, 61, 64, 66, 68, 73, 84, 85, 86, 90, 96, 104, 105, 111, 116, 121-125, 130, 134, 136, 138, 142, 145, 147, 166, 174, 176, 179, 184, 186, 190, 201, 204
5	12, 24, 28, 37, 44, 53, 55, 63, 67, 72, 76, 87, 106, 114, 119, 140, 155, 173, 178, 198
6	15, 69, 79, 82, 118, 137, 183, 196, 197, 199, 205
7	62, 144, 191, 195
8	77, 141

Table S15: Partition scheme 4 (C-ParFin4) of Clarke’s et al. matrix under Partition Finder. See Supplementary Material PF2 schemes for details.

Partition	Characters
1	1, 9, 23, 32, 59, 70, 135, 151, 160, 162, 185, 188
2	2, 11, 16, 25, 39, 42, 54, 56, 78, 93, 102, 108, 115, 139, 150, 152, 175
3	3, 13, 19, 22, 29, 41, 46, 51, 65, 81, 83, 89, 92, 100, 101, 109, 112, 117, 127, 129, 131-133, 149, 156-158, 161, 163, 168, 171, 187, 192
4	4, 5, 7, 17, 21, 30, 33, 38, 48, 60, 71, 75, 88, 94, 95, 97, 99, 103, 107, 113, 126, 128, 148, 153, 159, 164, 165, 169, 170, 181, 182, 193, 194, 200, 203
5	6, 35, 36, 40, 45, 66, 68, 90, 104, 116, 121-124, 138, 142, 174, 184, 186, 190
6	8, 10, 47, 49, 57, 84, 86, 96, 105, 111, 125, 136, 145, 147, 166, 204
7	12, 24, 28, 37, 44, 63, 67, 87, 114, 119, 155, 173, 178
8	14, 18, 31, 34, 43, 52, 74, 91, 98, 110, 120, 143, 146, 167
9	15, 69, 79, 82, 118, 137, 183, 196, 197, 199, 205
10	20, 61, 64, 73, 130, 134, 176, 179
11	26, 50, 80, 154, 172, 177, 189
12	27, 58, 85
13	53, 55, 72, 76, 106, 140, 198
14	62, 144
15	77, 141
16	180, 202
17	191, 195
18	201

Table S16: Partition scheme 5 (C-ParFin5) of Clarke’s et al. matrix under Partition Finder. See Supplementary Material PF2 schemes for details.

Partition	Characters
1	1, 9, 23, 32, 59, 70, 135, 151, 160, 162, 185, 188
2	2, 11, 16, 25, 39, 42, 54, 56, 78, 93, 102, 108, 115, 139, 150, 152, 175
3	3, 13, 19, 22, 29, 41, 46, 51, 65, 81, 83, 89, 92, 100, 101, 109, 112, 117, 127, 129, 131-133, 149, 156, 157, 158, 161, 163, 168, 171, 187, 192
4	4, 5, 7, 17, 21, 30, 33, 38, 48, 60, 71, 75, 88, 94, 95, 97, 99, 103, 107, 113, 126, 128, 148, 153, 159, 164, 165, 169, 170, 181, 182, 193, 194, 200, 203
5	6, 35, 36, 40, 45, 66, 68, 90, 104, 116, 121-124, 138, 142, 174, 184, 186, 190
6	8, 10, 47, 49, 57, 84, 86, 96, 105, 111, 125, 136, 145, 147, 166, 204
7	12, 24, 28, 37, 44, 63, 67, 87, 114, 119, 155, 173, 178
8	14, 18, 31, 34, 43, 52, 74, 91, 98, 110, 120, 143, 146, 167
9	15, 69, 79, 82, 118, 137, 183, 196, 197, 199, 205
10	20, 61, 64, 73, 130, 134, 176, 179
11	26, 50, 80, 154, 172, 177, 189
12	27, 58, 85
13	53, 55, 72, 76, 106, 140, 198
14	62, 144
15	77
16	141
17	180, 202
18	191, 195
19	201

Table S17: Partition scheme 6 (C-ParFin6) of Clarke’s et al. matrix under Partition Finder. See Supplementary Material PF2 schemes for details.

Partitions	Characters
1	1, 9, 23, 32, 59, 70, 135, 151, 160, 162, 185, 188
2	2, 11, 16, 25, 39, 42, 54, 56, 78, 93, 102, 108, 115, 139, 150, 152, 175
3	3, 13, 19, 22, 29, 41, 46, 51, 65, 81, 83, 89, 92, 100, 101, 109, 112, 117, 127, 129, 131, 132, 133, 149, 156, 157, 158, 161, 163, 168, 171, 187, 192
4	4, 5, 7, 17, 21, 30, 33, 38, 48, 60, 71, 75, 88, 94, 95, 97, 99, 103, 107, 113, 126, 128, 148, 153, 159, 164, 165, 169, 170, 181, 182, 193, 194, 200, 203
5	6, 35, 36, 40, 45, 66, 68, 90, 104, 116, 121, 122, 123, 124, 138, 142, 174, 184, 186, 190
6	8, 10, 47, 49, 57, 84, 86, 96, 105, 111, 125, 136, 145, 147, 166, 204
7	12, 24, 28, 37, 44, 63, 67, 87, 114, 119, 155, 173, 178
8	14, 18, 31, 34, 43, 52, 74, 91, 98, 110, 120, 143, 146, 167
9	15, 69, 79, 82, 118, 137, 183, 196, 197, 199, 205
10	20, 61, 64, 73, 130, 134, 176, 179
11	26, 50, 80, 154, 172, 177, 189
12	27, 58, 85
13	53, 76, 198
14	55
15	62, 144
16	72
17	77, 141
18	106
19	140
20	180, 202
21	191, 195
22	201

Table S18: Partition scheme 7 (C-ParFin7) of Clarke's et al. matrix under Partition Finder. See Supplementary Material PF2 schemes for details.

Partition	Characters
1	1, 9, 23, 32, 59, 70, 135, 151, 160, 162, 185, 188
2	2, 11, 16, 25, 39, 42, 54, 56, 78, 93, 102, 108, 115, 139, 150, 152, 175
3	3, 13, 19, 22, 29, 41, 46, 51, 65, 81, 83, 89, 92, 100, 101, 109, 112, 117, 127, 129, 131, 132, 133, 149, 156, 157, 158, 161, 163, 168, 171, 187, 192
4	4, 5, 7, 17, 21, 30, 33, 38, 48, 60, 71, 75, 88, 94, 95, 97, 99, 103, 107, 113, 126, 128, 148, 153, 159, 164, 165, 169, 170, 181, 182, 193, 194, 200, 203
5	6, 35, 36, 40, 45, 66, 68, 90, 104, 116, 121, 122, 123, 124, 138, 142, 174, 184, 186, 190
6	8, 10, 47, 49, 57, 84, 86, 96, 105, 111, 125, 136, 145, 147, 166, 204
7	12, 24, 28, 37, 44, 63, 67, 87, 114, 119, 155, 173, 178
8	14, 18, 31, 34, 43, 52, 74, 91, 98, 110, 120, 143, 146, 167
9	15, 69, 79, 82, 118, 137, 183, 196, 197, 199, 205
10	20, 61, 64, 73, 130, 134, 176, 179
11	26, 50, 80, 154, 172, 177, 189
12	27, 58, 85
13	53, 76, 198
14	55
15	62
16	72
17	77
18	106
19	140
20	141
21	144
22	180, 202
23	191
24	195
25	201

Table S19: Partition scheme (O-Ana) of O'Connor and Zhou's datamodified by Lee et al. matrix under anatomical criterion.

Partition	Description	Characters
1	skull and mandible	1-48
2	vertebral column and ribs	49-81
3	thoracic girdle and sternum	82-120
4	thoracic limb	121-177
5	pelvic girdle	178-198
6	pelvic limb	199-245
7	integument	246-247

Table S20: Characters of O'Connor and Zhou's data modified by Lee et al. matrix with respective homoplasy value (those showing a # sign are non-informative).

Character	Homoplasy values	Character	Homoplasy values	Character	Homoplasy values	Character	Homoplasy values
1	0.63	65	0.25	129	0.50	193	0.50
2	0.40	66	0.50	130	0.73	194	0.40
3	0.25	67	0.25	131	0.25	195	#
4	0.67	68	#	132	0.50	196	0.00
5	0.40	69	0.50	133	0.63	197	0.25
6	0.25	70	0.25	134	0.40	198	0.40
7	0.63	71	0.25	135	0.40	199	0.50
8	0.25	72	0.67	136	0.50	200	0.40
9	0.00	73	0.57	137	0.50	201	0.25
10	0.40	74	0.50	138	0.25	202	0.50
11	0.00	75	0.00	139	0.57	203	0.63
12	0.25	76	0.00	140	0.57	204	0.00
13	0.00	77	#	141	0.00	205	0.50
14	0.00	78	0.25	142	0.50	206	0.25
15	0.25	79	0.57	143	0.40	207	#
16	0.00	80	0.25	144	0.57	208	0.00
17	0.00	81	0.00	145	0.67	209	0.25
18	0.25	82	0.50	146	0.75	210	0.73
19	0.00	83	0.40	147	0.40	211	0.25
20	0.00	84	0.50	148	0.50	212	0.40
21	#	85	0.00	149	0.57	213	0.50
22	0.00	86	0.25	150	0.25	214	0.00
23	0.00	87	0.40	151	0.40	215	0.25
24	0.00	88	0.00	152	0.40	216	0.50
25	0.00	89	0.63	153	0.50	217	0.63
26	0.25	90	0.25	154	0.25	218	0.63
27	0.00	91	0.63	155	0.63	219	0.00
28	0.25	92	0.70	156	0.00	220	0.25
29	0.00	93	0.50	157	0.50	221	0.00
30	0.25	94	0.00	158	0.50	222	0.63
31	0.00	95	0.73	159	0.40	223	0.50
32	0.00	96	0.40	160	0.63	224	#
33	#	97	0.63	161	0.67	225	0.50
34	0.63	98	0.25	162	0.63	226	0.40
35	0.00	99	0.25	163	0.63	227	0.40
36	0.50	100	0.63	164	0.40	228	0.50
37	0.00	101	#	165	0.70	229	0.25
38	#	102	0.25	166	0.67	230	0.40
39	#	103	0.70	167	0.50	231	0.63
40	0.25	104	0.25	168	0.40	232	0.00
41	0.63	105	0.57	169	0.79	233	0.70
42	0.00	106	0.25	170	0.40	234	0.57
43	0.25	107	0.70	171	0.25	235	0.40
44	0.25	108	#	172	0.50	236	0.25
45	0.00	109	0.40	173	0.40	237	0.85
46	0.25	110	0.57	174	0.63	238	0.40
47	0.40	111	0.75	175	0.25	239	0.40
48	#	112	0.57	176	0.25	240	0.40
49	0.25	113	0.63	177	0.75	241	0.25
50	0.57	114	0.63	178	0.81	242	0.00
51	0.75	115	0.50	179	0.25	243	0.40
52	0.25	116	0.40	180	0.00	244	0.73
53	0.25	117	0.25	181	0.40	245	0.00
54	0.63	118	0.57	182	0.25	246	0.25
55	0.40	119	0.40	183	0.25	247	0.00
56	0.25	120	0.00	184	0.50		
57	0.40	121	0.00	185	0.00		
58	0.50	122	0.00	186	0.00		
59	0.25	123	0.00	187	0.50		
60	0.00	124	0.57	188	0.40		
61	0.81	125	0.57	189	0.57		
62	0.40	126	0.40	190	0.25		
63	0.50	127	0.63	191	0.50		
64	0.50	128	0.25	192	0.67		

Table S21: Partition scheme (O-Hom) of O'Connor and Zhou's data modified by Lee et al. matrix under homoplasy criterion.

Partition	Criterion	Characters
1	0.00	9, 11, 13, 14, 16, 17, 19, 20, 22-25, 27, 29, 31, 32, 35, 37, 42, 45, 60, 75, 76, 81, 85, 88, 94, 120-123, 140, 155, 179, 184, 185, 195, 203, 207, 213, 218, 220, 231, 241, 244, 246, 247
2	0.25	3, 6, 8, 12, 15, 18, 26, 28, 30, 40, 43, 44, 46, 49, 52, 53, 56, 59, 65, 67, 70, 71, 78, 80, 86, 90, 98, 99, 102, 104, 106, 117, 130, 137, 149, 153, 170, 174, 175, 178, 181, 182, 189, 196, 200, 205, 208, 210, 214, 219, 228, 235, 240, 245
3	0.40	2, 5, 10, 47, 55, 57, 62, 83, 87, 96, 109, 116, 119, 126, 133, 134, 142, 146, 150, 151, 158, 163, 167, 169, 172, 180, 187, 193, 197, 199, 211, 225, 226, 229, 234, 237, 238, 239, 242
4	0.50	36, 58, 63, 64, 66, 69, 74, 82, 84, 93, 115, 128, 131, 135, 136, 141, 147, 152, 156, 157, 166, 171, 183, 186, 190, 192, 198, 201, 204, 212, 215, 222, 224, 227
5	0.57	50, 73, 79, 105, 110, 112, 118, 124, 125, 138, 139, 143, 148, 188, 233
6	0.63	1, 7, 34, 41, 54, 89, 91, 97, 100, 113, 114, 127, 132, 154, 159, 161, 162, 173, 202, 216, 217, 221, 230
7	0.67	4, 72, 144, 160, 165, 191
8	0.70	92, 103, 107, 164, 232
9	0.73	95, 129, 209, 243
10	0.75	51, 111, 145, 176
11	0.79	168
12	0.81	61, 177
13	0.85	236
14	non-informative characters	21, 33, 38, 39, 48, 68, 77, 101, 108, 194, 206, 223

Table S22: Partition scheme 1 (O-ParFin1) of O'Connor and Zhou's data modified by Lee et al. matrix under Partition Finder. See Supplementary Material PF2 schemes for details.

Partition	Characters
1	1, 3, 4, 8, 9, 12, 28, 31, 51, 56, 61, 64, 67, 69, 70, 72, 74, 79, 92, 95, 104, 107, 109, 111, 112, 117, 118, 129, 131, 132, 134, 148, 153, 154, 156, 159, 160, 168, 173, 176, 177, 178, 183, 193, 197, 203, 204, 205, 212-214, 216, 222, 226, 229, 232-234, 236, 247
2	2, 5, 7, 10, 11, 13-18, 20, 23-26, 29, 30, 32, 34, 36, 37, 39, 40, 41, 43, 44, 45-47, 49, 50, 52-55, 57, 58, 66, 73, 75, 78, 80, 81, 84, 87, 89, 91, 93, 94, 96, 103, 105, 106, 108, 110, 113-116, 119, 120-128, 133, 135-139, 141-147, 149-152, 157, 161-167, 169, 171, 172, 174, 175, 182, 184-186, 188-191, 196, 198, 199, 201, 202, 207-209, 211, 215, 217, 219, 221, 224, 225, 227, 228, 230, 231, 237, 243-246
3	6, 19, 21, 22, 27, 33, 35, 38, 42, 48, 59, 60, 62, 63, 65, 68, 71, 76, 77, 82, 83, 85, 86, 88, 90, 97-102, 130, 140, 155, 158, 170, 179-181, 187, 192, 194, 195, 200, 206, 210, 218, 220, 223, 235, 238-242

Table S23: Partition scheme 2 (O-ParFin2) of O'Connor and Zhou's datamodified by Lee et al. matrix under Partition Finder. See Supplementary Material PF2 schemes for details.

Partition	Characters
1	1, 4, 8, 28, 31, 51, 61, 72, 74, 79, 104, 111, 112, 148, 153, 160, 168, 173, 176, 204, 212, 222, 229, 233, 234, 236, 247
2	2, 5, 7, 10, 11, 13, 14-18, 20, 23-26, 29, 30, 32, 34, 36, 37, 39-41, 43-47, 49, 50, 52-55, 57, 58, 66, 73, 75, 78, 80, 81, 84, 87, 89, 91, 93, 94, 96, 103, 105, 106, 108, 110, 113-116, 119-128, 133, 135-139, 141-147, 149-152, 157, 161-167, 169, 171, 172, 174, 175, 182, 184-186, 188-191, 196, 198, 199, 201, 202, 207-209, 211, 215, 217, 219, 221, 224, 225, 227, 228, 230, 231, 237, 243-246
3	3, 9, 12, 56, 67, 69, 70, 92, 95, 129, 131, 134, 154, 156, 159, 178, 183, 193, 197, 203, 205, 213, 214, 216, 226
4	6, 19, 21, 22, 27, 33, 35, 38, 42, 48, 59, 60, 62, 63, 65, 68, 71, 76, 77, 82, 83, 85, 86, 88, 90, 97-102, 130, 140, 155, 158, 170, 179-181, 187, 192, 194, 195, 200, 206, 210, 218, 220, 223, 235, 238-242
5	64, 107, 109, 117, 118, 132, 177, 232

Table S24: Partition scheme 3 (O-ParFin3) of O'Connor and Zhou's datamodified by Lee et al. matrix under Partition Finder. See Supplementary Material PF2 schemes for details.

Partition	Characters
1	1, 31, 79, 112, 153, 160, 173, 222, 233, 234, 247
2	2, 5, 7, 10, 11, 13-18, 20, 23-26, 29, 30, 32, 34, 36, 37, 39, 40, 41, 43-47, 49, 50, 52-55, 57, 58, 66, 73, 75, 78, 80, 81, 84, 87, 89, 91, 93, 94, 96, 103, 105, 106, 108, 110, 113-116, 119-128, 133, 135-139, 141-147, 149-152, 157, 161-167, 169, 171, 172, 174, 175, 182, 184-186, 188-191, 196, 198, 199, 201, 202, 207-209, 211, 215, 217, 219, 221, 224, 225, 227, 228, 230, 231, 237, 243-246
3	3, 131, 213
4	4, 8, 61, 148, 176, 212, 229, 236
5	6, 241
6	9, 12, 197, 226
7	19, 238
8	21, 27, 33, 35, 59, 60, 68, 71, 88, 98, 102, 130, 180, 200, 218, 242
9	22, 62, 63, 65, 76, 86, 90, 97, 100, 118, 158, 178, 179, 187, 192, 195, 210, 235, 239
10	28, 51, 72, 74, 104, 111, 168, 204
11	38, 101, 159, 194, 223
12	42, 48, 77, 85, 99, 140, 155, 170, 206, 220, 240
13	56, 129, 156, 193, 203, 205
14	64
15	67, 69
16	70
17	82, 83, 181
18	92, 183
19	95, 214
20	107, 109, 132, 177, 232
21	117
22	134, 216
23	154

Table S25: Partition scheme 4 (O-ParFin4) of O'Connor and Zhou's data modified by Lee et al. matrix under Partition Finder. See Supplementary Material PF2 schemes for details.

Partition	Characters
1	1, 31, 79, 112, 153, 160, 173, 222, 233, 234, 247
2	2, 5, 7, 10, 11, 13-18, 20, 23-26, 29, 30, 32, 34, 36, 37, 39-41, 43-47, 49, 50, 52-55, 57, 58, 66, 73, 75, 78, 80, 81, 84, 87, 89, 91, 93, 94, 96, 103, 105, 106, 108, 110, 113-116, 119-128, 133, 135-139, 141-147, 149-152, 157, 161-167, 169, 171, 172, 174, 175, 182, 184-186, 188-191, 196, 198, 199, 201, 202, 207-209, 211, 215, 217, 219, 221, 224, 225, 227, 228, 230, 231, 237, 243-246
3	3, 131, 213
4	4, 8, 61, 148, 176, 212, 229, 236
5	6, 241
6	9, 12, 197, 226
7	19, 238
8	21, 27, 33, 35, 59, 60, 68, 71, 88, 98, 102, 130, 180, 200, 218, 242
9	22, 65, 86, 158, 187, 195, 210
10	28, 51, 72, 74, 104, 111, 168, 204
11	38, 101, 159, 194, 223
12	42, 48, 77, 85, 99, 140, 155, 170, 206, 220, 240
13	56, 129, 156, 193, 203, 205
14	62, 63, 76, 90, 97, 100, 118, 179, 192, 235, 239
15	64
16	67, 69
17	70
18	82, 83, 181
19	92, 183
20	95, 178
21	107, 109, 132, 177, 232
22	117
23	134, 216
24	154
25	214

Table S26: Partition scheme 5 (O-ParFin5) of O'Connor and Zhou's data modified by Lee et al. matrix under Partition Finder. See Supplementary Material PF2 schemes for details.

Partition	Characters
1	1, 31, 79, 112, 153, 160, 173, 222, 233, 234, 247
2	2, 5, 7, 10, 11, 13, 14-18, 20, 23-26, 29, 30, 32, 34, 36, 37, 39, 40, 41, 43-47, 49, 50, 52-55, 57, 58, 66, 73, 75, 78, 80, 81, 84, 87, 89, 91, 93, 94, 96, 103, 105, 106, 108, 110, 113-116, 119-128, 133, 135-139, 141-147, 149-152, 157, 161-167, 169, 171, 172, 174, 175, 182, 184-186, 188-191, 196, 198, 199, 201, 202, 207-209, 211, 215, 217, 219, 221, 224, 225, 227, 228, 230, 231, 237, 243-246
3	3, 131, 213
4	4, 8, 61, 148, 176, 212, 229, 236
5	6
6	9, 12, 197, 226
7	19, 238
8	21, 27, 33, 35, 59, 60, 68, 71, 88, 98, 102, 130, 180, 200, 218, 242
9	22, 65, 86, 158, 187, 195, 210
10	28, 51, 72, 74, 104, 111, 168, 204
11	38, 101, 159, 194, 223
12	42, 48, 77, 85, 99, 140, 155, 170, 206, 220, 240
13	56, 129, 156, 193, 203, 205
14	62, 63, 76, 90, 97, 100, 179, 192, 235, 239, 241
15	64
16	67, 69
17	70
18	82, 83, 181
19	92, 183
20	95
21	107, 109, 132, 177, 232
22	117
23	118, 178
24	134, 216
25	154
26	214

Table S27: Partition scheme 6 (O-ParFin6) of O'Connor and Zhou's data modified by Lee et al. matrix under Partition Finder. See Supplementary Material PF2 schemes for details.

Partition	Characters
1	1, 31, 79, 112, 153, 160, 173, 222, 233, 234, 247
2	2, 10, 11, 16, 17, 34, 43, 47, 54, 66, 75, 94, 96, 103, 110, 114, 116, 120-122, 125, 126, 136, 141, 143, 152, 157, 184, 186, 188, 191, 198, 199, 201, 202, 215, 217, 219, 228, 231, 245
3	3, 131, 213
4	4, 8, 61, 148, 176, 212, 229, 236
5	5, 13, 24, 37, 40, 41, 45, 49, 52, 53, 55, 57, 58, 73, 78, 81, 84, 87, 91, 105, 108, 115, 119, 128, 135, 137, 142, 144-147, 149, 151, 163-165, 172, 174, 189, 190, 207, 208, 211, 221, 224, 225, 227, 230, 237
6	6, 241
7	7, 14, 15, 18, 20, 23, 25, 26, 29, 30, 32, 36, 39, 44, 46, 50, 80, 89, 93, 106, 113, 123, 124, 127, 133, 138, 139, 150, 161, 162, 166, 167, 169, 171, 175, 182, 185, 196, 209, 243, 244, 246
8	9, 12, 197, 226
9	19, 238
10	21, 27, 33, 35, 59, 60, 68, 71, 88, 98, 102, 130, 180, 200, 218, 242
11	22, 65, 86, 158, 187, 195, 210
12	28, 51, 72, 74, 104, 111, 168, 204
13	38, 101, 159, 194, 223
14	42, 48, 77, 85, 99, 140, 155, 170, 206, 220, 240
15	56, 129, 156, 193, 203, 205
16	62, 63, 76, 90, 97, 100, 118, 179, 192, 235, 239
17	64
18	67, 69
19	70
20	82, 83, 181
21	92, 183
22	95, 178
23	107, 109, 132, 177, 232
24	117
25	134, 216
26	154
27	214

Table S28: Partition scheme (S-Ana) of the Scolebythidae matrix under anatomical criterion .

Partition	Criterion	Characters
1	head	3-8, 20
2	meso- plus metasoma	9-14, 21-23, 25-27
3	wings	1, 2, 15-19, 24, 28

Table S29: Characters of the Scolebythidae matrix with respective homoplasy value (those showing a # sign are non-informative).

Character	Homoplasy values	Character	Homoplasy values	Character	Homoplasy values
1	0.25	10	0.50	19	0.40
2	0.00	11	0.00	20	0.40
3	0.40	12	0.25	21	0.50
4	0.25	13	0.25	22	0.25
5	0.40	14	0.00	23	0.00
6	0.00	15	0.00	24	0.00
7	0.50	16	0.00	25	#
8	0.25	17	0.00	27	0.25
9	0.25	18	0.25	28	0.57

Table S30: Partition scheme 2 (S-Hom2) of the Scolebythidae matrix under homoplasy criterion.

Partition	f	Characters
1	0.00	2, 6, 11, 14, 15, 16, 17, 23, 24
2	0.25	1, 4, 8, 9, 12, 13, 18, 22, 26, 27
3	0.40	3, 5, 19, 20
4	0.50	7, 10, 21
5	0.57	28
6	non-informative characters	25

Table S31: Partition scheme 1 (S-ParFin1) of Scolebythidae matrix under Partition Finder. See Supplementary Material PF2 schemes for details.

Partition	Criterion	Characters
1	Partition Finder	1, 2, 10-13
2	Partition Finder	3, 4- 9, 14-28

Table S32: Partition scheme 2 (S-ParFin2) of Scolebythidae matrix under Partition Finder. See Supplementary Material PF2 schemes for details.

Partition	Criterion	Characters
1	Partition Finder	1
2	Partition Finder	2, 10-13
3	Partition Finder	3, 7, 16, 17, 19, 21, 28
4	Partition Finder	4, 27
5	Partition Finder	5, 9, 14, 15, 20
6	Partition Finder	6, 18, 22, 23, 25, 26
7	Partition Finder	8
8	Partition Finder	24