Journal of Vertebrate Paleontology

Oldest *Deinotherium proavum* from Europe

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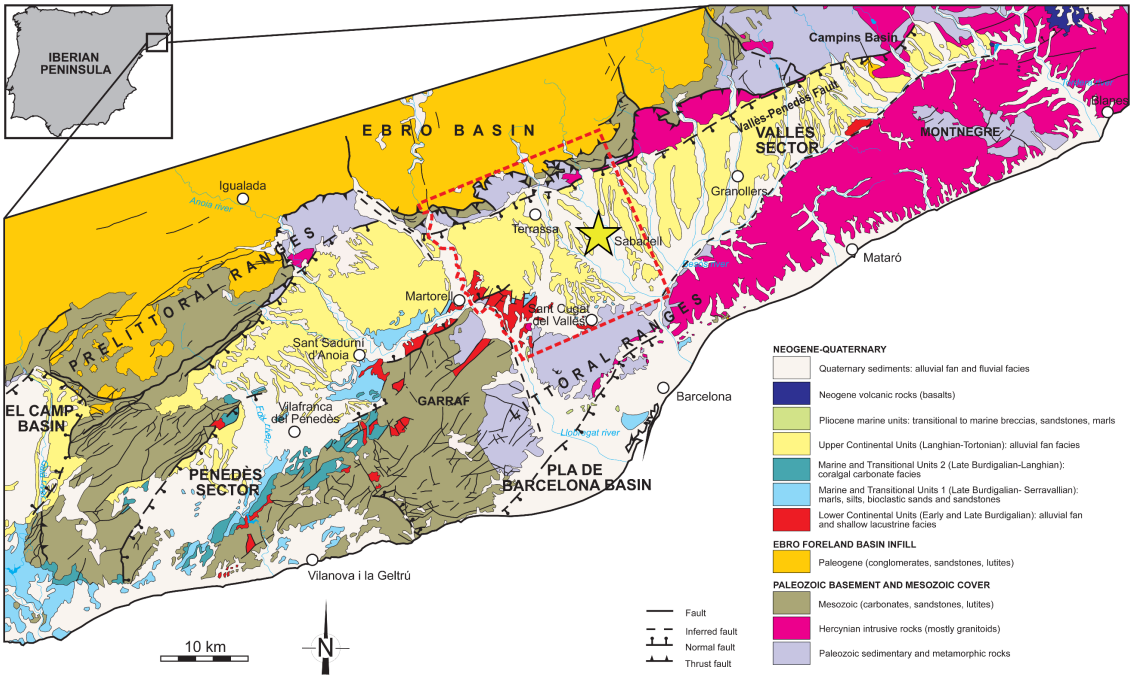

FIGURE S1. Location of ROS localities (yellow star) near the city of Sabadell within a simplified geological map of the Vallès-Penedès Basin. The area enclosed by the dashed perimeter is shown in greater detail in Figure S2. Modified from Casanovas-Vilar et al. (2016: Fig. 1).

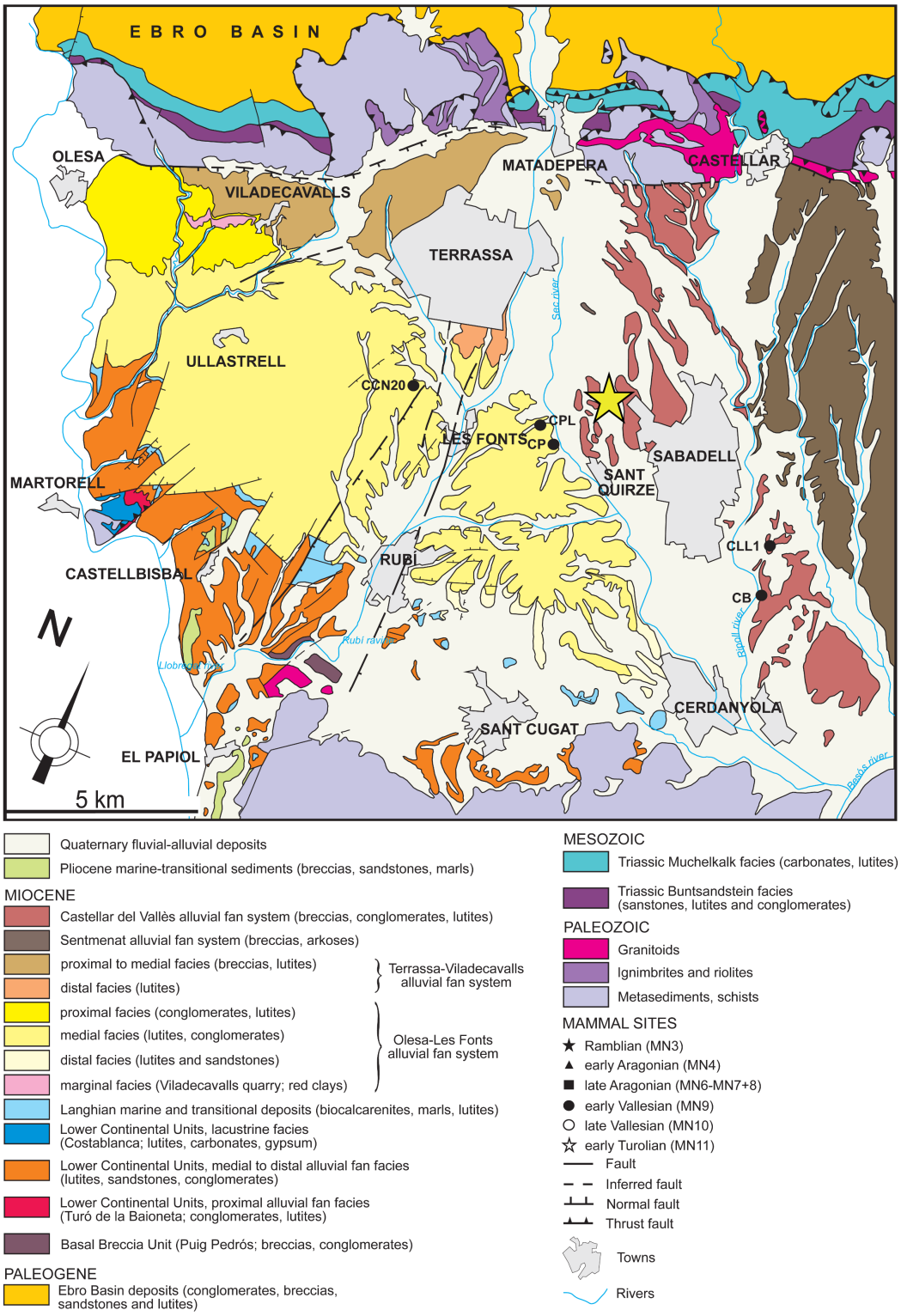

FIGURE S2. Location of ROS-D (yellow star) near the city of Sabadell within a detailed geological map of the Vallès sector of the Vallès-Penedès Basin (see Fig. S1). Modified from Casanovas-Vilar et al. (2016: Fig. 2). The location of other sites from the area is also shown: CB, Castell de Barberà; CCN20, Creu de Conill 20; CLL1, Can Llobateres 1; CP, Can Poncic; CPL, Can Pallars i Llobateres.

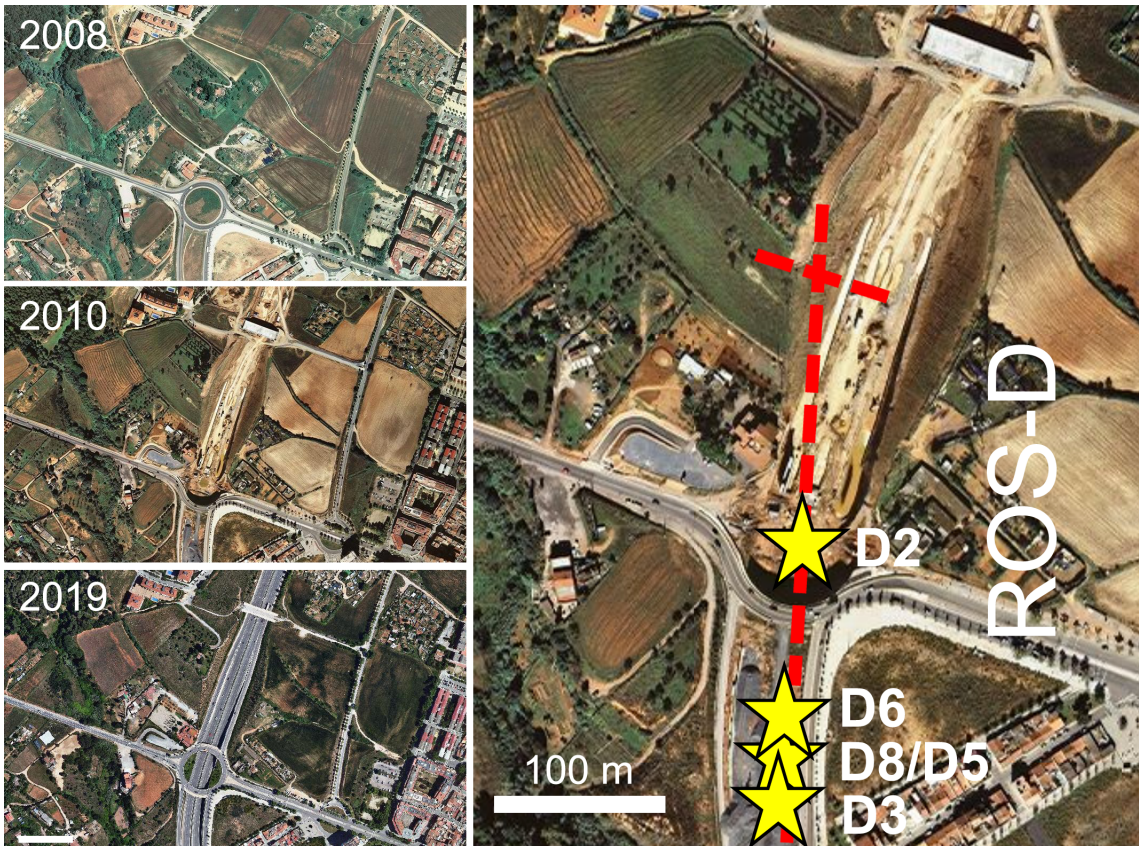

FIGURE S3. To the left, aerial photographs of the ROS-D area in 2008 (before the works started), 2010 (when ROS-D localities were excavated), and 2019. To the right, detail of the 2010 aerial photograph indicating the location of ROS-D localities (yellow stars) as well as the approximate transects followed to elaborate the stratigraphic column in Figure S3 (red dotted line). Photographs © Institut Cartogràfic i Geològic de Catalunya, under CC BY 4.0 license.

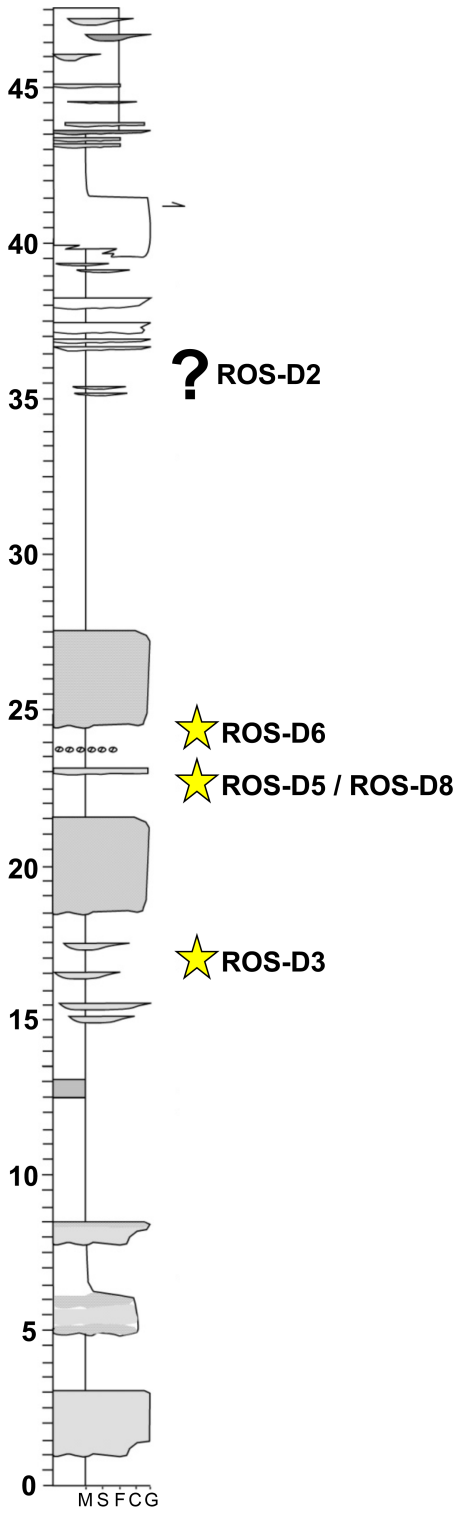

FIGURE S4. Stratigraphic column of ROS-D indicating the situation of ROS-D localities discussed in this paper; note that they are indicated with a yellow star except for ROS-D2, whose situation can only be approximated (see main text for further details). The scale is in meters with subdivisions each 0.5 m. Abbreviations: **M**, mud; **S**, silt; **F**, fine sand; **C**, coarse sand; **G**, conglomerate. Approximate kilometric points (PK) along C-58C and approximate UTM 31N / ETRS89 coordinates (within brackets) for

each locality are the following (from south to north): ROS-D3, PK 0.970 [422900 – 4600170]; ROS-D5 and ROS-D8, PK 1.000 [422900 – 4600200]; ROS-D6, PK 1.030 [422900 –4600230]; ROS-D2, PK 1120 [422925 – 4600330]. Outside the plot toward the north, ROS-A1 is located at PK 3.070 [423000 – 4602200].

FIGURE S5. IPS62080n, tusk fragment of *Deinotherium proavum* from ROS-D3.

TABLE S1. Descriptive statistics for dental measurements of *Deinotherium giganteum*, *Deinotherium proavum*, and *Deinotherium* from ROS localities. Measurements taken from the literature except for ROS (this study), see main text for literature references and further details.

Variable	Species	N	Mean	SD	Min	Max
P3 MD	*D. giganteum*	50	76.01	5.59	63.6	93.0
	D. proavum	6	94.22	9.53	78.6	100.7
	ROS	1	104.50	—	—	—
P3 BL	*D. giganteum*	50	75.34	5.31	61.0	86.3
	D. proavum	6	99.82	11.15	85.0	115.0
	ROS	1	99.50	—	—	—
P3 BLI	*D. giganteum*	50	99.25	4.61	90.1	113.6
	D. proavum	6	106.12	7.72	91.8	115.0
	ROS	1	95.21	—	—	—
P4 MD	*D. giganteum*	43	70.19	3.87	63.1	78.0
	D. proavum	6	80.62	4.72	75.0	86.6
	ROS	2	81.15	3.32	78.8	83.5
P4 BL	*D. giganteum*	43	78.54	4.87	69.0	90.2
	D. proavum	6	96.65	4.74	91.8	102.5
	ROS	2	96.3	9.05	89.9	102.7
P4 BLI	*D. giganteum*	43	111.96	5.09	99.1	122.2
	D. proavum	6	119.07	10.36	106.0	134.4
	ROS	2	118.55	6.29	114.1	123.0
M1 MD	*D. giganteum*	44	89.27	7.15	74.0	105.5
	D. proavum	9	107.69	7.23	97.1	119.0
	ROS	2	106.75	8.84	100.5	113.0
M1 BL	*D. giganteum*	44	74.71	5.57	62.5	85.0
	D. proavum	9	88.56	7.42	80.0	100.0
	ROS	2	83.75	8.84	79.5	92.0
M1 BLI	*D. giganteum*	44	83.78	3.34	77.2	91.1
	D. proavum	9	82.29	4.83	72.1	88.2
	ROS	2	80.25	1.63	79.1	81.4

TABLE S1. (Continued)

Variable	Species	N	Mean	SD	Min	Max
M2 MD	*D. giganteum*	31	83.89	6.05	75.1	94.0
	D. proavum	12	104.28	6.00	95.0	116.0
	ROS	2	98.0	10.61	90.5	105.5
M2 BL	*D. giganteum*	31	87.79	7.14	76.0	103.0
	D. proavum	12	110.14	8.18	97.0	129.0
	ROS	1	116	—	—	—
M2 BLI	*D. giganteum*	31	104.69	4.94	96.7	114.1
	D. proavum	12	105.62	4.77	94.8	111.2
	ROS	1	110.0	—	—	—
M3 MD	*D. giganteum*	23	81.22	7.10	71.5	95.6
	D. proavum	5	108.96	3.86	104.8	115.0
	ROS	2	105.00	4.95	101.5	108.5
M3 BL	*D. giganteum*	23	88.50	8.42	77.3	108.0
	D. proavum	5	115.00	1.73	114.0	118.0
	ROS	2	105.60	0.85	105.0	106.2
M3 BLI	*D. giganteum*	23	108.99	4.73	100.0	120.8
	D. proavum	5	105.64	3.77	99.1	108.8
	ROS	2	100.70	5.52	96.8	104.6
p3 MD	*D. giganteum*	34	64.78	4.37	58.0	73.1
	D. proavum	12	76.95	4.96	68.5	84.1
	ROS	2	83.20	0.42	82.9	83.5
p3 BL	*D. giganteum*	34	52.09	4.48	39.0	62.5
	D. proavum	12	62.28	6.88	52.0	73.0
	ROS	2	63.70	1.84	62.4	65.0
p3 BLI	*D. giganteum*	34	80.47	5.29	63.4	90.8
	D. proavum	12	80.87	6.01	73.7	96.7
	ROS	2	76.55	2.62	74.7	78.4
p4 MD	*D. giganteum*	38	73.31	4.71	61.2	80.3
	D. proavum	15	85.24	4.20	76.0	91.6
	ROS	3	81.03	7.70	76.1	89.9

TABLE S1. (Continued)

Variable	Species	N	Mean	SD	Min	Max
p4 BL	*D. giganteum*	38	59.64	4.35	48.0	69.9
	D. proavum	15	70.19	6.50	62.0	83.0
	ROS	3	66.60	3.64	64.3	70.8
p4 BLI	*D. giganteum*	38	82.58	4.95	68.4	92.3
	D. proavum	15	82.31	5.93	75.0	93.3
	ROS	3	82.40	3.22	78.8	85.0
m1 MD	*D. giganteum*	23	89.70	4.71	80.0	98.0
	D. proavum	11	100.47	7.96	89.0	111.0
	ROS	4	97.30	9.05	89.2	106.1
m1 BL	*D. giganteum*	23	62.67	4.16	56.5	72.0
	D. proavum	11	73.84	5.47	63.0	82.0
	ROS	4	69.85	8.73	61.9	77.8
m1 BLI	*D. giganteum*	23	70.01	5.55	63.0	88.1
	D. proavum	11	73.62	4.07	64.9	80.1
	ROS	4	71.63	2.50	69.4	74.7
m2 MD	*D. giganteum*	21	85.08	6.62	71.0	100.5
	D. proavum	11	103.77	10.08	91.0	120.0
	ROS	2	94.90	13.15	85.6	104.2
m2 BL	*D. giganteum*	21	74.80	4.98	64.0	84.7
	D. proavum	11	92.31	10.60	72.0	110.5
	ROS	2	82.2	11.03	74.4	90.0
m2 BLI	*D. giganteum*	21	88.10	4.28	77.8	94.6
	D. proavum	11	89.18	8.84	75.0	106.8
	ROS	2	86.65	0.35	86.5	86.9
m3 MD	*D. giganteum*	24	85.93	6.85	75.5	97.0
	D. proavum	8	107.18	10.08	91.5	120.0
	ROS	1	117.00	—	—	—
m3 BL	*D. giganteum*	24	74.44	7.72	58.0	88.0
	D. proavum	8	97.3	10.83	83.2	114.0
m3 BLI	*D. giganteum*	24	86.7	6.80	73.4	96.7
	D. proavum	18	90.73	4.22	85.5	99.1

TABLE S1. (Continued)

Variable	Species	N	Mean	SD	Min	Max
dP2 MD	*D. giganteum*	9	38.50	4.30	32.0	46.0
	D. proavum	9	47.44	4.49	40.6	53.9
	ROS	1	41.50	—	—	—
dP2 BL	*D. giganteum*	9	34.14	3.42	27.8	38.0
	D. proavum	9	44.13	2.55	40.0	47.1
	ROS	1	36.60	—	—	—
dP2 BLI	*D. giganteum*	9	88.91	5.67	82.6	99.4
	D. proavum	9	92.88	6.27	85.9	103.2
	ROS	1	88.20	—	—	—

TABLE S2. Statisticals tests for mean (ANOVA) and median (Kruskal-Wallis) differences in dental measurements between *Deinotherium giganteum* and *Deinotherium proavum*. Measurements taken from the literature, see main text for further details.

	ANOVA		Kruskal-Wallis	
	F	p	H (chi^2)	p
P3 MD	48.35	<0.001	12.98	<0.001
P3 BL	86.49	<0.001	15.37	<0.001
P3 BLI	10.18	0.002	5.88	0.015
P4 MD	36.39	<0.001	13.96	<0.001
P4 BL	65.24	<0.001	15.48	<0.001
P4 BLI	7.69	0.008	2.28	0.131
M1 MD	49.37	<0.001	19.31	<0.001
M1 BL	41.12	<0.001	16.80	<0.001
M1 BLI	1.277	0.264	0.42	0.515
M2 MD	98.68	<0.001	25.36	<0.001
M2 BL	78.29	<0.001	23.49	<0.001
M2 BLI	0.31	0.581	0.515	0.473
M3 MD	70.37	<0.001	11.90	<0.001
M3 BL	47.69	<0.001	11.90	<0.001
M3 BLI	2.185	0.151	3.026	0.082
p3 MD	64.25	<0.001	22.59	<0.001
p3 BL	34.31	<0.001	16.73	<0.001
p3 BLI	0.04	0.834	0.24	0.626
p4 MD	85.83	<0.001	29.70	<0.001
p4 BL	47.25	<0.001	24.76	<0.001
p4 BLI	0.03	0.867	0.40	0.527
m1 MD	24.64	<0.001	11.35	<0.001
m1 BL	43.69	<0.001	17.00	<0.001
m1 BLI	3.684	0.064	7.22	0.007
m2 MD	39.99	<0.001	17.52	<0.001
m2 BL	40.96	<0.001	15.27	<0.001
m2 BLI	0.223	0.604	0.05	0.827

TABLE S2. (Continued)

	ANOVA		Kruskal-Wallis	
	F	p	H (chi^2)	p
m3 MD	45.36	<0.001	15.00	<0.001
m3 BL	42.93	<0.001	15.00	<0.001
m3 BLI	2.45	0.128	1.88	0.170
dP2 MD	18.64	<0.001	9.827	0.002
dP2 BL	49.22	<0.001	12.79	<0.001
dP2 BLI	1.981	0.178	2.123	0.144

TABLE S3. Kruskal-Wallis tests of differences in the median for dental measurements among *Deinotherium giganteum*, *Deinotherium proavum*, and the ROS sample, and pairwise Dunn's post hoc tests (Bonferroni-corrected *p* values). Only tooth loci with at least two specimens from ROS are included. Measurements taken from the literature, see main text for further details.

P4	MD		BL		BLI	
Kruskal-Wallis	H = 18.40	p < 0.001	H = 19.62	p < 0.001	H = 4.549	p = 0.103
Dunn's *p* (sequential Bonferroni)	*D. proavum*	ROS	*D. proavum*	ROS	*D. proavum*	ROS
D. giganteum	<0.001	0.016	<0.001	0.022	0.119	0.117
D. proavum	—	0.885	—	0.868	—	0.578
M1	MD		BL		BLI	
Kruskal-Wallis	H = 22.32	p < 0.001	H = 19.43	p < 0.001	H = 3.153	p = 0.207
Dunn's *p* (sequential Bonferroni)	*D. proavum*	ROS	*D. proavum*	ROS	*D. proavum*	ROS
D. giganteum	<0.001	0.034	<0.001	0.073	0.522	0.085
D. proavum	—	0.929	—	0.770	—	0.409
M2	MD		BL		BLI	
Kruskal-Wallis	H = 26.85	p < 0.001	—	—	—	—
Dunn's *p* (sequential Bonferroni)	*D. proavum*	ROS	—	—	—	—
D. giganteum	<0.001	0.080	—	—	—	—
D. proavum	—	0.561	—	—	—	1

TABLE S3. (Continued)

M3	MD		BL		BLI	
Kruskal-Wallis	H = 15.62	p < 0.001	H = 15.19	p < 0.001	H = 6.676	p = 0.035
Dunn's *p* (sequential Bonferroni)	*D. proavum*	ROS	*D. proavum*	ROS	*D. proavum*	ROS
D. giganteum	0.001	0.031	<0.001	0.078	0.101	0.029
D. proavum	—	0.849	—	0.541	—	0.342
p3	MD		BL		BLI	
Kruskal-Wallis	H = 26.18	p < 0.001	H = 20.01	p < 0.001	H = 2.259	p = 0.323
Dunn's *p* (sequential Bonferroni)	*D. proavum*	ROS	*D. proavum*	ROS	*D. proavum*	ROS
D. giganteum	<0.001	0.006	<0.001	0.022	0.620	0.142
D. proavum	—	0.548	—	0.705	—	0.238
p4	MD		BL		BLI	
Kruskal-Wallis	H = 31.87	p < 0.001	H = 27.65	p < 0.001	H = 0.457	p = 0.796
Dunn's *p* (sequential Bonferroni)	*D. proavum*	ROS	*D. proavum*	ROS	*D. proavum*	ROS
D. giganteum	<0.001	0.037	<0.001	0.020	0.507	0.976
D. proavum	—	0.503	—	0.477	—	0.727

TABLE S3. (Continued)

m1	MD		BL		BLI	
Kruskal-Wallis	H = 12.00	p = 0.002	H = 16.53	p < 0.001	H = 8.266	p = 0.016
Dunn's *p* (sequential Bonferroni)	*D. proavum*	ROS	*D. proavum*	ROS	*D. proavum*	ROS
D. giganteum	<0.001	0.125	<0.001	0.116	0.005	0.288
D. proavum	—	0.477	—	0.291	—	0.425
m2	MD		BL		BLI	
Kruskal-Wallis	H = 17.94	p < 0.001	H = 15.7	p < 0.001	H = 0.52	p = 0.770
Dunn's *p* (sequential Bonferroni)	*D. proavum*	ROS	*D. proavum*	ROS	*D. proavum*	ROS
D. giganteum	<0.001	0.193	<0.001	0.251	0.845	0.515
D. proavum	—	0.437	—	0.424	—	0.471

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