

SUPPLEMENTARY MATERIAL OF

**A review on *Bison schoetensacki* and its closest relatives through the Early-Middle Pleistocene Transition: insights from the Vallparadís Section (NE Iberian Peninsula)
and other European localities**

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Table S1. List of *Bison schoetensacki* specimens from Vallparadís Estacio (EVT) and Cal Guardiola (CGR) layers.

ID	Anatomical element	Layer	ID	Anatomical element	Layer	ID	Anatomical element	Layer	ID	Anatomical element	Layer	ID	Anatomical element	Layer
IPS39141	Astragalus	CGRD7	IPS92970	Horn core	EVT7	IPS14985	Metacarpal	CGRD7	IPS92958	Cubonavicular	EVT10	IPS91545	Pyramidal	EVT7
IPS92949	Astragalus	EVT7	IPS50672	Humerus	CGRD4	IPS15002	Metacarpal	CGRD7	IPS92984	Indeterminate fragments	EVT7	IPS92961	Pyramidal	EVT10
IPS92950	Astragalus	EVT7	IPS92928	Humerus	EVT7	IPS107626	Metacarpal	EVT12	IPS92985	Indeterminate fragments	EVT7	IPS13570	Radius	CGRD2
IPS92951	Astragalus	EVT7	IPS92929	Humerus	EVT7	IPS107635	Metacarpal	EVT12	IPS14104	Pelvis fragment	CGRD2	IPS39893	Radius	CGRD2
IPS92952	Astragalus	EVT7	IPS114549	Humerus	EVT7	IPS107636	Metacarpal	EVT12	IPS14977	Proximal phalanx	CGRD7	IPS48775	Radius	CGRD7
IPS92953	Astragalus	EVT12	IPS114568	Humerus	EVT7	IPS118115	Metacarpal	EVT12	IPS61879	Proximal phalanx	CGRD3	IPS92914	Radius	EVT7
IPS118120b	Astragalus	EVT12	IPS107620	Humerus	EVT12	IPS118116	Metacarpal	EVT12	IPS92924	Proximal phalanx	EVT10	IPS92915	Radius	EVT7
IPS92966	Autopodial fragment	EVT10	IPS92981	Long bone fragment	EVT12	IPS17761	Metapodial distal fragment	CGRD7	IPS92925	Proximal phalanx	EVT7	IPS92916	Radius	EVT7
IPS114551	Axis	EVT7	IPS92968	Mandible	EVT12	IPS18517	Metapodial distal fragment	CGRD7	IPS92926	Proximal phalanx	EVT10	IPS92918	Radius	EVT7
IPS13936	Calcaneum	CGRD2	IPS92978	Maxilla	EVT7	IPS92959	Metapodial distal fragment	EVT10	IPS92927	Proximal phalanx	EVT7	IPS92919	Radius	EVT7
IPS92944	Calcaneum	EVT7	IPS796	Metacarpal	CGRD7	IPS18430	Metatarsal	CGRD7	IPS107624	Proximal phalanx	EVT12	IPS92920	Radius	EVT7
IPS92945	Calcaneum	EVT7	IPS92905	Metacarpal	CGRD7	IPS92906	Metatarsal	EVT7	IPS114554	Proximal phalanx	EVT7	IPS107616	Radius	EVT12
IPS92946	Calcaneum	EVT7	IPS92907	Metacarpal	EVT10	IPS92930	Metatarsal	EVT12	IPS118118	Proximal phalanx	EVT12	IPS107617	Radioulna	EVT12
IPS92947	Calcaneum	EVT7	IPS92908	Metacarpal	EVT7	IPS92931	Metatarsal	EVT7	IPS118119	Proximal phalanx	EVT12	IPS107628	Radioulna	EVT12
IPS92948	Calcaneum	EVT7	IPS92909	Metacarpal	EVT12	IPS92932	Metatarsal	EVT12	IPS16778	Intermediate phalanx	CGRD2	IPS118111	Radioulna	EVT12
IPS118120a	Calcaneum	EVT12	IPS92910	Metacarpal	EVT12	IPS92933	Metatarsal	EVT7	IPS40612	Intermediate phalanx	CGRD2	IPS92922	Scapula	EVT7
IPS92963	Capitotrapezoid	EVT10	IPS92911	Metacarpal	EVT7	IPS92934	Metatarsal	EVT7	IPS107621	Intermediate phalanx	EVT12	IPS107637	Scapula	EVT12
IPS107615	Cervical vertebra	EVT12	IPS92912	Metacarpal	EVT7	IPS92935	Metatarsal	EVT7	IPS118114	Intermediate phalanx	EVT12	IPS92960	Semilunar	EVT10
IPS92969	Cranial fragments	EVT12	IPS92913	Metacarpal	EVT12	IPS92936	Metatarsal	EVT7	IPS39142	Distal phalanx	CGRD2	IPS92965	Cuneiform	EVT10
IPS92971	Cranial fragments, horn core	EVT10	IPS13547	Metacarpal	CGRD7	IPS92937	Metatarsal	EVT12	IPS41597	Distal phalanx	CGRD2	IPS92994	M2 and M3	EVT10
IPS92972	Cranial fragments	EVT10	IPS13911	Metacarpal	CGRD2	IPS92938	Metatarsal	EVT12	IPS92967	Distal phalanx	EVT10	IPS92954	Thoracic vertebra	EVT3
IPS92980	Indeterminate fragments	EVT12	IPS13928	Metacarpal	CGRD7	IPS92939	Metatarsal	EVT7	IPS107623	Distal phalanx	EVT12	IPS92955	Thoracic vertebra	EVT7
IPS92982	Indeterminate fragments	EVT12	IPS14102	Metacarpal	CGRD7	IPS107634	Metatarsal	EVT12	IPS107625	Distal phalanx	EVT12	IPS92956	Thoracic vertebra	EVT3
IPS92983	Indeterminate fragments	EVT12	IPS14702	Metacarpal	CGRD7	IPS114552	Metatarsal	EVT7	IPS107622	Distal phalanx	EVT12	IPS118117	Thoracic vertebra	EVT12
IPS92973	Hemimandible	EVT7	IPS14815	Metacarpal	CGRD7	IPS114553	Metatarsal	EVT7	IPS118112	Distal phalanx	EVT12	IPS92940	Tibia	EVT7
IPS92977	Hemimandible	EVT7	IPS14917	Metacarpal	CGRD2	IPS92957	Cubonavicular	EVT10	IPS118113	Distal phalanx	EVT12	IPS92942	Tibia	EVT7

ID	Anatomical element	Layer	ID	Anatomical element	Layer	ID	Anatomical element	Layer	ID	Anatomical element	Layer
IPS92943	Tibia	EVT7	IPS93040	m1 or m2	EVT7	IPS93018	M3	EVT7	IPS93002	Upper molar	EVT7
IPS107618	Tibia	CGRD2	IPS93041	m1 or m2	EVT7	IPS93021	M3	EVT7	IPS93003	M2	EVT7
IPS114546	Tibia	EVT12	IPS93042	m1	EVT7	IPS93023	M3	EVT3	IPS93046	Upper molar	EVT7
IPS114555	p3	EVT7	IPS93047	M1	EVT7	IPS93033	M3	EVT7	IPS93057	Upper molar	EVT7
IPS93006	dP3	EVT7	IPS92991	M2	EVT10	IPS93043	m3	EVT7	IPS92986	P2	EVT7
IPS93050	dP3	EVT7	IPS92990	m2	EVT7	IPS20182	M3	CGRD7	IPS92996	P3	EVT10
IPS93054	dp3 or dp4	EVT7	IPS93005	M2	EVT7	IPS93000	Cheek tooth	EVT7	IPS92998	P3	EVT7
IPS92997	dp4	EVT7	IPS93014	m2	EVT7	IPS93026	Cheek tooth	EVT7	IPS93012	P3 or P4	EVT7
IPS93008	dp4	EVT7	IPS93019	m2	EVT7	IPS93052	Cheek tooth	EVT7	IPS92995	P4	EVT10
IPS93037	dp4	EVT7	IPS93022	M2	EVT7	IPS93053	Cheek tooth	EVT7	IPS93013	P4	EVT3
IPS14965	dp4	CGRD7	IPS93032	M2	EVT7	IPS93035	Lower cheek tooth	EVT7	IPS93015	p4	EVT7
IPS93063	i1	EVT12	IPS93027	m1	EVT7	IPS93001	Lower molar	EVT7	IPS93020	P4	EVT7
IPS93064	i1	EVT12	IPS93030	m2	EVT7	IPS93024	Lower molar	EVT7	IPS93045	p4	EVT7
IPS93062	i2	EVT12	IPS93044	m2	EVT7	IPS93031	Lower molar	EVT10	IPS93049	P4	EVT7
IPS93065	i3	EVT12	IPS92988	M2	EVT7	IPS93048	Lower molar	EVT7	IPS93056	p4	EVT7
IPS92992	M1	EVT10	IPS93007	M3	EVT7	IPS93061	Lower molar	EVT7	IPS13557	P4	CGRD7
IPS93017	M1	EVT6	IPS93028	M3	EVT7	IPS13681	Lower molar	CGRD2	IPS92921	Ulna	EVT12
IPS93036	M1	EVT7	IPS93028	M3	EVT7	IPS93004	Lower premolar	EVT7	IPS107616	Ulna	EVT12
IPS93039	m1 or m2	EVT7	IPS93034	M2	EVT7	IPS93058	Lower premolar	EVT7	IPS114545	Ulna	EVT12
IPS93009	m2	EVT7	IPS92993	M3	EVT10	IPS93051	Indeterminate tooth	EVT7	IPS114548	Ulna	EVT7
IPS93016	M1	EVT6	IPS92987	m3	EVT7	IPS93055	Indeterminate tooth	EVT7	IPS92962	Unciform	EVT10
IPS93029	M1	EVT7	IPS92989	m3	EVT7	IPS93059	Indeterminate tooth	EVT7	IPS92964	Unciform	EVT7
IPS93038	M2	EVT7	IPS93011	M3	EVT7	IPS93060	Indeterminate tooth	EVT7			

Table S2. Comparative dental measurements (mm) of m3, M1, M2, and M3 in selected *Leptobos* and *Bison* s.l. samples. Abbreviations: L, length; W, width.

Taxon (source) of data	Locality	Statistics	m3L	m3W	M1L	M1W	M2L	M2W	M3L	M3W
<i>Leptobos etruscus</i> (Duvernois and Guérin, 1989)	Senèze (France)	Mean	41.0	16.1	20.1	23.1	26.3	23.6	29.8	22.8
		Minimum	37.5	13.5	18.5	20.0	20.5	28.5	28.0	34.0
		Maximum	45.0	19.5	22.5	27.0	19.5	28.5	18.5	27.5
		SD	2.3	1.8	1.3	2.2	2.6	3	1.8	2.5
		N	10	11	7	7	8	8	10	10
<i>Bison (Eobison) georgicus</i> (Bukshianidze, 2005)	Dmanisi (Georgia)	Mean	40.5	15.3			29.0	26.0	30.1	27.4
		Minimum	37.9	13.0					28.9	27.1
		Maximum	43.3	18.0					31.3	27.8
		SD	2.4	2.2					1.7	0.5
		N	5	5			1	1	2	2
<i>Bison</i> sp. (Moyà Solà, 1987)	Venta Micena (Spain)	Mean	38.9	15.6	25.9	20.9	28.7	25.9	29.7	21.8
		Minimum	37.3	13.9	22.8	19.3	26.2	22.8	27.4	21
		Maximum	42.4	17.5	27.2	23.0	30.9	27.2	32.3	23.3
		SD	1.5	0.9	1.34	1.7	1.6	1.3	1.9	1.3
		N	14	15	11	11	9	11	10	9
<i>Bison (Eobison) degiulii</i> (Masini, 1989)	Pirro Nord/Capena (Italy)	Mean	34.3	15.0	20.4	23.3	23.3	24.7	20.3	23.2
		Minimum			19.6	21.0	22.0	23.9	16.5	21.2
		Maximum			22.2	26.0	26.0	25.3	27.6	24.6
		SD			1	1.5	1.5	0.6	3.4	0.9
		N	1	1	7	7	6	6	10	10
<i>Bison (Eobison) cf. degiulii</i> (Kostopoulos et al., 2018)	Mygdonia basin (Greece)	Mean	40	17.0	26.2	24.2	29.8	24.9	30.8	23.9
		Minimum	37.1	15.1	22.0	19.3	25.0	19.5	27.9	18.0
		Maximum	45.1	18.1	33.9	28.0	35.9	29.6	33.0	29.1
		SD	2.4	0.9	4.0	2.7	2.6	3.3	1.3	3.3
		N	16	16	18	18	22	22	22	22
<i>Bison menneri</i> (van Asperen and Kahlke, 2017)	Untermassfeld (Germany)	Mean	41.4	16.0	26.9	20.7	31.2	20.6	31.7	21
		Minimum	22.7	17.0	22.7	17	27.7	17	30.2	16.8
		Maximum	45.3	18.7	30.6	25.2	35	26.3	34.3	23.9
		SD	2.1	1.7	3.1	2.9	1.9	3.2	1.2	2.1
		N	20	22	16	16	17	17	13	13
<i>Bison schoetensacki</i> (Moullé, 1992)	Le Vallonnet (France)	Mean	41.5	18.4	28.1	26.1	30.7	28.1	32.0	29.9
		Minimum	37.8	17.2	23.0	16.5	28.5	25.0	29.5	26.6
		Maximum	43.5	18.9	32.2	29.2	33.3	30.5	35.3	31.5
		SD	1.8	0.6	3.1	3.3	1.4	1.8	1.8	2.3

<i>Bison schoetensacki</i> (This paper)	Vallparadís Composite Section (Spain)	N	7	7	18	12	11	8	8	4
		Mean	41.7	17.5	23.3	25.1	27.4	25.5	28.7	25.5
		Minimum	38.2	16.3	20.6	23.4	24.7	20.4	23.5	24.2
		Maximum	46.5	18.4	27.0	26.8	32.3	28.8	32.3	27.6
<i>Bison schoetensacki</i> (van Asperen and Kahlke, 2017)	Süssenborn (Germany)	SD	3.0	1.0	2.4	1.3	2.2	2.6	2.7	1.3
		N	5	5	8	8	12	12	9	9
		Mean	43.5	16.5	30.1	21.3	32.1	22.1	34.2	23.6
		Minimum	39.4	14.7	26.9	17.9	28.3	17.5	29.0	18.4
<i>Bison schoetensacki</i> (Breda et al., 2010)	Cromer Forest-bed (various localities; England)	Maximum	47.6	19.0	34.5	25.5	35.7	27.2	40.3	28
		SD	2.4	1.1	2	2	1.8	1.9	2.2	2.2
		N	17	18	28	24	43	37	30	26
		Mean	39.8	18.0	29.3	26.2	29.0	27.0	33.0	26.2
<i>Bison cf. priscus</i> (Breda et al., 2010)	Westbury (England)	Minimum	36.0	16.2	28.6	26.0			32.0	24.0
		Maximum	43.1	21.0	30.0	26.4			34.0	28.0
		SD	2.2	1.2	1	0.3			0.7	1.9
		N	9	13	2	2	1	1	6	6
<i>Bison schoetensacki</i> (This paper)	Isernia la Pineta (Italy)	Mean	44.6	19.5	29.5	26.3	33.2	28.1	33.4	28.0
		Minimum	41.0	16.1	26.0	23.0	31.6	26.8	30.0	26.3
		Maximum	49.7	21.9	33.5	29	35	29.3	37.0	30.2
		SD	2.6	1.9	2.5	1.6	1.3	1.1	2	1.4
<i>Bison schoetensacki</i> (This paper)	Isernia la Pineta (Italy)	N	8	8	17	17	8	7	14	13
		Mean	42.5	19.0					32.6	26.4
		Minimum	39.0	16.0					29.9	22.3
		Maximum	49.8	21.0					36.0	29.6
<i>Bison priscus</i> (van Asperen and Kahlke, 2017)	Taubach (Germany)	SD	2.3	1.2					1.6	2.3
		N	21	21					11	11
		Mean	48.6	18.8	33	23.3	35.9	25.5	38.1	24.2
		Minimum	44.0	16.0	30.2	21.1	33.8	22.3	36.1	20.7
<i>Bison priscus</i> (Vasiliev, 2008)	Krasny Yar, R–W (Russia)	Maximum	53.7	21.5	35.3	28.2	38.3	29.6	40.0	26.5
		SD	3.1	2.9	1.5	2.1	1.4	2.4	1.7	2.6
		N	18	19	15	15	14	14	4	4
		Mean	46.8	19.9	25.3	27.5	31.2	28.1	33.1	28.2
<i>Bison priscus</i> (Vasiliev, 2008)	Krasny Yar, R–W (Russia)	Minimum	42	16	20.5	24.7	26.5	23.0	29.0	24.0
		Maximum	53.5	22.5	32.0	33.0	34.7	31.0	37.0	30.5
		SD								
		N	58	68	10	10	11	9	8	6

Table S3. Z-scores values for length (L) and width (W) of m3, M1, M2, M3 of the VCS sample compared with selected *Leptobos* and *Bison* s.l. species.

Tooth	ID	<i>Leptobos etruscus</i> (Senèze)		<i>Bison</i> sp. (Venta Micena)		<i>Bison (Eobison)</i> <i>degiulii</i> (Pirro)		<i>Bison (Eobison)</i> cf. <i>degiulii</i> (Mygdonia basin)		<i>Bison schoetensacki</i> (Le Vallonnet)		<i>Bison menneri</i> (Untermassfeld)		<i>Bison schoetensacki</i> (Süssenborn)		<i>Bison priscus</i> (Taubach)	
		L	W	L	W	L	W	L	W	L	W	L	W	L	W	L	W
m3	IPS93043	0.39	0.83	2.01	2.30			0.82	0.59	0.24	-1.36	0.24	0.97	-0.65	1.00	-2.18	-0.40
m3	IPS92977	-1.22	0.11	-0.47	0.80			-0.75	-0.79	-1.74	-3.65	-1.53	0.21	-2.18	-0.19	-3.39	-0.84
m3	IPS92973	0.31	1.28	1.88	3.22			0.74	1.44	0.13	0.05	0.15	1.45	-0.73	1.73	-2.25	-0.13
m3	IPS92987	2.40	1.28	5.10	3.22			2.77	1.44	2.69	0.05	2.44	1.45	1.26	1.73	-0.68	-0.13
m3	IPS92989	-0.31	0.33	0.94	1.26			0.14	-0.36	-0.62	-2.94	-0.52	0.44	-1.31	0.17	-2.71	-0.71
	Mean	0.31	0.77	1.89	2.16			0.75	0.47	0.14	-1.57	0.16	0.90	-0.72	0.89	-2.24	-0.44
	Minimum	-1.22	0.11	-0.47	0.80			-0.75	-0.79	-1.74	-3.65	-1.53	0.21	-2.18	-0.19	-3.39	-0.84
	Maximum	2.40	1.28	5.10	3.22			2.77	1.44	2.69	0.05	2.44	1.45	1.26	1.73	-0.68	-0.13
	STD	1.33	0.53	2.05	1.11			1.29	1.02	1.63	1.70	1.46	0.57	1.26	0.88	1.00	0.33
	N	5	5	5	5			5	5	5	5	5	5	5	5	5	5
M1	IPS92992	4.02	1.12	-0.52	2.83	5.08	1.48	-0.25	0.51	-0.94	-0.16	-0.55	1.65	-2.42	2.15	-5.22	1.08
M1	IPS93016	5.59	0.49	0.97	1.99	7.18	0.56	0.25	-0.01	-0.30	-0.58	0.11	1.17	-1.42	1.46	-3.88	0.41
M1	IPS93017	3.62	1.25	-0.90	3.01	4.55	1.68	-0.37	0.62	-1.11	-0.07	-0.71	1.75	-2.67	2.30	-5.55	1.23
M1	IPS93029	1.42	1.65	-2.99	3.55	1.62	2.27	-1.07	0.96	-2.01	0.20	-1.63	2.06	-4.06	2.75	-7.41	1.66
M1	IPS93036	0.71	0.31	-3.66	1.75	0.67	0.30	-1.30	-0.15	-2.30	-0.70	-1.92	1.04	-4.51	1.26	-8.01	0.22
M1	IPS93047	0.39	0.13	-3.96	1.51	0.25	0.04	-1.40	-0.30	-2.43	-0.82	-2.05	0.90	-4.71	1.07	-8.28	0.03
	Mean	2.62	0.83	-1.84	2.44	3.23	1.06	-0.69	0.27	-1.51	-0.36	-1.12	1.43	-3.30	1.83	-6.39	0.77
	Minimum	0.39	0.13	-3.96	1.51	0.25	0.04	-1.40	-0.30	-2.43	-0.82	-2.05	0.90	-4.71	1.07	-8.28	0.03
	Maximum	5.59	1.65	0.97	3.55	7.18	2.27	0.25	0.96	-0.30	0.20	0.11	2.06	-1.42	2.75	-3.88	1.66
	STD	2.09	0.60	1.98	0.81	2.78	0.88	0.66	0.50	0.86	0.40	0.87	0.46	1.32	0.67	1.77	0.64
	N	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
M2	IPS92988	-0.19	0.57	-1.77	-0.45	1.69	1.09	-1.55	0.13	-3.45	-1.56	-2.78	1.47	-3.49	1.69	-7.04	-0.08
M2	IPS92991	0.70	1.74	-0.37	2.16	3.25	6.97	-0.65	1.20	-1.84	0.42	-1.59	2.57	-2.22	3.56	-5.43	1.36
M2	IPS92994	0.23	1.34	-1.10	1.27	2.44	4.95	-1.12	0.83	-2.68	-0.26	-2.21	2.19	-2.89	2.92	-6.27	0.87
M2	IPS93005	0.51	1.54	-0.67	1.72	2.91	5.96	-0.85	1.02	-2.19	0.08	-1.85	2.38	-2.50	3.24	-5.78	1.11
M2	IPS93003	-0.54	0.50	-2.32	-0.60	1.08	0.76	-1.91	0.07	-4.08	-1.67	-3.25	1.40	-3.99	1.59	-7.66	-0.16
M2	IPS93022	1.17	-0.80	0.37	-3.51	4.07	-5.79	-0.18	-1.12	-1.00	-3.87	-0.97	0.18	-1.56	-0.49	-4.60	-1.76

M2	IPS93032	0.78	1.24	-0.24	1.04	3.39	4.45	-0.57	0.74	-1.70	-0.43	-1.49	2.10	-2.11	2.76	-5.30	0.74
M2	IPS93034	-1.17	0.03	-3.29	-1.64	-0.01	-1.59	-2.54	-0.36	-5.20	-2.46	-4.07	0.96	-4.88	0.84	-8.78	-0.73
M2	IPS93038	-0.23	0.84	-1.83	0.15	1.62	2.43	-1.59	0.38	-3.52	-1.11	-2.83	1.72	-3.55	2.12	-7.11	0.25
	Mean	0.14	0.78	-1.25	0.02	2.27	2.14	-1.22	0.32	-2.85	-1.21	-2.34	1.66	-3.02	2.03	-6.44	0.18
	Minimum	-1.17	-0.80	-3.29	-3.51	-0.01	-5.79	-2.54	-1.12	-5.20	-3.87	-4.07	0.18	-4.88	-0.49	-8.78	-1.76
	Maximum	1.17	1.74	0.37	2.16	4.07	6.97	-0.18	1.20	-1.00	0.42	-0.97	2.57	-1.56	3.56	-4.60	1.36
	STD	0.74	0.81	1.16	1.80	1.29	4.05	0.74	0.74	1.32	1.36	0.98	0.76	1.05	1.28	1.32	0.99
	N	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
M3	IPS20182	0.45	1.29	0.48	3.21			-0.13	0.64	-0.78	-1.75	-0.96	2.36	-1.63	1.09	-4.51	0.69
M3	IPS92993	0.34	1.94	0.37	4.43			-0.28	1.12	-0.89	-1.03	-1.14	3.11	-1.73	1.82	-4.63	1.31
M3	IPS92994	0.68	1.90	0.70	4.35			0.18	1.09	-0.56	-1.08	-0.62	3.07	-1.45	1.77	-4.27	1.27
M3	IPS93007	-1.41	0.77	-1.28	2.21			-2.63	0.25	-2.61	-2.33	-3.79	1.76	-3.14	0.49	-6.49	0.18
M3	IPS93011	-1.02	0.60	-0.91	1.91			-2.10	0.13	-2.22	-2.50	-3.19	1.57	-2.82	0.31	-6.07	0.03
M3	IPS93018	-1.13	1.29	-1.02	3.21			-2.25	0.64	-2.33	-1.75	-3.37	2.36	-2.92	1.09	-6.19	0.69
M3	IPS93021	-0.40	1.17	-0.32	2.98			-1.26	0.55	-1.61	-1.88	-2.25	2.22	-2.32	0.95	-5.41	0.57
M3	IPS93023	-3.56	0.89	-3.32	2.44			-5.50	0.34	-4.72	-2.19	-7.05	1.90	-4.88	0.63	-8.77	0.30
M3	IPS93028	1.41	0.69	1.39	2.06			1.16	0.19	0.17	-2.41	0.49	1.66	-0.86	0.40	-3.49	0.11
M3	IPS93033	-1.58	1.49	-1.44	3.59			-2.85	0.79	-2.78	-1.52	-4.05	2.60	-3.28	1.31	-6.67	0.88
	Mean	-0.62	1.20	-0.53	3.04			-1.57	0.57	-1.83	-1.84	-2.59	2.26	-2.50	0.99	-5.65	0.60
	Minimum	-3.56	0.60	-3.32	1.91			-5.50	0.13	-4.72	-2.50	-7.05	1.57	-4.88	0.31	-8.77	0.03
	Maximum	1.41	1.94	1.39	4.43			1.16	1.12	0.17	-1.03	0.49	3.11	-0.86	1.82	-3.49	1.31
	STD	1.44	0.48	1.36	0.90			1.92	0.36	1.41	0.52	2.18	0.55	1.16	0.54	1.52	0.46
	N	10	10	10	10			10	10	10	10	10	10	10	10	10	10

Table S4. Measurements (mm) of the vertebrae of *Bison schoetensacki* from Vallparadís Estació (EVT) layers. Abbreviations: ant, anterior; CL, centrum length; CH, centrum height; CW, centrum width; NSL, neural spine length; NSW, neural spine width; post, posterior; SCW, spinal canal width.

ID Specimen	Layer	Element	CL	CH ant.	CW ant.	CH post.	CW post.	SCW ant.	SCW post.	NSW	NSL
IPS92954	EVT3	Thoracic vertebra	63.5	50.4	56.4	44.2	46.7	29.2	35.2	50.2	>400
IPS92956	EVT3	Thoracic vertebra	70.8	44.8	55.4	45.5	54.0	27.7	30.0	53.2	
IPS118117	EVT12	Thoracic vertebra	73.7	74.1	54.4		47.3	21.0	22.3	40.6	73.7
IPS107615	EVT12	Cervical vertebra	60.5	45.1	35.6	55.0	51.0	17.6	14.6		
IPS114551	EVT7	Axis	145.4	44.8	106.7	69.0	53.9	28.5	27.2		

Table S5. Measurements (mm) and descriptive statistics of the scapulae of *Bison schoetensacki* from Vallparadís Estació (EVT) layers. Abbreviations: CSL, *collum scapulae* length; GL, glenoid cavity length; GPL, glenoid process length; GW: glenoid cavity width; L, left; R, right.

ID Specimen	Layer	Side	GL	GW	GPL	CSL
IPS107637	EVT12	R	75.1	62.2	83.3	67.4
IPS92922	EVT7	L		60.5	84	75.9
		Mean	75.1	61.4	83.7	71.6
		Minimum		60.5	83.3	67.4
		Maximum		62.2	84	75.9
		SD		0.5	6	1.2
		N	1	2	2	2

Table S6. Comparative measurements (mm) of the scapula in selected *Bison* s.l. samples. Abbreviations: CSL, *collum scapulae* length; GL, glenoid cavity length; GPL, glenoid process length; GW: glenoid cavity width.

Taxon	Locality	Statistics	GL	GW	GPL
<i>Bison menneri</i> (Sher, 1997)	Untermassfeld (Germany)	Mean	70.6	60.9	84.5
		Minimum	67.5	55	80.5
		Maximum	70.0	70.0	92.5
		SD	3.8	6.0	4.7
		N	4	4	4
<i>Bison schoetensacki</i> (Moullé, 1992)	Le Vallonnet (France)	Mean	78.2	59.9	88.4
		Minimum	78.1	58.0	86.8
		Maximum	78.3	61.8	89.9
		SD	0.1	2.7	2.2
		N	2	2	2
<i>Bison schoetensacki</i> (This paper)	Vallparadís composite section (Spain)	Mean	75.1	61.4	83.7
		Minimum		60.5	83.3
		Maximum		62.2	84.0
		SD		0.5	6.0
		N	1	2	2
<i>Bison schoetensacki</i> (Sala, 1986)	Mauer (Germany)	Mean	88.0	71.5	103.5
		Minimum	84.0	68.0	101.0
		Maximum	92.0	75.0	106.0
		SD	5.7	5.0	3.5
		N	2	2	2
<i>Bison priscus</i> (Sala, 1986)	Cava Filo (Italy)	Mean	83.9	63.7	97.4
		Minimum	69.0	51.0	76.0
		Maximum	98.5	75.0	115
		SD	13.2	9.2	15.9
		N	5	5	5
<i>Bison priscus</i> (Vasiliev, 2008)	Krasny Yar, R–W (Russia)	Mean	88.8	70.6	104.9
		Minimum	74.5	60,5	84.5
		Maximum	100.0	84.2	126
		SD			
		N	33	33	33
<i>Bison priscus</i> (Vasiliev, 2008)	Taradanovo, W1–2 (Russia)	Mean	89.0	70.5	103.2
		Minimum	78.0	56.0	87.5
		Maximum	96.5	81.8	117
		SD			
		N	42	46	40

Table S7. Measurements (mm) and descriptive statistics of the humeri of *Bison schoetensacki* from Vallparadís Estació (EVT) and Cal Guardiola (CGR) layers.

Abbreviations: DDT, distal diaphysis thickness; DDW, distal diaphysis width; DEAW, distal epiphysis articular width; DEW, distal epiphysis width; DET, distal epiphysis thickness; L, left; OW, oleocranon fossa width; R, right; TCH, trochlea crest height; THl, lateral trochlear height; THm, medial trochlear height; TTm, trochlea thickness (medial epicondyle); TTI, trochlea thickness (lateral epicondyle); TWl, trochlear lateral articulation width; TWm, trochlear medial articulation width.

ID Specimen	Layer	Side	DDW	DDT	DEW	DEAW	OW	TWm	TWl	DET	TTm	TTl	THm	TCH	THl
IPS50672	CGRD4	R	58.1	64.5	111.3	105.0	28.8	72.0	33.0	95.3	105.7	72.0	70.0	52.2	44.0
IPS92928	EVT7	R	50.0	56.2	100.0	92.3	34	65.3	27.0				57.8	49.5	41.3
IPS92929	EVT7	R	48.4				35.4								
IPS107620	EVT12	L	42.1	50.7	93.0	89.2	21.0	60.5	28.7			65.2	54.5	48.5	41.7
IPS114568	EVT7	R	60.1	65.8	98.1	95.3	37.5	68.8	26.5				57.0	53.4	43.2
IPS114549	EVT7	L	50.2	57.1	101.7	87.9		62.4	25.5				52.0	49.1	36
		Mean	51.5	58.9	100.8	93.9	31.3	65.8	28.1	95.3	105.7	68.6	58.3	50.6	41.3
		Minimum	42.1	50.7	93.0	87.9	21.0	60.5	25.5			65.2	52	48.5	36
		Maximum	60.1	65.8	111.2	105	37.5	72.0	33			72.0	70.0	53.4	44.1
		SD	6.6	6.3	6.7	6.8	6.6	4.7	23.0			4.8	7.0	2.1	3.1
		N	6	5	5	5	5	5	5	1	1	2	5	5	5

Table S8. Comparative measurements (mm) of the humerus in selected *Leptobos* and *Bison* s.l. samples. Abbreviations: DEAW, distal epiphysis articular width; DEW, distal epiphysis width; THl, lateral trochlear height; THm, medial trochlear height; TTI, trochlea thickness (lateral epicondyle); TTm, trochlea thickness (medial epicondyle); TWm, trochlear medial articulation width.

Taxon	Locality	Statistics	DEW	DEAW	TWm	TTm	TTI	THm	THl
<i>Leptobos etruscus</i> (Masini, 1989)	Matassino/Olivola (Italy)	Mean	88.0	79.7	55.6	83.6	57.7	52.3	39.3
		Minimum	82.9	64.5	53	68	48.6	43	33
		Maximum	91.5	85	58.6	88.7	63	55.8	42.4
		SD	2.8	4.5	1.6	5.8	3.6	3.2	2.9
		N	10	16	15	10	14	14	16
<i>Bison (Eobison) palaeosinensis</i> (Tong et al., 2016)	Shanshenmiaozui (China)	Mean	93.0						
		N	1						
<i>Bison (Eobison) georgicus</i> (Bukshianidze, 2005)	Dmanisi (Georgia)	Mean	93.0	81.9	63.9	87.3	57.7	49.7	34.8
		Minimum	91.3	78.4	54.5	81.6	55.4	48.6	31.6
		Maximum	95.4	84.8	91.8	91.9	59.1	50.9	37.2
		SD	1.9	2.7	15.7	4.6	2.1	1.3	2.4
		N	4	4	5	4	3	4	4
<i>Bison (Eobison) degiulii</i> (Masini, 1989)	Pirro Nord (Italy)	Mean	80.0	75.5			53.0		35.3
		N	1	1			1		1
<i>Bison menneri</i> (Sher, 1997)	Untermassfeld (Germany)	Mean	104.1	94.8				60.1	
		Minimum	90.0	85.0				52.0	
		Maximum	120	104.5				68.0	
		SD	8.6	6.0				4.6	
		N	24	30				28	
<i>Bison schoetensacki</i> (Moullé, 1992)	Le Vallonnet (France)	Mean		103.3					
		Minimum		92.0					
		Maximum		113.0					
		SD		6.9					
		N		12					
<i>Bison schoetensacki</i> (This paper)	Vallparadís Composite Section (Spain)	Mean	100.8	93.9	65.8	105.7	68.6	58.3	41.3
		Minimum	93.0	87.9	60.5		65.2	52.0	36
		Maximum	111.3	105.0	72.0		72.0	70.0	44
		SD	6.7	6.8	4.7		4.8	7.0	3.1
		N	5	5	5	1	2	5	5
<i>Bison schoetensacki</i> (Sala, 1986)	Mauer (Germany)	Mean		94.5					
		Minimum		93.0					
		Maximum		96.0					
		SD		2.1					
		N		2					
<i>Bison schoetensacki</i> (Sala, 1986)	Isernia (Italy)	Mean		105.2					
		Minimum		96.0					

		Maximum		108			
		SD		3.8			
		N		9			
<i>Bison aff. priscus</i> (Sher, 1997)	Tiraspol (Ukraine)	Mean	117.7	115.7			
		Minimum	114.0	111.5			
		Maximum	120.0	118.0			
		SD					
		N	3	3			
<i>Bison priscus</i> (Sher, 1997)	North-East Siberia (Russia)	Mean	112.5	100.4			63.5
		Minimum	100.0	90.0			56.0
		Maximum	125.0	111.0			68.0
		SD	9.3	7.2			4.0
		N	15	15			15
<i>Bison priscus</i> (Vasiliev, 2008)	Krasny Yar, R-W (Russia)	Mean	119.7	108.9	118.1	79.6	68.0
		Minimum	99.3	94.0	102.3	68.7	59.0
		Maximum	135.5	124.5	132	90	76.7
		SD					
		N	63	69	62	56	73
<i>Bison priscus</i> (Sala, 1986)	Cava Filo (Italy)	Mean	118.3	107.3			
		Minimum	106.0	97.0			
		Maximum	124.0	115.0			
		SD	8.3	7.8			
		N	4	4			
<i>Bison priscus</i> (Castaños, 2012)	Kiputz IX (Spain)	Mean	107.4	99.7			
		Minimum	93.0	85.5			
		Maximum	115.0	111.5			
		SD	8.6	7.0			
		N	6	20			
<i>Bison bonasus</i> (Empel and Roskoz, 1963)	Warsaw (Czech Republic)	Mean		89.4			
		Minimum		81.0			
		Maximum		101.0			
		SD		7.2			
		N		39			

Table S9. Stampfli's trochlea index for selected species of *Leptobos* and *Bison* s.l.

Taxon	Stampfli's trochlea index
<i>Leptobos etruscus</i> , Matassino/Olivola (Masini, 1989)	range: 28.4–35.4; mean = 31.4; N = 16
<i>Bison (Eobison) georgicus</i> , Dmanisi (Bukshianidze, 2005)	range: 29.6–31.3; mean = 30.6; N = 4
<i>Bison menneri</i> , Untermassfeld (Sher, 1997)	range: 28.7–34.4; mean = 31.5; N = 16
<i>Bison schoetensacki</i> , VCS (this paper)	range: 27.8–32.2; mean = 29.9; N = 5
<i>Bison</i> aff. <i>priscus</i> , Tiraspol (Sher, 1997)	mean = 27.8; N = 1
<i>Bison priscus</i> , Siberia (Sher, 1997)	range:27.8–34.0; mean = 30.4; N = 15
<i>Bos primigenius</i> , Rhine Gravels (Martin, 1987)	range:26.5–29.4; mean = 28.0; N = 10

Table S10. Lehmann trochlear index for selected species of bovids.

Taxon	Lehmann trochlear index
<i>Leptobos etruscus</i> , Matassino/Olivola (Masini, 1989)	range: 66.2–80.4; mean = 75.3; N =15
<i>Bison (Eobison) georgicus</i> , Dmanisi (Bukshianidze, 2005)	range: 62.1–76.4; mean =70; N = 4
<i>Bison menneri</i> , Untermassfeld (Sher, 1997)	range: 66.2–87; mean =72.7; N = 24
<i>Bison schoetensacki</i> , VCS (this paper)	range: 62.9–76.5; mean = 71.2; N = 5
<i>Bison priscus</i> (Martin, 1987)	range: 63.4–72.4; mean =67.1; N= 14
<i>Bos primigenius</i> (Martin, 1987)	range: 65.7–73.1; mean =: 69.2; N = 10

Table S11. Measurements (mm) and descriptive statistics of the radii of *Bison schoetensacki* from Vallparadís Estació (EVT) and Cal Guardiola (CGR) layers.

Abbreviations: DEAT, distal end articular thickness; DEATmin, distal end articular thickness (not considering the distal end of ulna); DEAW, distal end articular width; DET, distal end maximum thickness; DEW, distal end width; DT, diaphysis thickness (midshaft); DTmin, diaphysis minimum thickness; DW, diaphysis width (midshaft); DWmin, diaphysis minimum width; L, left; Lmax, maximum length; PEAT, proximal end articular thickness; PEATI, lateral facet articular thickness (proximal end); PEAW, proximal end articular width ; PET, proximal end thickness; PEW, proximal end width; R, right.

ID Specimen	Layer	Side	Lmax	PEW	PEAW	PET	PEAT	PEATI	DWmin	DWm	DTmin	DTm	DEW	DEAW	DET	DEAT	DEATmin
IPS48775	CGRD2	R	380.0	107.6	99.1	54.8	47.2	30.7	59.8	63.9	37.7	38.6					
IPS39893a	CGRD2	R	384.5			63.0	53.0		62.0	62.9	38.1	38.9	102.7	97.0	69.2	66.1	44.2
IPS13570	CGRD2	R		107.9	100.7	52.4	47.2	29.7									
IPS92914	EVT7	L	363.7	102.9	91.9	49.5	42.2	29.8	56.6	58.0	28.0	30.5	94.5	92.5	46.0	44.5	33.5
IPS92915	EVT7	R		102.8	94.5	57.6	49.6	30.5	60.0		35.5						
IPS92916	EVT7	L											101.3	90.4	48.5	44.5	39.5
IPS92918	EVT7	L		99.9	91.8	50.9	47.5	28.4					96.5	91.9	58.5	52.1	36.9
IPS92919	EVT7	R	339.1	96.2	86.9	46.5	41.0	25.5	49.8	50.6	27.5	32.8	89.0	78.1	61.4	51.0	36.6
IPS92920	EVT7	R		104.0	95.4	54.0	48.4	29.5	57.5	60.0	35.1	36.4					
IPS107617	EVT12	L	357.2	101.8	92.7	52.3	46.3	32.7	59.4	62.8	34.1	35.4	96.9	88.9	60.1	57.0	50.8
IPS107628	EVT12	R	376.9	106.4	99.5	53.9	47.2	34.0	55.3	60.4	35.3	36.5	97.5	90.8	67.3	56.7	47.9
IPS107616	EVT12	R	360.4	102.6	94.1	54.0	48.8	33.9	56.8	63.9	34.8	36.0	97.1	90.6	64.0	54.6	48.9
IPS118111	EVT12	R	383.0	110.1	97.6	55.1	46.9	36.8	63.1	64.2	36.0	40.8	102.8	88.3	77.0	63.0	54.0
	Mean		368.1	103.8	94.9	53.7	47.1	31.0	58.0	60.4	37.2	36.1	97.6	89.8	61.3	54.4	43.6
	Minimum		339.1	96.2	86.9	46.5	41.0	25.5	49.8	50.6	27.5	30.5	89.0	78.1	46.0	44.5	33.5
	Maximum		384.5	110.1	100.7	63	53	36.8	63.1	64.2	67.4	40.8	102.8	97.0	77.0	66.1	54.0
	SD		15.8	4.0	4.1	4.1	3.1	3.1	3.8	4.0	10.6	3.0	4.4	5.1	9.8	7.4	7.2
	N		8	11	11	12	12	11	10	11	11	10	9	9	9	9	9

Table S12. Comparative measurements (mm) of the radius of selected *Leptobos* and *Bison* s.l. samples. Abbreviations: DET, distal end maximum thickness; DW, diaphysis width (midshaft); Lmax, maximum length; PEAT, proximal end articular thickness; PEAW, proximal end articular width; PET, proximal end maximum thickness; PEW, proximal end maximum width.

Taxon	Locality	Statistics	Lmax	PEW	PEAW	PET	PEAT	DW	DEW	DET
<i>Leptobos etruscus</i> (Masini, 1989)	Matassino/Olivola (Italy)	Mean	297.4	84.7	77.5	41.6	43.5	47.3	76.7	53.0
		Minimum	273.0	77.2	70.0	39.2	39.2	42.0	66.2	47.0
		Maximum	308.5	92.6	83.2	48.0	48.0	53.6	84.7	56.9
		SD	16.5	4.9	4.0	10.6	3.1	4.3	5.4	3.4
		N	4	15	15	16	9	5	8	6
<i>Bison (Eobison) palaeosinensis</i> (Tong et al., 2016)	Shanshenmiaozui (China)	Mean	335	91.8	83.1				92.0	
		Minimum		84.0	75.0					
		Maximum		99.5	91.2					
		SD		11.0	11.5					
		N	1	2	2				1	
<i>Bison (Eobison) georgicus</i> (Bukshianidze, 2005)	Dmanisi (Georgia)	Mean	302	91.7	81.6	48.5	43.0	51.8	81.6	59.0
		Minimum	300.0	90.1	79.8	47.6	40.7	50.7	80.2	62.9
		Maximum	304.0	93.3	82.6	49.6	44.3	52.7	82.9	62.9
		SD	1.9	2.7	15.7	1.2	4.6	2.1	1.3	2.4
		N	4	4	5	4	4	3	4	4
<i>Bison</i> sp. (Moyà-Solà, 1987)	Venta Micena (Spain)	Mean	277.0	71.6		37.2		42.2	63.3	43.0
		Minimum	267.8	65.2		34.5		42.0	57.0	40.2
		Maximum	282.6	76.3		40.3		42.4	69.2	48.0
		SD	8.0	4.2		2.0		0.2	4.5	3.0
		N	3	8		8		3	5	5
<i>Bison (Eobison) cf. degiulii</i> (Kostopoulos, 1997)	Mygdonia basin (Greece)	Mean	300.0	84.3		47.8		48.0	79.7	47.0
		Minimum		80.6		44.8		47.7		
		Maximum		88.0		50.8		48.3		
		SD								
		N	1	2		2		2	1	1
<i>Bison menneri</i> (Sher, 1997)	Untermassfeld (Germany)	Mean	384.5	104.3	94.9		49.1	57.6	98.8	
		Minimum	350.0	91.5	83.0		43.0	49.0	89.0	350.0
		Maximum	418.0	118.0	106.5		57.0	65.5	110.0	418.0

		SD	22.5	7.5	6.5		4.1	5.4	6.9	22.5
		N	13	24	24		24	17	13	13
<i>Bison schoetensacki</i> (Moullé, 1992)	Le Vallonnet (France)	Mean	390.0	102.2	93.5		46.9			
		Minimum		94.4	88.4		40.5			
		Maximum		110.0	99.5		54.5			
		SD		11.0	5.6		6.3			
		N	1	2	4		4			
<i>Bison schoetensacki</i> (This paper)	Vallparadís CS (Spain)	Mean	368.1	103.9	94.5	53.6	46.6	31.9	57.8	60.9
		Minimum	339.1	96.2	86.9	46.5	41.0	50.6	89.0	46.0
		Maximum	384.5	110.1	100.7	63.0	53.0	64.2	102.7	77
		SD	15.8	4.2	4.1	4.1	3.1.0	4.4	4.4	9.8
		N	8	10	11	12	12	9	9	9
<i>Bison schoetensacki</i> (Brugal, 1995)	Durfort (France)	Mean	380.8	106.6	97.9	55.7		59.3	98.6	66.1
		Minimum	373.0	106.0	96.7	55.3		58.0	96.0	63.3
		Maximum	388.5	107.2	99.0	56.0		61.0	101.7	70.0
		SD	11.0	0.9	1.6	0.5		1.5	2.9	3.5
		N	2	2	2	2		2	2	2
<i>Bison schoetensacki</i> (Sala, 1986)	Mauer (Germany)	Mean		109.8	102.3		56.6			
		Minimum		104.0	97.0		56.0			
		Maximum		115.0	107.0		57.0			
		SD		4.6	4.1		0.6			
		N		4	4		4			
<i>Bison priscus</i> (Vercoutère and Guérin, 2010)	Romain-la-Roche (France)	Mean	388.2	120.1		60.8		70.2	114.0	71.4
		Minimum	373.0	115.0		56.0		64.0	105.0	63.0
		Maximum	405.0	126.0		66.0		75.0	120.0	79.0
		SD	13.8	4.7		4.4		4.0	7.0	6.0
		N	5	4		5	5	4	5	
<i>Bison aff. priscus</i> (Sher, 1997)	Tiraspol (Ukraine)	Mean	383.5	118.2	110.2	62.2				
		Minimum	371.2	112.2	106.4	60.0				
		Maximum	397.0	122	113.3	65.3				
		SD	9.4	3.4	2.8	1.8				
		N	5	7	6	7				
<i>Bison priscus</i> (Sher, 1997)	NorthEast Siberia (Russia)	Mean	351.9	106.1	97.4		50.1	54.4	97.9	
		Minimum	318.0	97.0	90.0		43.5	46.0	86.5	

		Maximum	393.0	120.5	107.5		58.5	63.5	111.0	
		SD	20.2	6.8	5.2		4.0	5.0	8.7	
		N	16	16	16		16	16	15	
<i>Bison priscus</i> (Vasiliev, 2008)	Krasny Yar, R–W (Russia)	Mean	389.9	115.9	107.1	60.3		66.1	110.6	67.6
		Minimum	343.0	100.0	94.0	50.0		51.8	93.2	56,5
		Maximum	427.0	142.0	130.0	71.5		86.0	132.5	77.5
		SD								
		N	40	61	62	62		49	40	46
<i>Bison priscus</i> (Vasiliev, 2008)	Taradanovo, W1–2 (Russia)	Mean	374.4	106.9	99.5	55.0		59.6	95.8	60.7
		Minimum	351.8	98.5	94.0	51.5		49.1	82.3	51.7
		Maximum	400.3	121.7	108.7	60.7		71	111.2	71
		SD								
		N	6	11	11	12		6	16	15
<i>Bison priscus</i> (Vasiliev, 2008)	Krasny Yar, W2 (Russia)	Mean	366.0	107.8	100.3	56.6		55.6	90.9	56.1
		Minimum		126.4	116.5	65.0		58.5	98.0	66.0
		Maximum		94.0	86.0	48		50.7	84.0	50.3
		SD								
		N	1	4	3	5		5	3	3
<i>Bison priscus</i> (Sala, 1986)	Cava Filo (Italy)	Mean	389.0	107.2	100.7		51			
		Minimum	388.0	92.0	86.0		45			
		Maximum	390.0	125.0	114.0		56			
		SD	1.4	13.8	11.5		4.6			
		N	2	6	6		6			
<i>Bison priscus</i> (Castaños, 2014)	Kiputz IX (Spain)	Mean	363.3	106.7	99.0			53.6	94.4	
		Minimum	327.0	96.5	91.0			47.0	77.0	
		Maximum	405.0	117.5	110.0			61.5	114	
		SD	23.1	6.6	5.7			4.4	8.3	
		N	10	17	17			10	23	
<i>Bison bonasus</i> (Empel and Roskoz, 1963)	Warsaw (Czech Republic)	Mean	343.4	92.3		46.9			82.4	57.7
		Minimum	291.0	80.0		42.0			71.0	47.0
		Maximum	392.0	111.0		54.0			100.0	72.0
		SD	21.8	8.2		3.3			7.8	5.9
		N	36	36		36			36	36

Table S13. Measurements (mm) and descriptive statistics of the ulnae of *Bison schoetensacki* from Vallparadís Estació (EVT) and Cal Guardiola (CGR) layers.

Abbreviations: AL, articular surface length; AT, articular surface thickness; L, left; Lmax, maximum length; OL, olecranon length; OTmin, olecranon minimum thickness; R, right; Wmax, maximum width (on the coronoid process).

ID Specimen	Layer	Side	Lmax	OL	OTmin	Wmax	AL	AT
IPS39893	CGR-D2	Right	482.4	150.3	81.6		52.7	31.1
IPS92921	EVT7	Right				57.5	51.3	30.1
IPS107616	EVT12	Right	469.6	135.2	78.8	57.5	49.39	31.6
IPS107617	EVT12	Left	470.7	133.4	77.6	55.1	50.9	30.3
IPS107628	EVT12	Right				60.8		
IPS118111	EVT12	Right				58	55	30
		Mean	474.2	139.6	79.3	57.8	51.8	30.6
		Minimum	469.6	133.4	77.6	55.1	49.4	30
		Maximum	482.4	150.3	81.6	60.8	55	31.6
		SD	5.8	7.6	1.7	1.8	1.9	0.7
		N	3	3	3	5	5	5

Table S14. Comparative measurements (mm) of the ulna in selected *Bison* s.l. Abbreviations: AL, articular surface length; AT, articular surface thickness; Lmax, maximum length; OL, olecranon length; OTmin, olecranon minimum thickness; PAT, processus anconaeus thickness; Wmax, maximum width (on the coronoid process).

Taxon	Locality	Statistics	Lmax	OL	OTmin	Wmax	AL	AT
<i>Bison (Eobison) palaeosinensis</i> (Tong et al., 2016)	Shanshenmiaozui (China)	Mean		>104.0				
		N		11				
<i>Bison (Eobison) georgicus</i> (Bukshianidze, 2005)	Dmanisi (Georgia)	Mean	495.0	115.3		52		
		N	1	1				
<i>Bison menneri</i> (Sher, 1997)	Untermaßfeld (Germany)	Mean	465	148.4	90.2	57.6		
		Minimum	420.0	133.0	84.0	53.0		
		Maximum	509.0	165.0	105.0	66.0		
		SD	32.2	12.4	6.7	3.7		
		N	6	9	11	13		
<i>Bison schoetensacki</i> (This paper)	Vallparadís Composite Section (Spain)	Mean	474.2	139.6	79.3	57.8	51.8	30.6
		Minimum	469.6	133.4	77.6	55.1	49.4	30.0
		Maximum	482.4	150.3	81.6	60.8	55.0	31.6
		SD	5.8	7.6	1.7	1.8	1.9	0.7
		N	3	3	3	5	5	5
<i>Bison aff. priscus</i> (Sher, 1997)	Tiraspol (Ukraine)	Mean		196.0	126.0			
		N		1	1			
<i>Bison priscus</i> (Sher, 1997)	Taubach (Germany)	Mean		166.0	119.2	>70.0		
		Minimum			114.3			
		Maximum			124.0			
		SD			6.9			
		N			1	2	1	
<i>Bison priscus</i> (Sher, 1997)	North-East Siberia (Russia)	Mean		157.0	100.5	62.3		
		Minimum		138.0	80.5	55.5		
		Maximum		195.0	128.5	75.0		
		SD		17.6	14.0	5.9		
		N		12	13	13		
<i>Bison priscus</i> (Vasiliev, 2008)	Krasny Yar, R–W (Russia)	Mean	487.9	154.9	110.8		64.4	
		Minimum	464	135.5	85.5		52.7	
		Maximum	515.5	173.5	123.3		77	
		SD						
		N	9	23	43		44	

Table S15. Measurements (mm) of the carpals and tarsals of *Bison schoetensacki* from Vallparadís Estació (EVT) layers. Abbreviations: L, left; L, length; R, right; T, thickness; W, width.

ID Specimen	Layer	Element	Side	L	W	T
IPS92963	EVT10	Capitatotrapezoid	L	49.0	45.5	29.0
IPS91545	EVT7	Pyramidal	R	45.0	28.4	50.9
IPS92961	EVT10	Pyramidal	L	45.8	26.7	49.9
IPS92960	EVT10	Semilunar	L	32.9	39.0	48.2
IPS92962	EVT10	Unciform	L	30.6	38.2	39.2
IPS92964	EVT7	Unciform	L	27.4	32.9	37.3
IPS92957	EVT7	Cubonavicular	R	51.2	74.2	68.5
IPS92958	EVT3	Cubonavicular	R	45.0	73.6	68.0
IPS92965	EVT10	Cuneiform	R	20.0	27.4	40.0

Table S16. Comparative measurements (mm) of the metacarpal in selected *Leptobos* and *Bison* s.l. samples. Abbreviations: DET, distal epiphysis thickness; DEW, distal epiphysis width; DT, diaphysis thickness (midshaft); DW, diaphysis width (midshaft); L, left; Lmax, maximum length; PET, proximal epiphysis thickness; PEW, proximal epiphysis width; R, right.

Taxon	Locality	Measures	Lmax	PEW	PET	DW	DT	DEW	DET
<i>Leptobos etruscus</i> (Masini, 1989)	Senèze /Olivola (France/Italy)	Mean	250.5	62.4	40.6	38.9	27.8	63.1	34.6
		Minimum	242.0	55	36.7	32.7	21.5	55.3	29.7
		Maximum	265.5	66.8	42.8	43.7	31.5	67.3	37.2
		SD	5.8	3	1.7	3.5	2.5	3.2	1.9
		N	16	17	17	16	16	17	18
<i>Bison (Eobison) palaeosinensis</i> (Tong et al., 2016) (Masini, 1989)	Various localities of China	Mean	227.7	64.4	40.4	39.4	30.6	63.9	34.6
		Minimum	207.0	56.0	35.0			58.8	34.2
		Maximum	248.1	73.8	47.5			65.2	34.9
		SD	12.9	6.8	5.3			2.2	0.3
		N	7	7	3	1	1	6	3
<i>Bison (Eobison) georgicus</i> (Bukshianidze, 2005)	Dmanisi (Georgia)	Mean	244.2	66.9	42.1	39.8	29.2	65.5	35.0
		Minimum	231.3	62.8	37.7	34.3	25.8	61.0	33.2
		Maximum	256.6	70.5	45.4	44.4	31.6	72.0	36.9
		SD	10.3	3.1	2.8	4.2	2.5	4.0	1.6
		N	3	4	4	3	3	4	4
<i>Bison</i> sp. (Maniakas and Kostopoulos, 2017a)	Venta Micena (Spain)	Mean	225.6	58.5	36.6	35.3	26.9	60.1	33.0
		Minimum	208.2	52.3	32.8	31.4	24.1	53.5	30.0
		Maximum	248.7	69.5	46.5	44.2	32.1	69.1	36.3
		SD	10.0	4.6	3.3	3.6	2.1	4.7	1.6
		N	30	43	44	31	30	36	35
<i>Bison (Eobison) degiulii</i> (Masini, 1989)	Pirro Nord/Capena (Italy)	Mean	221.1	63.8	40.1	40.0	28.0	64.4	33.4
		Minimum	210.0	58.0	35.5	29.8	25.0	62.1	29.3
		Maximum	230.0	69.5	44.1	46.2	30.1	66.5	37.3
		SD	8.6	4.6	3.1	6.4	2.1	1.6	2.5
		N	5	7	6	4	4	6	7
<i>Bison (Eobison) cf. degiulii</i> (Kostopoulos et al., 2018)	Mygdonia basin (various localities Greece)	Mean	238.5	67.4	40.1	42.4	29.4	70.3	39.3
		Minimum	220.7	57.7	32.9	31.8	23.5	59.5	34.4
		Maximum	258.1	78.3	48.4	51.2	35.2	88.8	48.2
		SD	10.4	4.8	3.0	5.0	2.8	6.5	3.0

<i>Bison menneri</i> (Sher, 1997); Maniakas and Kostopoulos, 2017a)	Untermassfeld (Germany)	N	19	24	24	23	23	22	22
		Mean	276.5	77.0	46.5	44.8	32.8	75.6	38.2
		Minimum	255.8	64.4	39.3	35.3	27.8	65.4	29.5
		Maximum	296.0	91.4	52.6	57.7	39.0	86.0	47.3
<i>Bison schoetensacki</i> (This paper)	Le Vallonnet (France)	SD	10.1	5.6	3.2	4.6	3.0	6.2	5.8
		N	37	50	48	43	40	41	38
		Mean	261.7	82.3	48.9	53.6	35.6	75.2	42.0
		Minimum	245.0	74.7	45.0	43.0	31.0	66.2	37.5
<i>Bison schoetensacki</i> (This paper)	Vallparadís Composite Section (Spain)	Maximum	271.0	89.0	51.5	64.0	42.0	83.7	46.5
		SD	9,2	5,3	2,3	6,9	3,8	6,4	2,5
		N	8	6	6	9	9	15	15
		Mean	241.7	77.6	46.1	48.8	33.7	77.2	41.2
<i>Bison schoetensacki</i> (Brugal, 1995)	Durfort (France)	Minimum	228.9	67.7	41.3	36.3	27.9	66.7	35.3
		Maximum	262.7	85.1	51.5	53.9	46.6	83.4	45.9
		SD	10.8	5	2.7	5.0	4.1	5.9	3.7
		N	11	18	17	15	15	10	10
<i>Bison schoetensacki</i> (Maniakas and Kostopoulos, 2017a)	Süssenborn (Germany)	Mean	247.2	77.1	46.2	47.7	32.4	77.2	41.9
		Minimum	239.0	69.2	41.3	42.4	28.7	67.5	38.0
		Maximum	250.0	81.3	50.0	53.0	35.0	82.3	43.4
		SD	3.9	5.2	3.5	4.3	2.6	6.1	2
<i>Bison schoetensacki</i> (Sala, 1987; this paper)	Cromer Forest-bed formation (Various localities (United Kingdom)	N	6	6	6	6	6	6	6
		Mean	246.1	77.7	45.0	46.3	32.1	75.6	42.7
		Minimum	238.3	69.6	37.6	40.8	28.0	65.9	35.8
		Maximum	253.7	85.2	49.7	50.5	36.4	81.8	52.4
<i>Bison schoetensacki</i> (Maniakas and Kostopoulos, 2017a)	Isernia La Pineta (Italy)	SD	7.7	5.9	4.3	3.1	3.1	6.2	5.2
		N	5	10	10	9	9	7	6
		Mean	247.6	78.2	48.3			78.6	42.8
		Minimum	225.0	70.0	42.0			67.0	40.0
<i>Bison schoetensacki</i> (Schertz, 1936b; this paper)	Mauer (Germany)	Maximum	263.0	89.0	56.0			87.2	46.0
		SD	10.7	6.4	4.4			5.8	1.9
		N	11	11	8			12	7
		Mean			52.2			80	43.3
<i>Bison schoetensacki</i> (Schertz, 1936b; this paper)	Mauer (Germany)	Minimum			52.2			79.2	43.2
		Maximum			52.2			80.8	43.4
		SD						0.8	0.1
		N			1			2	2
<i>Bison schoetensacki</i> (Schertz, 1936b; this paper)	Mauer (Germany)	Mean	265.4	83.7	49.0	49.2	33.5	79.1	42.9
		Minimum	250.4	71.8	43.5	46.7	30.3	70.7	36.8

		Maximum	277.0	93.0	53.0	55.5	37.0	88.5	50.0
		SD	8.5	6.4	3.3	3.2	3.0	6.7	5.1
		N	12	10	9	6	6	11	6
<i>Bison cf. schoetensacki</i> (Schertz, 1936b; this paper)	Mosbach (Germany)	Mean	256	84.5	48.9	49.9	32.6	42.4	33.2
		Minimum	241.1	72.0	43.4	43.3	30.2	40.1	30.3
		Maximum	277.8	97.3	56.4	55.1	35.1	46.0	36.3
		SD	11.3	6.9	3.3	5.2	2.5	2.1	3.0
		N	22	18	19	4	4	6	3
<i>Bison aff. priscus</i> (Sher, 1997)	Tiraspol (Ukraine)	Mean	265.1	92.6	54.1	58.2	36.7	93.9	47.5
		Minimum	252.7	80.5	49.0	46.6	33.7	81.0	43.5
		Maximum	276.0	10.0	64.0	67.6	38.7	99.0	51.6
		SD	6.4	6.2	4.1	5.7	1.9	5.3	4.0
		N	9	11	11	8	8	8	7
<i>Bison priscus</i> (Maniakas and Kostopoulos, 2017a)	Taubach (Germany)	Mean	270.9	89.0	56.2	54.4	37.0	90.1	47.4
		Minimum	251.4	71.4	47.4	42.3	30.6	78.3	41.8
		Maximum	286.5	100.9	62.9	61.6	42.0	98.1	51.4
		SD	10.6	8.9	5.1	6.6	3.6	6.9	3.2
		N	8	8	8	8	8	10	10
<i>Bison priscus</i> (This paper)	Châtillon-Saint-Jean (France)	Mean	248.8	87.6	52.4	55.9	36.2	85.8	45.7
		Minimum	232	75.5	44	45	31	75.5	37
		Maximum	263	102	63	63	42	97	51.5
		SD	7	8.3	5.2	6.3	3.5	8.4	3.1
		N	26	26	26	26	26	7	26
<i>Bison priscus</i> (Vercoutère and Guérin, 2010)	Romain-la-Roche (France)	Mean	257.4	87.8	51.1	57.0	36.0	86.5	45.5
		Minimum	238.5	80.5	50.0	53.5	33.0	80.5	44.0
		Maximum	279	95.0	52.5	59.5	42.5	90.0	47.0
		SD	15.4	4.9	1.1	2.2	3.8	2.9	1.1
		N	6	5	4	4	4	6	4
<i>Bison priscus</i> (Sala, 1986)	Cava Filo (Italy)	Mean	240.7	84.1	47.5			91.0	47.8
		Minimum	232.0	79.0	43.0			80.0	44.0
		Maximum	260.0	93.0	50.0			99.0	53.0
		SD	10.0	4.6	2.4			5.9	2.8
		N	6	6	6			6	6
<i>Bison priscus</i> (Drees, 2005)	North Sea seabed	Mean	238.2	82.3	48.2	50.7	34.0	83.8	44.0
		Minimum	226.0	72.0	43.0	41.0	30.0	75.0	40.0
		Maximum	248.0	96.0	55.0	59.0	40.0	95.0	48.0
		SD	6.3	6.7	3.2	6.3	29.0	6.7	2.2
		N	15	15	15	15	15	15	15

<i>Bison priscus</i> (Sher, 1997)	North-East Siberia (Russia)	Mean	222.1	80.3	45.8	49.1	32.5	82.8	
		Minimum	206.0	68.5	39.0	38.7	28.0	71.0	
		Maximum	235.0	90.5	51.5	62.0	37.0	95.0	
		SD	8.5	6.5	3.5	6.2	2.7	6.8	
		N	29	29	29	29	29	29	
<i>Bison priscus</i> (Maniakas and Kostopoulos, 2017a)	Various localities of England (United Kingdom)	Mean	225.8	81.9	46.3	50.8	33.0	79.2	41.5
		Minimum	209.7	69.4	40.8	43.2	27.6	69	36.2
		Maximum	241.3	90.8	52.8	56.2	36.6	88.2	45.6
		SD	9.3	7.0	3.5	4.4	3.1	6.4	2.9
		N	9	9	9	9	9	8	9
<i>Bison priscus</i> (Vasiliev, 2008)	Krasny Yar, R–W (Russia)	Mean	240.5	85.5	49.6	53.0	34.4	87.1	46.7
		Minimum	215.2	71.5	40.8	42.0	28.5	73.7	39.5
		Maximum	280.0	98.0	59.0	63.0	43.0	99.0	53.0
		SD							
		N	64	68	69	69	70	63	59
<i>Bison priscus priscus</i> (Vasiliev, 2008)	Taradanovo, W1–2 (Russia)	Mean	236.0	89.0	46.4	48.1	32.1	44.5	44.5
		Minimum	220.3	69.8	38.3	40.2	28.5	72.2	39.0
		Maximum	254.5	95.4	55.6	61.5	40.7	93.0	51.0
		SD							
		N	31	34	34	36	36	40	35
<i>Bison priscus</i> (Vasiliev, 2008)	Chumysh, Q3 (Russia)	Mean	237.9	84.0	48.8	52.6	34.0	85.7	46.1
		Minimum	218.0	71.3	40.7	41.2	28.8	71.2	38.3
		Maximum	260.6	99.0	58.8	65.0	39.8	99.6	54.4
		SD							
		N	57	52	51	56	55	57	41
<i>Bison priscus</i> (Vasiliev, 2008)	Krasny Yar, W2 (Russia)	Mean	237.4	83.0	47.4	50.9	33.3	83.8	45.2
		Minimum	226.5	73.0	42.6	41.0	29.3	72.0	40.0
		Maximum	246.0	95.0	53.0	60.8	36.8	94.0	51.0
		SD							
		N	8	10	8	9	10	8	7
<i>B. priscus</i> (Vasiliev 2008)	Kurtak, Q3 (Russia)	Mean	236.8	84.6	48.7	52.2	33.7	85.4	45.2
		Minimum	213.4	73.4	40	41.2	26.8	74.0	39.6
		Maximum	251	101.5	60	65.1	39.5	104.4	55.6
		SD							
		N	63	65	65	70	70	75	62
<i>Bison priscus</i> (Bibikova, 1950)	Ukraine, Q3 (Ukraine)	Mean	228.6	78.3	46.0	47.7	31.5	81.3	43.3
		Minimum	206.2	69.5	40.2	40.7	27.7	71.5	39.0
		Maximum	245.4	90.4	52.6	57.8	36.8	98.1	49.1

		SD							
		N	78	73	74	75	75	67	64
<i>Bison</i> sp. (This paper)	Siréjol cave (France)	Mean	223.2	73.6	44.3	43.4	30.1	75.3	40
		Minimum	210.5	64.2	39.5	36	25.8	69	37.7
		Maximum	231	86	51.4	47	32.5	80.8	43.2
		SD	5.8	5.7	3.7	3.1	2	4.1	1.8
		N	15	14	15	15	15	15	14
<i>Bison priscus</i> (Castaños et al., 2012)	Kiputz IX (Spain)	Mean	236.9	80.7		48.9		87.9	46.4
		Minimum	217.0	60.0		39.5		78.0	41.5
		Maximum	254.0	96.5		57.0		101.5	52.0
		SD	11.9	7.9		5.2		7.5	3.1
		N	14	22		14		14	14
<i>Bison bonasus</i> (Reshetov and Sukhanov, 1979)	Unknown	Mean	210.0	70.5	41.4	39.5	25.9	66.5	38.2
		Minimum	201.0	62.0	37.3	32.0		60.0	34.6
		Maximum	225.0	79.0	45.8	49.0		75.0	42.4
		SD							
		N	35	35	35	35	35	35	35
<i>Bos primigenius</i> (Brugal, 1985)	Lunel Viel (France)	Mean	254.4	82.5	50.5	52.0	36.2	84.5	45.1
		Minimum	241.1	69.6	41.7	40.0	29.5	70.7	38.9
		Maximum	271.5	95.2	59.3	66.0	42.2	99.2	52.2
		SD							
		N	60	71	71	60	60	57	54

Table S17. Ratio (%) between distal diaphysis width (DDW) and distal maximum width (DEW) in metacarpals of various species of bovids.

Taxon	DDW/DEW*100
<i>Leptobos etruscus</i> , Olivola/ Senèze (Masini, 1989)	range: 89.2–98.3; mean = 95; N = 17
<i>Bison (Eobison) georgicus</i> , Dmanisi (Bukshianidze, 2005)	range:94.0–103.4; mean = 98.7; N = 4
<i>Bison</i> sp., Venta Micena (Maniakas and Kostopoulos, 2017a)	range: 92.5–101.5; mean = 97; N= 32
<i>Bison (Eobison) degiulii</i> , Pirro Nord/Capena (Masini, 1989)	range: 98.2–101.7; mean = 99.7; N = 3
<i>Bison (Eobison) cf. degiulii</i> , Mygdonia Basin (Kostopoulos et al., 2018)	range: 92.2–99.9; mean = 96.2; N = 21
<i>Bison menneri</i> , Untermassfeld (Sher, 1997)	range: 92.8–102.7; mean = 98.8; N = 21
<i>Bison schoetensacki</i> , Vallparadís Composite Section (This paper)	range: 91.5–97.5; mean = 94.8; N = 8
<i>Bison schoetensacki</i> , Süssenborn (Maniakas and Kostopoulos, 2017a)	range: 93.6–99.8; mean = 96.9; N = 6
<i>Bison schoetensacki</i> , Durfort (Brugal, 1995)	range: 94.7–98.7; mean = 95.8; N = 6
<i>Bison priscus</i> , Romain-la-Roche (Vercoutère and Guérin, 2010)	range: 93.3–98.9; mean = 95.3; N = 4
<i>Bison priscus</i> , Taubach (Sher, 1997)	range: 89.3–98.5; mean = 93.9; N = 9
<i>Bison priscus</i> , UK (Maniakas and Kostopoulos, 2017a)	range: 98.1–102.6; mean = 99.4; N = 8
<i>Bos primigenius</i> Romain-la-Roche (Vercoutère and Guérin, 2010)	range:87.8–101.4; mean = 93.6; N = 9
<i>Bos primigenius</i> Lunel Viel (Brugal, 1985)	mean = 92.4; N:57

Table S18. Ratio (%) between width of the lateral facet (PFWl) and width of the medial facet (PFWm) of the proximal epiphysis in metacarpals of various species of bovids.

Taxon	PFWl/ PFWm*100
<i>Leptobos etruscus</i> Olivola/Senèze (Masini, 1989)	range: 71.6–98; mean = 81.3; N = 18
<i>Bison (Eobison) palaeosinensis</i> China (Masini, 1989)	mean = 86.5; N = 1
<i>Bison (Eobison) georgicus</i> , Dmanisi (Bukshianidze, 2005)	range :67.3–75; mean = 71.1; N = 4
<i>Bison</i> sp., Venta Micena (Masini, 1989)	range:67.7–70.2; mean = 68.9; N = 2
<i>Bison (Eobison) degiulii</i> , Pirro Nord/Capena (Masini, 1989)	range:68.5–74.8; mean = 72.3; N = 4
<i>Bison menneri</i> , Untermassfeld (Sher, 1997)	mean = 72.3; N = 24
<i>Bison schoetensacki</i> , Vallparadís Composite Section (This paper)	range: 62.3–82.9; mean = 71.4; N = 16
<i>Bison priscus</i> , Ukraine/Germany (Sher, 1997)	mean = 69.7; N = 18
<i>Bos primigenius</i> Ukraine/Germany (Sher, 1997)	mean = 69; N = 21

Table S19. Principal component analysis of metacarpals using seven selected variables (see Section 3 and Fig. 10). Eigenvalue and % variance of the PCs and coefficient of each variables for each PC. Abbreviations as in Table 4.

	PC 1	PC 2	PC 3	PC 4	PC 5	PC 6	PC 7
Eigenvalue	0.00258538	0.000585286	0.000427393	0.000408312	0.000188404	0.000116617	8,56E-16
% variance	59.966	13.575	99.131	94.705	43.699	27.049	1,98E-11
mv Lmax	-0.83086	-0.17921	-0.27416	0.14799	-0.19284	0.021075	0.37796
mv PET	-0.0095925	0.29015	0.37141	0.62507	0.4779	0.12578	0.37796
mv PEW	0.21969	0.26208	0.10576	0.1438	-0.55811	-0.62996	0.37796
mv DT	-0.0059032	-0.53122	0.64735	-0.39292	0.036922	-0.010008	0.37796
mv DW	0.45535	-0.52992	-0.53669	0.20786	0.18901	-0.044997	0.37796
mv DETI	-0.054462	0.43139	-0.25535	-0.59101	0.46217	-0.19998	0.37796
mv DEW	0.22578	0.25673	-0.058324	-0.1408	-0.41504	0.73809	0.37796

Table S20. Principal component analysis of metacarpals following Scott and Barr (2004) (see Section 3 and Fig. 10). Eigenvalue and % variance of the PCs and coefficient of each variables for each PC. Abbreviations as in Table 4.

	PC 1	PC 2	PC 3	PC 4	PC 5	PC 6	PC 7	PC 8
Eigenvalue	0.00275304	0.000667232	0.000518681	0.000387236	0.000199621	7,89E+00	5,73E+00	4,76E+00
% variance	58.456	14.167	11.013	82.222	42.386	16.745	12.174	10.108
re Lmax	0.81739	0.36269	-0.083492	0.36791	-0.22368	0.061456	0.015739	0.06288
re DW	-0.44093	0.38381	0.072559	0.73961	0.26044	0.13508	0.13271	0.048037
re DT	0.043998	0.61013	0.44117	-0.50562	0.25478	0.14236	0.25699	0.15587
re DETI	0.2263	-0.33029	0.32148	0.13645	0.2538	-0.13944	0.60295	-0.51992
re DETm	0.18711	-0.48411	0.30725	0.13375	0.27791	0.31828	-0.001039	0.66317
re DEW	-0.09344	0.026324	-0.041165	0.039192	-0.24246	-0.70443	0.43037	0.49711
re PEW	-0.15322	-0.058333	-0.26866	-0.081916	-0.47145	0.58365	0.57248	0.059988
re PET	0.13075	0.036564	-0.72215	-0.13122	0.62812	-0.010199	0.19897	0.092827

Table S21. Pairwise comparison results based on MANOVA ($p < 0.05$) for seven raw selected variables of metacarpals of several *Bison* s.l. and *Leptobos etruscus* samples. *Leptobos etruscus*: samples from Olivola and Senèze; *B. (Eobison) sp.*: sample from Venta Micena; *B. (Eobison) cf. degiulii*: sample from Mygdonia Basin; *B. menneri*: sample from Untermassfeld; *B. schoetensacki*: samples from Le Vallonnet, Durfort, Süssenborn, Mauer; *B. priscus priscus*: samples from Taubach, Châtillon-Saint-Jean, Romain-la-Roche; *B. priscus mediator*: samples from UK (several sites, see Fig. 9), North Sea seabed. Abbreviations are given in Table 4. Values of $p < 0.05$ are in bold.

	<i>Eobison sp.</i>	<i>Eobison cf. degiulii</i>	<i>Bison menneri</i>	<i>Bison schoetensacki</i>	VCS	<i>Bison priscus priscus</i>	<i>Bison priscus mediator</i>
<i>Leptobos etruscus</i>	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
<i>Eobison sp.</i>		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
<i>Eobison cf. degiulii</i>			<0.001	0.001	0.045	<0.001	<0.001
<i>Bison menneri</i>				<0.001	<0.001	<0.001	<0.001
<i>Bison schoetensacki</i>					0.075	<0.001	<0.001
VCS						0.03	0.011
<i>Bison priscus priscus</i>							<0.001

Table S22. Measurements (mm) and descriptive statistics of the tibiae of *Bison schoetensacki* from Vallparadís Estació (EVT) and Cal Guardiola (CGR) layers.

Abbreviations: DEAAW, distal epiphysis astragalus articulation width; DEAT, distal epiphysis articulation thickness; DEAW, distal epiphysis articular width; DET, distal epiphysis thickness; DEW, distal epiphysis width; DTmin, minimum diaphysis thickness; DWmin, minimum diaphysis width; L, left; MFT, malleolar facet thickness; MFW, malleolar facet width; R, right.

ID Specimen	Layer	Side	DWmin	DTmin	DEW	DEAW	DEAAW	DET	DEAT	MFW	MFT
IPS107618	CGRD2	R	56.7	39.2	89.6	78.6	58.7	60.9	53.4	19.3	
IPS92940	EVT7	R			74.4	68.9	54.2	51.9	45.3	13.5	34.8
IPS92942	EVT7	R	54.0	40.4	81.7	74.9	57.2	59.4	51.7	16.8	34
IPS92943	EVT7	L	46.5	33.4	69.3	61.5	50.2	50.6	44.6	11.0	24.5
IPS114546	EVT12	R			92.3	80.6	58.0	69.9	60.5	18.7	41.8
		Mean	52.4	37.7	81.5	72.9	55.7	58.5	51.1	15.8	33.8
		Minimum	46.5	33.4	69.3	61.5	50.2	50.6	44.6	11.0	24.5
		Maximum	56.7	40.4	92.3	80.6	58.7	69.9	60.5	19.3	41.8
		SD	5.3	3.7	9.8	7.8	3.5	7.8	6.5	3.5	7.1
		N	3	3	5	5	5	5	5	5	4

Table S23. Comparative measurements (mm) of the tibia in selected *Leptobos* and *Bison* s.l. samples. Abbreviations: DET, distal epiphysis thickness; DEW, distal epiphysis width; DTmin, minimum diaphysis thickness; DWmin, minimum diaphysis width.

Taxon	Locality	Measures	DWmin	DTmin	DEW	DET
<i>Leptobos etruscus</i> (Duvernois and Guérin, 1989)	Senèze (France)	Mean	46.8	34.3	68.0	57.0
		Minimum	44.5	33.0	61.0	56.0
		Maximum	48.5	36.5	72.0	57.0
		SD	1.8	1.7	6.1	
		N	4	4	3	2
<i>Bison (Eobison) palaeosinensis</i> (Tong et al., 2016)	Various localities of China	Mean	47.8		73.8	56.0
		Minimum	45.0		70.0	53.0
		Maximum	51.0		78.0	58.0
		SD	3.2		3.9	2.5
		N	4		4	4
<i>Bison (Eobison) georgicus</i> (Bukshianidze, 2005)	Dmanisi (Georgia)	Mean			71.2	55.1
		Minimum			70.2	54.7
		Maximum			72.3	55.6
		SD			1.6	0.6
		N			2	2
Bison sp. (Maniakas and Kostopoulos, 2017a)	Venta Micena (Spain)	Mean			60.7	46.1
		Minimum			60	41.2
		Maximum			62.2	51.7
		SD			1	4.4
		N			4	4
<i>Bison menneri</i> (Sher, 1997)	Untermassfeld (Germany)	Mean			84.0	62.0
		Minimum			74.0	55.0
		Maximum			94.0	67.0
		SD			5.4	3.5
		N			23	23
<i>Bison schoetensacki</i> (Moullé, 1992)	Le Vallonnet (France)	Mean	56.9		82.9	62.2
		Minimum	51.0		76.3	57.2
		Maximum	68.0		89.8	64.4
		SD	7.6		5.8	3.3
		N	4		4	4
<i>Bison schoetensacki</i> (This paper)	Vallparadís Composite Section (Spain)	Mean	52.4	37.7	81.5	58.5
		Minimum	46.5	33.4	69.3	50.6
		Maximum	56.7	40.4	92.3	69.9
		SD	5.3	3.7	9.8	7.8
		N	3	3	5	5
<i>Bison schoetensacki</i>	Durfort (France)	Mean			82.7	67.4

(Brugal, 1995)		Minimum		81.4	66.7
		Maximum		84.0	68.0
		SD		1.8	0.9
		N		2	2
<i>Bison schoetensacki</i> (Sala, 1986)	Isernia la Pineta (Italy)	Mean		86.9	63.3
		Minimum		79.0	57.0
		Maximum		91.0	67.0
		SD		5.4	4.4
		N		4	4
<i>Bison</i> spp. (Sher, 1997)	Mauer (Germany)	Mean	56.9	85.1	61.9
		Minimum	53.0	77.0	56.0
		Maximum	60.5	91.0	64.0
		SD	5.3	4.4	2.5
		N	2	7	7
<i>Bison</i> aff. <i>priscus</i> (Sher, 1997)	Tiraspol (Ukraine)	Mean		92.8	69.5
		Minimum		89.0	64.0
		Maximum		94.0	73.0
		SD		2.2	3.4
		N		4	4
<i>Bison priscus</i> (Sala, 1986)	Cava Filo (Italy)	Mean	54.5	78.9	59.3
		Minimum	46.0	68.0	56.0
		Maximum	62.0	91.0	64.5
		SD	5.7	9.7	3.5
		N	6	5	5
<i>Bison priscus</i> (Vasiliev, 2008)	Krasny Yar, R–W (Russia)	Mean		43.5	85.8
		Minimum		36.3	73.0
		Maximum		54.5	98.2
		SD			
		N		70	92
<i>Bison priscus priscus</i> (Vasiliev, 2008)	Taradanovo, W1–2 (Russia)	Mean		42.6	83.9
		Minimum		38.0	67.3
		Maximum		45.7	94.6
		SD			
		N		12	31
					27

Table S24. Measurements (mm) and descriptive statistics of the astragali of *Bison schoetensacki* from Vallparadís Estació (EVT) and Cal Guardiola (CGR) layers. Abbreviations: DTW, distal trochleae width; LI, lateral length; Lm, medial length; Lmin, minimum length; PTW, proximal trochleae width; TI, lateral thickness; Tm, medial thickness; TTW, intertrochlear width.

ID Specimen	Layer	Side	LI	Lm	Lmin	TI	Tm	PTW	TTW	DTW
IPS39141	CGRD7	R	90.1	83.4	71.5	45.6	50.8	60	48.4	60.1
IPS92949	EVT7	R	84.4	77.2	66.0	46.0	42.7	49.4	44.2	52.1
IPS92950	EVT7	R	78.9	73.1	60.8	43.3	42.1	45.6	42.9	51.5
IPS92951	EVT7	R	81.9	76.6	64.5	44.5	44.0	45.5	49.0	52.8
IPS92952	EVT7	R	82.4	74.1	63.1	44.6	48.1	51.8	50.1	55.0
IPS92953	EVT12	L	90.9	80.8	68.7	48.3	51.0	54.8	54.9	61.0
IPS118120b	EVT12	L	85.2	76.8	67.0	45.6	48.3	56.8	50.8	56.9
		Mean	84.8	77.4	65.9	45.8	46.3	52.0	48.6	55.6
		Minimum	78.9	73.1	60.8	43.3	42.1	45.5	42.9	51.5
		Maximum	90.9	83.4	71.5	48.3	51.0	60.0	54.9	61.0
		SD	4.4	3.6	3.6	1.9	3.7	5.5	4.0	3.8
		N	7	7	7	7	7	7	7	7

Table S25. Comparative measurements (mm) of the astragalus in selected *Leptobos* and *Bison* s.l. samples. Abbreviations: DTW, distal trochleae width; LI, lateral length; Lm, medial length; PTW, proximal trochleae width; TI, lateral thickness.

Taxon	Locality	Measures	LI	Lm	TI	PTW	DTW
<i>Leptobos etruscus</i> (Masini, 1989)	Olivola (Italy)	Mean	71.5	39.2	38.2	43.6	46.2
		Minimum	67.2	35.0	35.0	39.7	42.0
		Maximum	76.7	43.7	42.0	48.0	52.0
		SD	2.9	2.5	2.3	2.3	3.2
		N	18	18	18	18	18
<i>Bison (Eobison) palaeosinensis</i> (Tong et al., 2016)	Various localities of China	Mean	78.0				50.7
		Minimum	74.0				46.0
		Maximum	80.0				53.0
		SD	3.5				4.0
		N	3				3
<i>Bison (Eobison) georgicus</i> (Bukshianidze, 2005)	Dmanisi (Georgia)	Mean	78.9			50.3	52.5
		N	1			1	1
<i>Bison</i> sp. (Moyà-Solà, 1987)	Venta Micena (Spain)	Mean	71.5				47.2
		Minimum	66.6				40.0
		Maximum	77.0				53.7
		SD	3.5				3.6
		N	15				17
<i>Bison (Eobison) degiulii</i> (Masini, 1989)	Pirro Nord (Italy)	Mean	73.4	42.1	40.6	46.8	48.7
		Minimum	67.1	39	36.7	41.3	44.3
		Maximum	79.8	46.8	44.0	49.7	53.3
		SD	4.1	2.2	2.2	2.7	3.1
		N	10	10	10	9	10
<i>Bison (Eobison) cf. degiulii</i> (Croitor, 2016)	Mygdonia basin (various localities) (Greece)	Mean	79.1				52.6
		Minimum	73.5				46.4
		Maximum	87.1				60.3
		SD	4.7				4.2
		N	8				8
<i>Bison menneri</i> (Sher, 1997)	Untermassfeld (Germany)	Mean	85.8			57.6	56.2
		Minimum	78.5			52.0	50.5
		Maximum	95.5			66.0	64.4
		SD	4.1			3.7	3.8
		N	33			34	35

<i>Bison schoetensacki</i> (Moullé, 1992)	Le Vallonnet (France)	Mean	86.7	49	48.2	60.1	
		Minimum	83.7	46.5	46.5	56.8	
		Maximum	90.0	51.9	52.1	65.4	
		SD	2.1	2.1	1.7	2.9	
		N	6	6	8	7	
<i>Bison schoetensacki</i> (This paper)	Vallparadís Composite Section (Spain)	Mean	84.8	77.4	45.8	52	55.6
		Minimum	78.9	73.1	43.3	45.4	51.5
		Maximum	90.9	83.4	48.3	60.0	61.0
		SD	4.4	3.6	1.9	5.5	3.8
		N	7	7	7	7	7
<i>Bison schoetensacki</i> (Brugal, 1995)	Durfort (France)	Mean	83.1	46.5	45.4	55.4	53.7
		Minimum	69.8	41.2	39.0	48.5	47.2
		Maximum	89.6	49.0	48.5	60.0	57.6
		SD	7.4	2.9	3.4	4.3	4.0
		N	6	6	6	6	5
<i>Bison schoetensacki</i> (Maniakas and Kostopoulos, 2017)	Isernia la Pineta (Italy)	Mean	92.3	52.6	51.6	60.5	60.6
		Minimum	87.7	49.0	49.6	54.2	55.2
		Maximum	99.5	56.5	54.8	65.5	63.7
		SD	3.3	2.6	1.7	3.3	3
		N	11	6	7	12	13
<i>Bison schoetensacki</i> (Sher, 1997)	Mauer (Germany)	Mean	91.0	48.6	49.7	60.0	
		Minimum	85.0	34.0	43.0	55.0	
		Maximum	100.0	55.0	53.5	65.0	
		SD	4.4	5.3	3.3	3.3	
		N	14	14	15	15	
<i>Bison cf. schoetensacki</i> (Sher, 1997)	Mosbach (Germany)	Mean	94.2	51.3	51.6	60.0	
		Minimum	88.5	47.0	49.0	53.0	
		Maximum	99.5	57.0	55.5	66.0	
		SD	5.0	4.4	2.5	5.7	
		N	5	4	5	5	
<i>Bison aff. priscus</i> (Sher, 1997)	Tiraspol (Ukraine)	Mean	97.8			62.8	
		Minimum	92.8			59.8	
		Maximum	105.3			66.0	
		SD	6.6			3.1	
		N	3			3	
<i>Bison priscus</i> (Vercoutère and Guérin, 2010)	Romain-la-Roche (France)	Mean	94.1	54.9	53.1	60.8	65.5
		Minimum	91.0	52.5	51.0	57.0	60.0

<i>Bison priscus</i> (Sala, 1986)	Cava Filo (Italy)	Maximum	100.0	57.0	57.0	66.0	69.5
		SD	3.1	1.6	1.7	2.3	3.1
		N	12	12	12	12	12
		Mean	88.5	49.8	49.8		58.5
		Minimum	86.0	46	47.8		52.0
<i>Bison priscus</i> (Vasiliev, 2008)	Krasny Yar, R-W (Russia)	Maximum	90.7	52	51.2		62.6
		SD	2.4	3.3	1.8		5.7
		N	3	3	3		3
		Mean	91.5	52	51.7		60.5
		Minimum	82.0	46.5	46.0		53.2
<i>Bison priscus</i> (Vasiliev, 2008)	Taradanovo, W1-2 (Russia)	Maximum	102.5	58.0	56.7		67.3
		SD					
		N	68	60	67		69
		Mean	88.5	49.6	48.9		57.0
		Minimum	76.2	42.5	41.7		47.5
<i>Bison bonasus</i> (Empel and Roskoz, 1963)	Warsaw (Polonia)	Maximum	104	55.3	57.7		63.6
		SD					
		N	139	95	134		125
		Mean	77.0	45.1			54.4
		Minimum	67.0	38.0			47.0
		Maximum	87.0	51.0		63.0	
		SD	4.7	3.3		3.5	
		N	39	39		39	

Table S26. Measurements (mm) and descriptive statistics of the calcanei of *Bison schoetensacki* from Vallparadís Estació (EVT) and Cal Guardiola (CGR) layers. Abbreviations: Lmax, maximum length; BLm, minimum length (medial view); BLp, calcaneum body length (posterior view); CBHmin, calcaneum body minimum height; CBWmin, calcaneum body minimum width; Hmax, maximum height; HST, height at sustentaculum tali level; HTC, height of tuber calcanei; L, left; MFL, malleolar facet length; MFW, malleolar facet width; NCFL, cubonavicular articular facet length; R, right; STT, sustentaculum tali thickness; Wmax, maximum width; WTC, width of tuber calcanei.

ID Specimen	Layer	Side	Lmax	BLP	BLm	Hmax	Wmax	HST	STT	HTC	WTC	MFL	MFW	NCFL	CBWmin	CBHmin
IPS13936	CGR-D2	R	189.4	139.1	110.3	72.5	60.0	69.9	33.0	52.2	46.9	34.5	21.1	48.9	25.4	50.1
IPS92944	EVT7	R	166.6	125.4	102.9	66.7	58.0	58.3	35.6	52.1	40.4	32.0	19.0	48.0	26.0	44.8
IPS92945	EVT7	R	160.8	115.3	92.7	68.5	51.2	61.9	33.7	49.2	38.3	32.9	17.7	48.0	21.6	46.3
IPS92946	EVT7	R	174.4	126.3	102.2	69.9	52.0	63.1	33.0	51.6	43.4	31.0	16.0	49.3	31.3	46.4
IPS92947	EVT7	R	169.6	123.6	100.5	73.5	59.0	62.9	35.7	47.3	43.7	32.4	20.1	46.7	26.6	47.2
IPS92948	EVT7	L	177.6	129.1	103.8	70.8	55.0	64.0	33.0	53.2	45.6	32.8	19.6	50.5	28.7	47.4
IPS-118120	EVT12	R	170.8	131.0	102.1	69.3	58.7		34.9	50.6	44.0	32.7	18.8	48.5	25.3	45.0
		Mean	172.7	127.1	102.1	70.2	56.3	63.4	34.1	50.9	43.2	32.6	18.9	48.5	26.4	46.8
		Minimum	160.8	115.3	92.7	66.7	51.2	58.3	33.0	47.3	38.3	31	16	46.7	21.6	44.8
		Maximum	189.4	139.1	110.3	73.5	60.0	69.9	35.7	53.2	46.9	34.5	21.1	50.5	31.3	50.1
		SD	9.1	7.3	5.2	2.3	3.5	3.8	1.2	2.1	3.0	1.1	1.7	1.2	3.0	1.8
		N	7	7	7	7	7	6	7	7	7	7	7	7	7	7

Table S27. Comparative measurements (mm) of the calcaneus in selected *Leptobos* and *Bison* s.l. samples. Abbreviations: BLp, calcaneum body length (posterior view); Hmax, maximum height; HTC, height of tuber calcanei; Lmax, maximum length; Wmax, maximum width; WTC, width of tuber calcanei.

Taxon	Locality	Measures	Lmax	BLp	Hmax	Wmax	HTC	WTC
<i>Leptobos etruscus</i> (Masini, 1989)	Olivola (Italy)	Mean	149.7	104.9	58.9	51.1	43.5	38.2
		Minimum	134.0	100.0	54.7	43.2	39.0	34.0
		Maximum	159.1	123.5	62.2	59.0	47.0	42.1
		SD	9.3	7.3	2.4	4.2	2.9	2.6
		N	10	14	11	13	12	12
<i>Bison (Eobison) palaeosinensis</i> (Tong et al., 2016)	Various localities of China	Mean	146.3			47.0		
		Minimum	136.0			44.0		
		Maximum	160.0			53.0		
		SD	10.0			4.1		
		N	4			4		
<i>Bison</i> sp. (Moyà-Solà, 1987)	Venta Micena (Spain)	Mean	151.7					25.1
		Minimum	148.0					23.0
		Maximum	158.0					27.4
		SD	5.5					2.2
		N	3					3
<i>Bison (Eobison) degiulii</i> (Masini, 1989)	Pirro Nord (Italy)	Mean	140.8	109.4	58.2	45.2	44.2	36.5
		Minimum	138.5	103.0	57.2	41.3	42.0	34.5
		Maximum	143.0	119.2	59.2	49.0	48.0	39.5
		SD	3.2	8.6	1.4	5.4	3.3	2.7
		N	2	3	2	2	3	3
<i>Bison menneri</i> (Sher, 1997)	Untermassfeld (Germany)	Mean	177.1		70.0	59.2	52.4	44.6
		Minimum	163.5		61.0	53.4	47.8	37
		Maximum	189.0		79.6	68.3	59.3	49.5
		SD	7.9		5.0	4.2	3.1	3.5
		N	21		20	20	21	21
<i>Bison schoetensacki</i> (Moullé, 1992)	Le Vallonet (France)	Mean	158.0			50.0	48.5	
		Minimum	155.0				46.5	
		Maximum	161.0				50.5	
		SD	4.2				2.8	
		N	2			1	2	
<i>Bison schoetensacki</i> (This paper)	Vallparadís Composite Section (Spain)	Mean	172.7	127.1	70.2	56.3	50.9	43.2
		Minimum	160.8	115.3	66.7	51.2	47.3	38.3
		Maximum	189.4	139.1	73.5	60.0	53.2	46.9

		SD	9.1	7.3	2.3	3.5	2.1	3.0
		N	7	7	7	7	7	7
<i>Bison schoetensacki</i> (Brugal, 1995)	Durfort (France)	Mean	180.0	123.1	70.6	59.4		
		Minimum		120.0	66.5	54.0		
		Maximum		130.2	73.0	62.0		
		SD		4.1	2.5	3.7		
		N	1	5	5	4		
<i>Bison priscus</i> (Maniakas and Kostopoulos, 2017a)	Taubach (Germany)	Mean	199.3		81.8	74.0	63.0	52.9
		Minimum	185.0		79.6	69.9	59.5	50.5
		Maximum	206.0		83.6	77.1	65.5	54.0
		SD	8.3		1.8	3.0	2.3	1.4
		N	4		4	4	4	4
<i>Bison priscus</i> (Vercoutère and Guérin, 2010)	Romain-la-Roche (France)	Mean	190.0		78.3	66.7	54.0	48.7
		Minimum	187.0		75.0	63.0	51.0	48.0
		Maximum	195.0		82.0	71.0	57.0	49.0
		SD	3.6		3	4	4.2	0.6
		N	4		4	3	2,00	3
<i>Bison priscus</i> (Vasiliev, 2008)	Krasny Yar, R–W (Russia)	Mean	188.3		74.8	65.1	52.4	49.6
		Minimum	163.0		66.0	56.0	46.0	39.5
		Maximum	201.0		85.7	75.0	57.0	54.6
		SD						
		N	23		50.0	44	25	24
<i>Bison priscus</i> (Vasiliev, 2008)	Taradanovo, W1–2 (Russia)	Mean	186.3		73.3	64.4	52.1	50.3
		Minimum	170		65.2	51.3	44.3	42.7
		Maximum	210		82.7	74	59	58
		SD						
		N	53.0		77	69.0	51.0	53.0
<i>Bos primigenius</i> (Brugal, 1985)	Lunel Viel (France)	Mean	179.1		71.5	63.1		
		Minimum	164.5		61.8	54.6		
		Maximum	199.3		81.1	77.3		
		SD						
		N	35.0		80	35		
<i>Bison bonasus</i> (Empel and Roskoz, 1963)	Warsaw (Polonia)	Mean	159.8			56.0	43.2	40.0
		Minimum	142.0			49.0	37.0	34.0
		Maximum	181.0			66.0	50.0	50.0
		SD	11.3			5.4	3.6	4.3
		N	33			28	33	33

Table S28. Comparative measurements (mm) of the metatarsal in selected *Leptobos* and *Bison* s.l. samples. Abbreviations: DEW, distal epiphysis width; DET, distal epiphysis thickness; DW, diaphysis width (midshaft); DT, diaphysis thickness (midshaft); Lmax, maximum length; PET, proximal epiphysis thickness; PEW, proximal epiphysis width.

Taxon	Locality	Statistics	Lmax	PEW	PET	DW	DT	DEW	DET
<i>Leptobos etruscus</i> (Masini, 1989)	Senèze/Olivola (France/Italy)	Mean	273.8	50.4	50.1	34.2	33.8	55.1	35.0
		Minimum	258.0	46.4	45.0	31.3	29.5	50.2	32.0
		Maximum	290.5	55.7	53.5	37.4	36.3	59.0	37.3
		SD	8.6	2.7	2.6	2.1	2.1	2.7	1.8
		N	16	16	16	16	15	15	10
<i>Bison (Eobison) palaeosinensis</i> (Tong et al., 2016; Masini, 1989)	Various localities of China	Mean	256.2	51.1	50.9	32.2	33.2	59.4	32.8
		Minimum	237.0	46.5	45.0	31.4	30.9	52.5	31.6
		Maximum	280.0	57.0	60.0	32.9	35.5	67.0	34.0
		SD	19.8	4.6	6.1	1.1	3.3	6.4	1.7
		N	6	6	6	2	2	6	2
<i>Bison</i> sp. (Maniakas and Kostopoulos, 2017a)	Venta Micena (Spain)	Mean	264.7	51.1	48.5	32.8	34.5	57.3	34.4
		Minimum	240.9	43.5	45.0	27.4	29.6	50.2	29.5
		Maximum	286.2	59.4	53.9	38.0	37.7	63.8	38.3
		SD	12.9	4.4	3.7	3.3	2.5	4.0	2.2
		N	15	24	23	20	19	20	20
<i>Bison (Eobison) degiulii</i> (Masini, 1989)	Pirro/Capena (Italy)	Mean	257.3	52.8	54.3	37.1	34.7	57.9	34.9
		Minimum	246.8	50.9	52.3	34.6	32.4	51.7	32.9
		Maximum	267.8	56.7	58	39.5	36.8	66.0	37
		SD	14.9	3.4	3.2	2.5	2.2	5.4	1.5
		N	2	3	3	3	3	5	5
<i>Bison (Eobison) cf. degiulii</i> (Kostopoulos et al., 2018)	Mygdonia basin (Various localities) (Greece)	Mean	275.5	55.3	55.0	34.3	35.2	63.7	39.3
		Minimum	261.2	51.1	51.4	31.1	31.9	59.5	36.9
		Maximum	286.9	62.1	64	38.1	40.3	70.6	40.9
		SD	8.4	2.9	3.5	2.3	2.6	3.2	1.2
		N	10	16	17	15	14	12	12
<i>Bison menneri</i> (Sher, 1997; Maniakas and Kostopoulos 2017a)	Untermassfeld (Germany)	Mean	315.0	64.0	61.7	41.3	41.0	72.8	45.1
		Minimum	301.4	56.9	53.8	35.6	35.7	64.5	39.5
		Maximum	329	72.3	68.6	47.3	45.2	80	50.6
		SD	9.5	4.5	4.9	3.9	3.1	4.8	2.8
		N	18	18	18	18	17	19	19
<i>Bison schoetensacki</i>	Le Vallonnet (France)	Mean	298.0	69.8	61.3			77.7	48.7

(Moullé 1992)		Minimum	290.0	58.0	54.0			74.0	46.5
		Maximum	306.0	82.0	66.0			85.0	52.5
		SD	11.3	12	6.4			6.4	3.3
		N	2	3	3			3	3
<i>Bison schoetensacki</i> (This paper)	Vallparadís Composite Section (Spain)	Mean	283.4	59.7	58.2	39.6	40.2	67.3	40.3
		Minimum	269.7	53.0	52.7	34.0	34.2	61.3	34.5
		Maximum	300.2	68.3	66.0	45.5	45.0	78.0	43.6
		SD	11.7	4.2	3.7	3.1	3.3	6.0	3.1
		N	8	13	13	13	13	8	7
<i>Bison schoetensacki</i> (Brugal, 1995)	Durfort (France)	Mean	277.8	63.2	59.3	41.8	39.0	68.4	42
		Minimum	269.0	59.3	56.4	39.2	35.5	65.3	41
		Maximum	286.3	68.0	63.0	43.5	41.6	71.3	43
		SD	8.7	4.5	3.0	2.3	3.2	3.0	1.0
		N	3	4	4	3	3	3	3
<i>Bison schoetensacki</i> (Maniakas and Kostopoulos, 2017a)	Süssenborn (Germany)	Mean	298.3	63.4	60.9	41.0	40.0	72.6	41.9
		Minimum	266.0	53.4	48.6	33.6	33.6	62.2	35.8
		Maximum	315.0	67.2	67.2	45.4	44.5	80.7	47.3
		SD	19.4	5.0	6.0	4.5	4.1	7.3	4.9
		N	5	7	7	5	5	6	5
<i>Bison schoetensacki</i> (Sala, 1986)	Cromer Forest-bed formation (various localities; England)	Mean	284.4	58.3	62.0			71.4	43.0
		Minimum	277.5	51.0	55.0			62.7	39.0
		Maximum	295.0	69.0	69.0			83.9	47.0
		SD	6.9	7.2	9.9			9.0	5.7
		N	6	6	2			4	2
<i>Bison schoetensacki</i> (Sher, 1997)	Mauer (Germany)	Mean	298.3	59.44	59.4	38.7		68.0	
		Minimum	280.0	53.6	55.5	36.0		65.5	
		Maximum	315.0	66.0	61.5	44.5		76.0	
		SD	11.9	4.0	2.2	2.9		4.0	
		N	5	8	6	10		5	
<i>Bison cf. schoetensacki</i> (Sher, 1997)	Mosbach (Germany)	Mean	300.3	66.5	63.1	42.7		77.2	
		Minimum	270.5	56.5	56.5	34.0		66.2	
		Maximum	314.0	81.0	63.1	52.3		88.0	
		SD	12.2	5.9	4.7	5.0		6.3	
		N	22	22	22	22		22	
<i>Bison aff. priscus</i> (Sher, 1997)	Tiraspol (Ukraine)	Mean	313.9	66.9	66.8	45.5		79.7	
		Minimum	297.3	61.0	62.5	40.0		70.5	
		Maximum	340.0	76.5	78.5	50.5		93.0	

<i>Bison priscus</i> (Maniakas and Kostopoulos, 2017a)	Taubach (Germany)	SD	15	5.9	5.6	4.1		7.2	
		N	6	6	6	6		6	
		Mean	284.2	65.5	62.8	46.7	46.7	80.1	45.4
		Minimum				41.1	41.4	72.4	42.4
		Maximum				53.9	51.9	89.3	47.8
<i>Bison priscus priscus</i> (Vercoutère and Guérin, 2010)	Romain-la-Roche (France)	SD				6.6	5.3	6.9	2.3
		N	1	1	1	3	3	5	5
		Mean	305.8	71.5	66.0	47.3	48.7	76.2	45.5
		Minimum	298.0	70.0	64.0	46.0	47.0	75.0	45.0
		Maximum	314.0	73.0	68.0	48.0	50.0	77.5	46.0
<i>Bison priscus</i> (Sala, 1986)	Cava Filo (Italy)	SD	8.0	2.1	2.8	1.2	1.5	1.3	0.7
		N	3	2	2	3	3	3	2
		Mean	294.3	65.2	63.3			83.3	47.3
		Minimum	281.0	61.0	56.5			73.0	44.0
		Maximum	308.0	74.0	68.0			89.0	50.0
<i>Bison priscus</i> (Sher, 1997)	North East Siberia (Russia)	SD	10.4	5	4.2			5.4	2.1
		N	6	6	6			6	6
		Mean	266.4	58.5	58.0	36.6		79.7	
		Minimum	254.0	51.5	53.5	29.5		70.5	
		Maximum	283.0	69.5	66	48.0		78.5	
<i>Bison priscus</i> (Maniakas and Kostopoulos, 2017a)	Various localities of England (United Kingdom)	SD	7.2	4.7	3.8	4.5		5.6	
		N	25	25	24	25		6	
		Mean	279.8	65.3	60.6	42.6	40.5	75.0	42.7
		Minimum	254.6	57.7	56.0	37.5	33.7	69.5	38.9
		Maximum	302.1	70.2	67.1	49.1	44.8	79.8	46.5
<i>Bison priscus</i> (Vasiliev, 2008)	Krasny Yar, R–W (Russia)	SD	13.4	4.1	3.6	4.2	3.9	3.9	2.9
		N	8	8	8	8	8	8	8
		Mean	296.7	66.6	64.6	44.4	42.0	77.7	46.7
		Minimum	278.3	56.8	55.5	34.7	38.0	68.3	42.1
		Maximum	314.0	75.4	70.5	50.2	47.0	86.7	50.9
<i>B. priscus priscus</i> (Vasiliev, 2008)	Taradanovo, W1–2 (Russia)	SD							
		N	30	43	41	36	35	42	35
		Mean	293.4	65.7	63.4	41.7	42.1	76.6	46.0
		Minimum	264.0	56.2	56.0	34.3	36.4	67.5	40.7
		Maximum	309.0	73.2	68.5	47.5	46.4	84.0	50.4
		SD							
		N	33	38	37	38	37	43	37

<i>Bison priscus</i> (Vasiliev, 2008)	Krasny Yar, W2	Mean	286.3	59.6	57.3	36.8	38.3	73.8	42.1
		Minimum	285.5	57.8	55.0	32.8	32.0	71.2	41.5
		Maximum	287.0	61.3	59.2	38.8	41.0	76.4	44.0
		SD							
		N	2	5	5	4	4	3	3
<i>Bison priscus</i> (Castaños et al., 2012)	Kiputz IX (Spain)	Mean	296.5	65.8		42.6		81.2	45.9
		Minimum	268.0	51		36.5		70	40.5
		Maximum	318.0	79		51.0		91	51.5
		SD	16.3	6.9		5.7		7.4	3.8
		N	12	23		12		12	12
<i>Bison bonasus</i> (Empel and Roskoz, 1963)	Warsaw (Polonia)	Mean	260.9	58.0	53.2			62.0	41.5
		Minimum	242.0	47.0	44.0			51.0	36.0
		Maximum	288.0	69.0	63.0			72.0	48.0
		SD	11.1	5.4	4.3			5.3	2.9
		N	39	39	39			39	39
<i>Bos primigenius</i> (Brugal, 1985)	Lunel Viel (France)	Mean	288.4	66.5	64.8	44.8	45.1	77.4	38.4
		Minimum	263.7	53.4	54.8	35.7	38.3	68.0	32.0
		Maximum	312.7	78.7	74.6	55.0	52.7	89.3	42.7
		SD							
		N	52	92	92	63	63	52	54

Table S29. Ratio (%) between distal diaphysis width (DDW) and distal maximum width (DEW) in metatarsals of various species of bovids.

Taxon	DDW/DEW*100
<i>Leptobos etruscus</i> (Masini, 1989)	range: 94.2–101.3; mean = 98.2; N = 14
<i>Bison</i> sp. Venta Micena (Maniakas and Kostopoulos, 2017a)	range: 95.1–100.0; mean = 97; N = 19
<i>Bison (Eobison) degiulii</i> (Masini, 1989)	range: 93.3–96.7; mean = 95; N = 2
<i>Bison (Eobison) cf. degiulii</i> (Kostopoulos et al., 2018)	range: 93.8–106.8; mean = 98.6; N = 12
<i>Bison menneri</i> (Sher, 1997)	range: 96.4–105.4; mean = 99.8; N = 19
<i>Bison schoetensacki</i> Vallparadís Composite Section (This paper)	range: 90.8–103.3; mean = 98.7; N = 8
<i>Bison schoetensacki</i> Süssenborn (Maniakas and Kostopoulos, 2017a)	range: 94.8–98.8; mean = 97.6; N = 6
<i>Bison schoetensacki</i> Durfort (Brugal, 1995)	range: 97.1–102.9; mean = 99.9; N = 3
<i>Bison priscus</i> Taubach (Sher, 1997)	range: 93.9–96.9; mean = 95.2; N = 8
<i>Bison priscus</i> Romain-la-Roche (Vercoutère and Guérin, 2010)	range: 101.3–108.0; mean = 105.7; N = 3
<i>Bison priscus</i> UK (Maniakas and Kostopoulos, 2017a)	range: 95.7–99.7; mean = 97.4; N = 8
<i>Bos primigenius</i> Romain-la-Roche (Vercoutère and Guérin, 2010)	range: 91.7–98.6; mean = 95.7; N = 3
<i>Bos primigenius</i> (Brugal, 1985)	average: 93.7; N = 52

Table S30. Principal component analysis of metatarsals using seven selected variables (see Section 3 and Fig. 10). Eigenvalue and % variance of the PCs and coefficient of each variables for each PC. Abbreviations as in Table 4.

	PC 1	PC 2	PC 3	PC 4	PC 5	PC 6	PC 7
Eigenvalue	0.00104894	0.00055803	0.000459951	0.000312436	0.00015311	0.000110268	9,84E-15
% variance	39.692	21.116	17.404	11.822	57.936	41.725	3,73E-12
mv Lmax	0.81154	-0.35556	-0.13103	-0.10965	-0.19147	0.079202	0.37796
mv PET	-0.020849	0.15944	-0.13173	-0.525	0.73203	-0.049449	0.37796
mv PEW	-0.2466	0.039901	-0.17232	-0.20579	-0.43866	-0.7282	0.37796
mv DT	-0.10104	-0.062571	0.9035	-0.10061	-0.087596	0.09437	0.37796
mv DW	-0.42049	-0.66638	-0.20568	0.3781	0.18127	0.13469	0.37796
mv DETI	0.20422	0.50097	0.014653	0.70483	0.19835	-0.16767	0.37796
mv DEW	-0.22677	0.3842	-0.2774	-0.14187	-0.39393	0.63706	0.37796

Table S31. Principal component analysis of metatarsals following Scott and Barr (2004) (see Section 3 and Fig. 10). Eigenvalue and % variance of the PCs and coefficient of each variables for each PC. Abbreviations as in Table 4.

	PC 1	PC 2	PC 3	PC 4	PC 5	PC 6	PC 7	PC 8
Eigenvalue	0.00107108	0.000679073	0.000467574	0.000233519	0.00014504	8,62E+00	3,97E+00	2,76E+00
% variance	38.951	24.695	17.004	84.921	52.745	31.359	14.453	10.025
re Lmax	0.90652	0.12343	-0.049579	0.30502	-0.20162	0.1265	-0.097363	0.036869
re DW	-0.046536	0.82418	-0.3662	-0.083114	0.30869	0.04473	0.061286	0.2766
re DT	0.1545	0.24712	0.79638	-0.46758	-0.023953	0.10068	0.13179	0.18476
re DETI	0.23835	-0.28778	-0.23494	-0.26483	0.35307	0.26888	0.72778	-0.091805
re DETm	0.18033	-0.32507	-0.23471	-0.39033	0.012315	-0.42979	-0.16882	0.66408
re DEW	-0.23325	-0.14062	0.028346	0.31295	-0.2064	0.6256	0.091064	0.62033
re PEW	-0.075716	0.13996	0.097497	0.35516	-0.35665	-0.53833	0.63182	0.15112
re PET	0.052133	-0.12875	0.32958	0.48462	0.75424	-0.1835	-0.061169	0.17586

Table S32. Pairwise comparison results based on MANOVA ($p < 0.05$) for seven raw selected variables of metatarsals of several *Bison* s.l. and *Leptobos etruscus* samples. *L. etruscus*: samples from Olivola, Senèze; *B. (Eobison) sp.*: sample from Venta Micena; *B. (Eobison) cf. degiulii*: sample from Mygdonia Basin; *B. menneri*: sample from Untermassfeld; *B. schoetensacki*: samples from Le Vallonnet, Durfort, Süssenborn, Mauer; *B. priscus priscus*: samples from Taubach, Romain-la-Roche; *B. priscus mediator*: samples from UK (several sites; see Fig. 9). Abbreviations are given in Tables 2 and 4. Values of $p < 0.05$ are in bold.

	<i>Eobison sp.</i>	<i>Eobison cf. degiulii</i>	<i>Bison menneri</i>	<i>Bison schoetensacki</i>	VCS	<i>B. priscus priscus</i>	<i>B. priscus mediator</i>
<i>Leptobos etruscus</i>	0.08	0.007	<0.001	0.001	0.025	0.044	<0.001
<i>Eobison sp.</i>		0.041	<0.001	0.00	0.085	0.086	<0.001
<i>Eobison cf. degiulii</i>			<0.001	0.226	0.437	0.32	0.016
<i>Bison menneri</i>				0.006	0.002	0.016	<0.001
<i>Bison schoetensacki</i>					0.274	0.594	0.179
VCS						0.769	0.075
<i>B. priscus priscus</i>							0.567

Table S33. Measurements (mm) of the phalanges of *Bison schoetensacki* from Vallparadís Estació (EVT) and Cal Guardiola (CGR) layers. Abbreviations: DET, distal end thickness; DEW, distal end width; Lmax, maximum length; PEAT, proximal end articular thickness; PEAW, proximal end articular width; SLmax, maximum length of the sole; SOL, oblique length of the sole; SW, width at the middle; Tmax, maximum thickness; Wmax, maximum width; Wmin, minimum width.

ID Specimen	Layer	Element	Lmax	Wmax	Tmax	PEAW	PEAT	DEW	DET	Wmin	SLmax	SOL	SW
IPS14977	CGRD7	Proximal phalanx	71.6	35.7	42.3	32.1	29.4	31.1	26.7	30.2			
IPS61879	CGRD3	Proximal phalanx	77.8	33.9	40.0	30.7	28.7	32.7	27.0	29.9			
IPS92924	EVT10	Proximal phalanx	71.0	38.8	43.1	36.6	30.5	37.1	27.3	33.8			
IPS92925	EVT7	Proximal phalanx	74.8	39.7	42.6	34.8	33.9	35.0	28.5	30.0			
IPS92926	EVT10	Proximal phalanx	77.7	34.7	42.7	32.5	28.9	31.9	24.0	32.0			
IPS92927	EVT7	Proximal phalanx	72.7	35.0	39.5	30.4	29.3	32.4	25.2	27.9			
IPS107621	EVT12	Proximal phalanx	74.0	35.5	38.8	32.1	28.7	32.9	26.2	32.1			
IPS114554	EVT7	Proximal phalanx	83.5	39.1	43.7	34.2	35.7	36.9	28.2	34.5			
IPS118118	EVT12	Proximal phalanx	77.2	39.4	43.1	34.1	35.7	27.2	38.1	35.6			
IPS118119	EVT12	Proximal phalanx	73.4	41.5	46.5	35.0	38.2	29.1	41.7	36.8			
IPS16778	CGRD2	Intermediate phalanx	57.0	43.4	46.8	41.7	32.6	34.7	42.3	35.0			
IPS40612	CGRD2	Intermediate phalanx	50.0	40.9	47.4		27.6						
IPS107624	EVT12	Intermediate phalanx	55.0	40.4	40.5	37.0	30.6	28.8	36.4	31.6			
IPS118114	EVT12	Intermediate phalanx	50.2	41.1	47.0	39.5	31.1	38.5	36.0	33.6			
IPS39142	CGRD2	Distal phalanx	92.8	45.1	49.6	33.2					89.0	74.7	34.3
IPS41597	CGRD2	Distal phalanx	97.6	48.9	51.0	34.0	44.0				97.5	76.8	35.1
IPS107622	EVT12	Distal phalanx	95.0	37.5	43.4	32.1	35.7				94.8	80.9	30.0
IPS107623	EVT12	Distal phalanx	95.9	50.7	47.3	33.5	39.8				95.5	80.6	36.9
IPS107625	EVT12	Distal phalanx	83.2	42.0	46.4	27.3	33.5				80.5	70.4	30.9
IPS118112	EVT12	Distal phalanx	72.8	33.0	46.2	29.2	38.3				79.8	69.0	29.2
IPS118113	EVT12	Distal phalanx	92.4	41.5	52.1	36.2	43.2				86.3	86.3	33.0

Table S34. Sexual dimorphism in various samples of *Bison* s.l.. We computed the difference (%) between male and female of four selected metacarpal measurements following the equation given by Schertz (1936b) (equation in Section 3 of the main text). Abbreviations: DEW, distal end width; DW, diaphysis width; Lmax, maximum length; PEW, proximal end width.

Taxa	Variable	Female mean values (mm)	Male mean values (mm)	Difference %
<i>Bison menneri</i> , Untermassfeld (Sher, 1997; Maniakas and Kostopoulos, 2017a)	Lmax	272.8	283.3	3.7
	PEW	74.1	84.3	12.1
	DW	42.5	51.6	17.7
	DEW	71.8	83.4	14.0
<i>Bison schoetensacki</i> , Le Vallonnet (This paper)	Lmax	253,7	266,4	4,8
	PEW	74,7	85,1	12,2
	DW	49,8	59,1	15,9
	DEW	70,8	82,8	14,5
<i>Bison schoetensacki</i> , EVT12 (VCS) (This paper)	Lmax	229.7	234.7	2.1
	PEW	78.6	79.1	12.5
	DW	37.3	50.4	25.9
	DEW	66.7	79.1	15.7
<i>Bison schoetensacki</i> , Süssenborn (Maniakas and Kostopoulos, 2017a)	Lmax	239.5	252.7	5.2
	PEW	71.1	81.1	12.3
	DW	43.9	47.7	7.8
	DEW	67.9	78.7	13.7
<i>Bison schoetensacki</i> , Durfort (Brugal, 1995)	Lmax	242.5	249.5	2.8
	PEW	69.8	80.8	13.7
	DW	42.4	50.4	15.9
	DEW	68.7	81.4	15.7
<i>Bison priscus</i> , Châtillon-Saint-Jean (This paper)	Lmax	244.7	251.9	2.8
	PEW	79	93.8	15.8

	DW	49	60.9	19.7
	DEW	77.3	92.2	16.2
	Lmax	235.2	241.9	2.8
<i>Bison priscus</i> North Sea (Drees, 2005)	PEW	78.6	88.3	13.1
	DW	45.6	56.7	19.6
	DEW	78.4	90.0	12.4
	Lmax	236.7	243.0	2.6
<i>Bison priscus</i> Krasny Yar, R–W, (Vasiliev, 2008)	PEW	78,6	89.8	12.5
	DW	46.1	57.7	20.0
	DEW	80.1	91.5	12.4
	Lmax	205.0	215.0	4.7
Extant <i>Bison bonasus</i> (Reshetov and Sukhanov, 1979)	PEW	67.0	74.0	9.5
	DW	35.0	44.0	20.5
	DEW	63.0	70.0	10.0
Extant <i>Bison</i> spp. (Lewis et al., 2005)	Lmax	203	211.6	4.1
	PEW	64.2	75.1	14.5
	DW	36.9	48.6	24.1
	DEW	63.6	75.1	15.3

Figure S1. a-d, Bivariate plots of length (L) vs width (W) of m3 (a), M1 (b), M2 (c), and M3 (d) in several *Bison* s.l. species. e-h, Box-plots of W/L% of m3 (e), M1 (f), M2 (g), and M3 (h) in several *Bison* s.l. species.

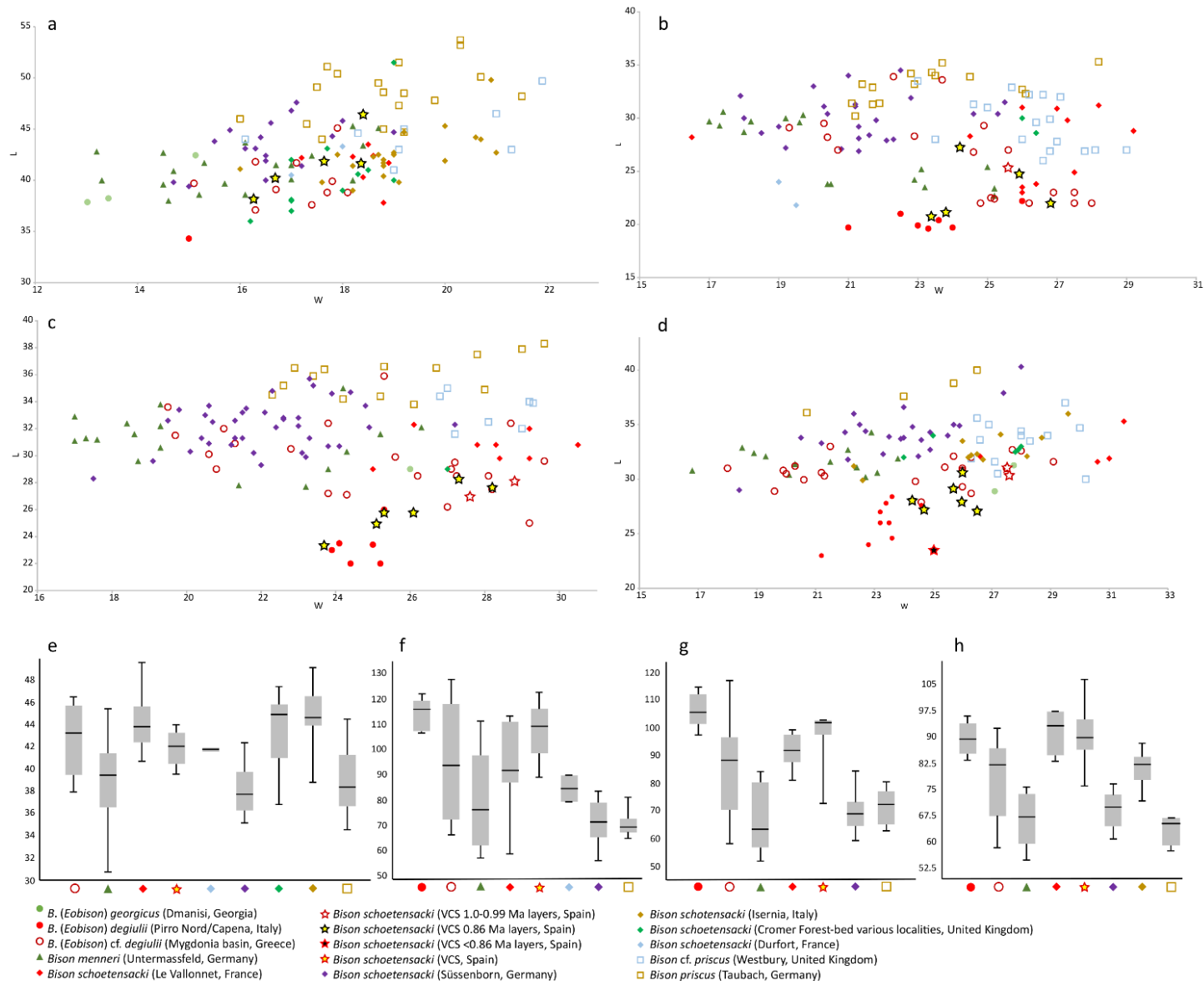




Figure S2. Vertebral remains of *Bison schoetensacki* from the Vallparadís Composite Section. a, Axis IPS114451 in anterior (1), left lateral (2), and posterior (3) views; b, Cervical vertebra IPS107605 in anterior (1) and right lateral (2) views; c, Thoracic vertebra IPS92954 in anterior (1) and right lateral (2) views. Scale bar: 100 mm.

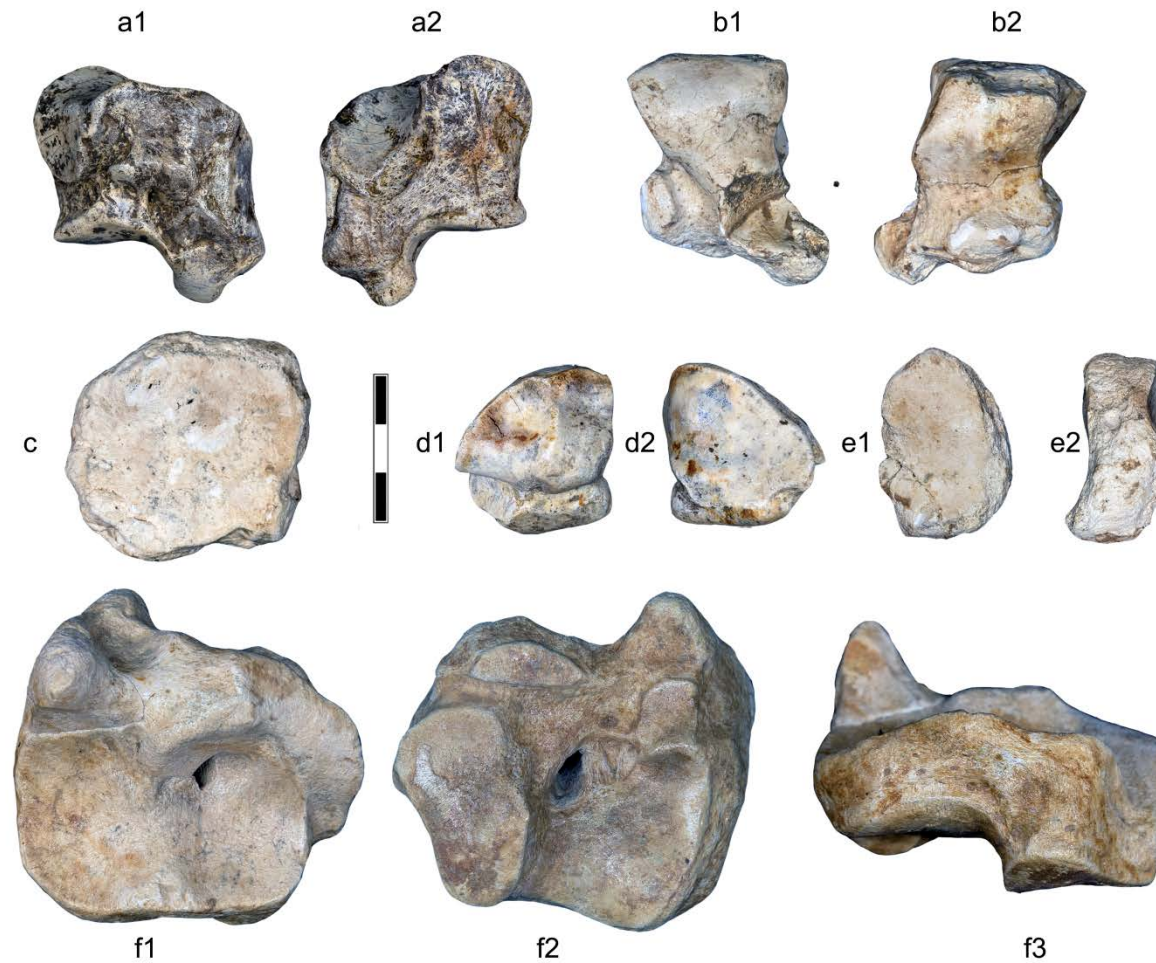
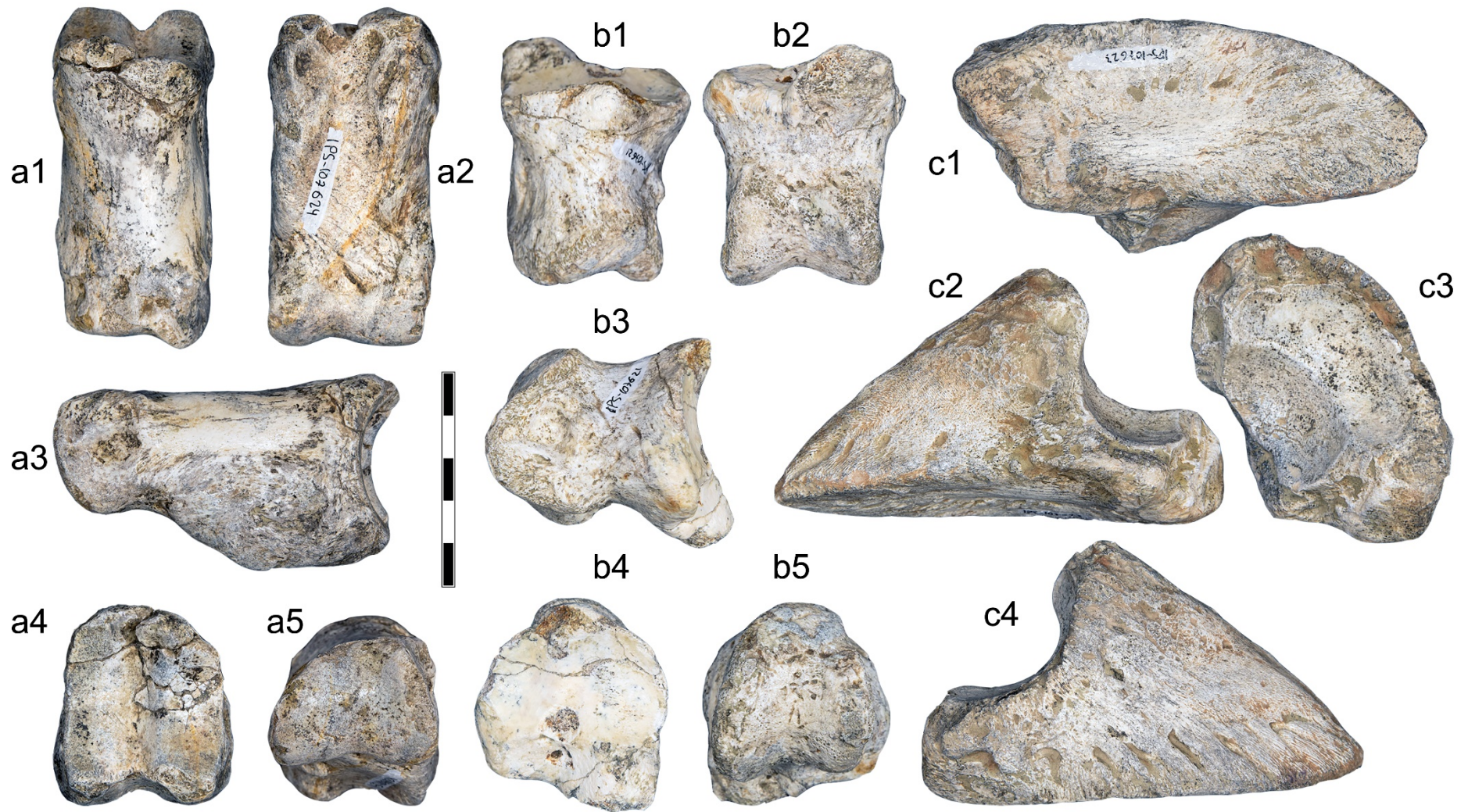


Figure S3. Carpals and tarsals of *Bison schoetensacki* from the Vallparadís Composite Section. a, Right pyramidal IPS91545 in medial (1) and lateral (2) views; b, Right semilunar IPS92960 in proximal (1) and distal (2) views; c, Left capitotrapezoid IPS92963 in distal view; d, Left unciform in proximal (1) and distal (2) views; e, Right cuneiform (IPS92965) in distal (1) and medial (2) views; f, Left cubonavicular in proximal (1), distal (2), and anterior (3) views. Scale bar: 30 mm.



Supplementary Figure 4. Phalanges of *Bison schoetensacki* from the Vallparadís Composite Section: a, Left proximal phalanx IPS107624 in anterior (1), posterior (2), lateral (3), proximal (4), and distal (5) views; b, Right intermediate phalanx IPS107621 in anterior (1), posterior (2), lateral (3), proximal (4), and distal (5) views; c, Right distal phalanx IPS107623 in posterior (1), medial (2), proximal (3), and lateral (4) views. Scale bar: 50 mm.

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