

Online Supplementary Material

Table 1. Dental measurements (in mm) of *Buisnictis* and select Plio-Pleistocene spotted skunks. Comparative data derived from Hibbard (1941a; b), Dalquest (1972), Skinner et al. (1972), and our own (San Josecito Cave).

	<i>B. metabatos</i>	<i>Buisnictis meadensis</i>					<i>B. burrowsi</i>	<i>Spilogale rexroadii</i>						<i>Spilogale gracilis</i>					
	MPGJ	KUVP	UMMP	UMMP	UMMP	UMMP	F:AM	MSU	MSU	MSU	KUVP	KUVP	KUVP	San Josecito Cave (left teeth only)					
	2140	4609	28450	30196	25769	25771	87402	8347	8348	8349	4596	4578	4573	N	Mean	STD	CV	Max	Min
Alveolar length of P4-M1	7.8										7.3			8	9.85	0.529	5.37	10.6	9.0
Anteroposterior length of P4	4.8			5.4	5.6						5.2			8	6.14	0.447	7.28	6.5	5.2
Anteroposterior length of M1	4.0										3.7			8	4.66	0.469	10.06	5.3	4.0
Transverse width of M1	4.5										5.0			8	5.39	0.323	5.99	5.9	4.8
Anterior of p4 to posterior of m2	9.5		12.15								9.1			3	11.93	0.473	3.96	12.3	11.4
Anteroposterior length of p4	2.8		3.55			3.2					2.6	2.7		20	3.39	0.159	4.68	3.7	3.1
Transverse width of p4	1.6		2.07								1.7	1.9		20	2.21	0.121	5.47	2.4	2.0
Anteroposterior length of m1	5.4	5.7	6.51			5.9	5.4	5.6	5.6		5.2	6.0	5.7	20	7.08	0.297	4.20	7.7	6.5
Transverse width at metaconid of m1	2.5	2.8	2.91			2.4	2.7				2.3	2.8	2.5	20	3.14	0.179	5.69	3.4	2.8
Anteroposterior length of trigonid of m1	3.2	3.4	4.16			3.4	3.8				3.2	3.6	3.2	20	4.15	0.201	4.86	4.5	3.8
Maximum width of m1 talonid	2.2	2.5	3.12			2.5	2.8				2.0	2.5	2.1	20	3.02	0.188	6.23	3.4	2.7
Anteroposterior length of m2	1.7		3.23								1.9			3	2.57	0.231	9.00	2.7	2.3
Transverse width of m2	1.7		2.61				1.7				1.5			3	2.27	0.058	2.55	2.3	2.2
Depth of ramus below metaconid	3.1	6.1					5.7	4.1	4.5		4.1		4.2	20	4.57	0.351	7.68	5.1	3.9
Width of ramus below metaconid	2.0							2.6	2.3		2.4	3.1	2.3	20	2.86	0.231	8.07	3.2	2.5

Table 2. Morphologic data matrix of 21 taxa by 39 characters used in phylogenetic analysis.

This is a modified matrix from Wang and Carranza-Castañeda (2008:table 2, appendix 1) and character numbers correspond to those listed in Table 3.

<i>Amphicyonodon</i>	000000000000000000000000000000??0000
<i>Mustelavus</i>	1100000?0000000000000000000000??00?0
<i>Mydaus</i>	111121111110001001010010120100002000000
<i>Palaeomephitis</i>	??11111???1?0?????0??102??00??0???????
<i>Promephitis</i>	11112111111100000000001011000000?000000
<i>Martinogale faulli</i>	111121111100111?0000000000000000?0000?0
<i>Martinogale chisoensis</i>	1111211?1100111100?00000010000?0??????0
<i>Martinogale alveodens</i>	?1???11?11?0?1?1111?0??????0?????????00
<i>Buisnictis meadensis</i>	11?1?11?11001111111?1?0001000000??????1
<i>Buisnictis burrowsi</i>	?1?1?11?11000111111?1?0??0?0?0?0??????1
<i>Buisnictis metabatos</i>	111121???1100111??1001111?1?00000?000??0
<i>Brachyprotoma</i>	11112111110001?011111?1022101000??????0
<i>Spilogale</i>	111131111100111111111111020000000000100
<i>Mephitis</i>	111121111100012001111110121110001101010
<i>Osmotherium</i>	?1?1211?11?1?1?001110??????11??????????0
<i>Conepatus sanmiguelensis</i>	1111211?1?0001211111111012110011?111010
<i>Conepatus leuconotus</i>	111121111100012111112210221101112111010
<i>Conepatus robustus</i>	1111211?11000121111?2?1022?100?1??????0
<i>Conepatus semistriatus</i>	111121111101012111111110211200112101110
<i>Conepatus altiramus</i>	?1???1???11?1?1?1111?1??????2?????????10
<i>Conepatus S.Am. spp.</i>	111121111100012111111110201200112101110

Table 3. Definitions of characters and their states used in compiling the data matrix for phylogenetic analysis. Character numbers and character state numbers correspond to those in Table 2.

- (1) M2: present (0); absent (1).
- (2) m3: present (0); absent (1).
- (3) Alisphenoid foramen: present (0); absent (1).
- (4) Upper carnassial (P4) notch: present (0); absent (1).
- (5) Mastoid sinus (expansion of epitympanic recess into mastoid): absent (0); small and not fully reaching to lateral wall of mastoid process (1); large and fully filling mastoid process (2); further expansion posteriorly to separate paroccipital process from bulla (3).
- (6) Extra roots on m1: no extra roots (anterior and posterior main roots only) (0); extra roots on both lingual and labial sides (1).
- (7) P1 and p1: present (0); absent (1).
- (8) Central septum in internal naris: absent (0); present (1).
- (9) Ridge on posterior face of m1 protoconid (presumably associate with crest-like M1 paracone and metacone): absent (0); present (1).
- (10) Chin on mandibular symphysis: absent (0); present (1).
- (11) Anterior shelf of P4 protocone to expand anterolingual corner: absent (0); present (1).
- (12) Cuspules (entoconulid) on anterior segment of m1 entoconid crest: absent (0); present (1).
- (13) P4 parastyle: absent (0); present (1).
- (14) Talonid cusps of m1: hypoconid approximately equal in height to entoconid (0); hypoconid dominant over entoconid (1).
- (15) M1 lingual cingulum: surrounding protocone lingually (0); posteriorly shifted and not surrounding protocone lingually (1); a widened shelf on posterolingual corner (2).
- (16) Lower canine lingual cingulum: absent or poorly developed (0); well developed (1).
- (17) Premolar anterior and posterior cingular cusps: absent or weakly developed (0); distinctly developed (1).
- (18) Crown height of p4: relatively low and not much exceeding m1 paraconid (0); relatively high and equal or exceeding m1 protoconid (1).
- (19) Premolar width: narrow (0); broadened (1).
- (20) Postorbital constriction: narrow (0); widened (1).
- (21) Entoconid crest of m1: fully enclosed on lingual side (0); notch on anterior end of entoconid crest (1); deeply notched (2).
- (22) M1 protocone height: low (0); high (1).
- (23) P4 protocone crest: narrowly constricted and anteriorly located (0); broadened and posteriorly shifted (1).
- (24) Paroccipital process: not reduced (0); reduced (1).
- (25) P2: normal size (0); much reduced relative P3 (1); lost (2).

- (26) Outline of M1: transverse width nearly twice anteroposterior length (0); transverse width less than twice anteroposterior length (1); approximately equal length and width; 3, anteroposteriorly elongated (2).
- (27) Profile of forehead: flat (0); domed (1).
- (28) Relative length of m1 trigonid and talonid: trigonid much longer than talonid (0); trigonid roughly equal to talonid (1); talonid longer than trigonid (2).
- (29) P4 protocone crest: thin and crest-like (0); swollen and conical (1).
- (30) Crista behind M1 postprotocrista: absent (0); present (1).
- (31) Nasal and premaxillary: normally proportioned (0); nasal retracted and premaxillary protruded (associated with hog-nose) (1).
- (32) P4 paracone crown height: relatively low (0); very high (1).
- (33) Premaxillary-maxillary suture in palatal view: across incisive foramen (0); at level of posterior edges of incisive foramen (1); behind posterior edge of incisive foramen (2).
- (34) Condylod canal: present (0); extremely reduced or absent (1).
- (35) Condylod foramen: outside of posterior lacerate foramen (0); confluent with posterior lacerate foramen (1).
- (36) Postorbital process of frontal: present (0); extremely reduced or absent (1).
- (37) Infraorbital foramen: one foramen (0); two or more foramina (1).
- (38) Angular process: small inferior ramus for medial pterygoid muscle (0); enlarged inferior ramus.
- (39) m1 metaconid reduction: no (0); yes (1).