Appendix 1. Characters used by Voss and Jansa (2003) and data matrix of characters and taxa for this analysis 0 indicates absence, 1 and 2 presence, -innaplicable character, ? missing data

Characters

1 Rhinarium / with_2_grooves with_1_groove,
2 Midrostral_stripe / absent present,
3 Mask_1 / absent present,
4 Mask_2 / like_Marmosa polymorphic like_Metachirus,
5 Spot__above_eye / absent present,
6 Gular_gland / absent present,
7 Dorsal_fur_markings / unpatterned dark_bars scapular_stripes median_and_lateral_stripes red_flanks red_head_and_rump tricolored,
8 Dorsal_underfur / dark white,
9 Dorsal_guard_hairs / short long,
10 Manual_digits / III_longest 'III_=_IV' IV_longest,
11 Central_palmar_surface / 'smooth-sparsely_tubercular' densely_tubercular sandpapery,
12 Lateral_carpal_tubercles / absent present_in_adult_males,
13 Medial_carpal_tubercles / absent present_in_adult_males,
14 Pedal_digits / III_longest subequal IV_longest,
15 Interdigital_webbing / absent present,
16 'Plantar pelage (pes)' / tarsus_naked tarsus_hairy,
17 Pouch_1 / absent present,
18 Pouch_2 / opens_medially opens_anteriorly opens_posteriorly,
19 Mammae / 'inguinal-abdominal_only' 'thoracic-pectoral_too',
20 Cloaca / present absent,
21 Body_pelage_on_tail / longer_dorsally subequal none,
22 Caudal_coloration / uniform_or_variable 'black-and-white',
23 Caudal_scales / annular intermediate spiral,
24 Base_of_tail / smooth_scales raised_tubercles,
25 Tail_tip / not_prehensile prehensile,
26 Caudal_hairs_1 / 3_per_scale 4_or_more,
27 Caudal_hairs_2 / all_hairs_alike middle_hair_thickest,
28 Tail_incrassate / no yes,
29 Rostral_proc._premaxillae / absent present,
30 Palatal_proc._premaxillae / reach_C1_alveoli 'don''t_reach_C1_alveoli',
31 Maxilloturbinals / elaborately_branched simple_scrolls,
32 Nasal_tips / above_or_anterior_to_I1 posterior_to_I1,
33 Nasal_shape / widest_posteriorly subparallel,
34 Postorbital_process_frontals / absent_or_indistinct 'Caluromys-like' 'Didelphis-like',
35 Sagittal_crest / absent_or_small large,
36 Parietal_and_alisphenoid / in_contact separated,
37 Petrosal_exposure / not__exposed polymorphic exposed_laterally,
38 Maxillopalatine_fenestrae / absent_or_indistinct polymorphic present,
39 Palatine_fenestrae / absent present,
40 Maxillary_fenestrae / absent present,
41 'Post.-lat. palatal foramina' / behind_M4s lingual_to_M4s,
42 Posterior_palatal_morphology / '"Caluromys"_type' '"Didelphis"_type',
43 'Max.-alisph. contact' / absent polymorphic present,
44 Transverse_canal_foramen / absent present,
45 Secondary_foramen_ovale / absent 'formed_by_ant.-med._strut' formed_by_lamina,
46 Ectotympanic_suspension / from_skull from_malleus_only,
47 Fenestra_cochleae / exposed concealed,
48 Paraoccipital_process / adnate_to_petrosal erect,
49 Dorsal_margin_for._magnum / 'supra-_and_exoccipitals' exoccipitals_only,
50 Mental_foramina / two one,
51 Angular_process / 'acute-strongly_inflected' 'obtuse-weakly_inflected',
52 'Shape I2-I5 crowns.' / symmetrical_rhomboids asymmetrical,
53 Upper_canine / simple post.__cusp ant.__and_post.__cusps,
54 P1_size / large small_or_absent,
55 'Height P2, P3' / P2__taller subequal P3_taller,
56 P3_cutting_edges / anterior_and_posterior posterior_only,
57 'M1--M4 widths' / M1_wider_than_M4 M4_wider_than_M1,
58 Centrocrista / linear 'weakly_V-shaped' 'strongly_V-shaped',
59 'Ectoflexus on M1-M3' / absent present,
60 'Anterior cingulum (M3)' / complete incomplete,
61 Upper_molar_eruption / M4_before_P3 M4__and_P3_together P3_before_M4,
62 Lower_incisors / with_lingual_cusp without_lingual_cusp,
63 'Height p2, p3' / p2__taller subequal p3__taller,
64 dp3_trigonid / tricuspid bicuspid,
65 m3_hypoconid_position / labially_salient lingual_to_protoconid,
66 Entoconid_size / large small_and_indistinct,
67 Hypoconulid / twinned_with_entoconid in_midline,
68 'RES {a1+ a5, m1}' / metacentric acrocentric,
69 'RES {a2+a8, m2}' / metacentric acrocentric,
70 'RES {a3+a10, m3}' / metacentric acrocentric,
71 'RES {a6+a9, m4}' / metacentric acrocentric,

Matrix

Caluromys_derbianus	01100000020002001100110010001100010000000000110001101000100000000000000
Caluromys_lanatus	01100000020002001100002110001100010000000000011000110100010000000000000
Caluromys_philander	01100000020002001000102010001100010000000000011000110100010000000000000
Caluromysiops_irrupta	000–00200200020012000021100001000110000000002110001101000000000001????
Chacodelphys_formosa	?0100100001??200????200000000000100022110101000000000001121?00?110????
Chironectes_minimus	10120010002002101201112000000001021002000101210101000021111121000001111
Cryptonanus_chacoensis	00100100010102000–00200010000000000022100101000000001021121100000000????
Cryptonanus_unduaviensis	0010010001010200???020001000000000002210010100000000202112100002000????
Didelphis_albiventris	10100001100001001100112010000001021002100101210110010021111121000001111
Didelphis_marsupialis	10100001100002001100112010000001021002100101210110010021111121000001111
Didelphis_virginiana	10100001100001001100112010000001021002100101210110010021111121000001111
Glironia_venusta	00100?00010??2000–0000–11??000001000100000100000001001011100000?000?????
Gracilinanus_aceramarcae	00100100010102000–00200010001000000022110101100000000001112210?00?000????
Gracilinanus_agilis	0010010001010200???020001000100000002211010110000000000111210?0020000000
Gracilinanus_emiliae	00100100010102000–00201010001000000022110101100000001011121000020000????
Gracilinanus_microtarsus	0010010001010200???020001000100001002211010110000000001112100000?0000000
Hyladelphys_kalinowskii	00100000010002000–00201010000000000010001010000010100001110000020000????
Lestodelphys_halli	10100100001000010–1020000?0100000000121011011010000000211211002210000000
Lutreolina_crassicaudata	100–00000000000012001120010000010210021001212101100100211111210000011111
Marmosa_lepida	00100000010102000–00202010001000010002000101000000001011121000020000????
Marmosa_mexicana	00100100010112000–00201010001000010002100101000000000011121000020000000
Marmosa_murina	00100000010002000–00202010001000010002000101000000000011121000020000000
Marmosa_robinsoni	00100100010112000–00201010001000010002000101000000000011121000020000000
Marmosa_rubra	?0100000010112000–0?2020100010000000020001010010000000111210000020000????
Marmosops_impavidus	00100000000102000–00202010101000000022100101100000000011121100000000000
Marmosops_incanus	00100100000102000–1020201010?000100012100101100000000011121100?0000000
Marmosops_noctivagus	00100100000102000–00202010101000000012100101100000000011121100000000000
Marmosops_parvidens	00100000000102000–00202010101000000022000101100000002011121000000000????
Marmosops_pinheiroi	00100000000102000–00202010101000000022000101100000002011121100000000????
Metachirus nudicaudatus	10121100000002000–00201000000000000102000101100110000011121110000000000
Micoureus_demerarae	00100000010112000–00202010001000010002000101000000000011121000020000000
Micoureus_paraguayanus	0 0100000010112000–?010201000100 00100020001010000000000011210?00?0000000
Micoureus_regina	00100000010112000–00202010001000010002000101000000000011121000020000000
Monodelphis_adusta	100–0100000000000–00200000000010000002000121000000000211211001?110????
Monodelphis_brevicaudata	100–0100000000000–00000000000010000002000121000000000211211101011001 01
Monodelphis_emiliae	100–0100000000000–00000000000010000002000121001000000021121 1?0201100101
Monodelphis_theresa	100–000000000000???020000000001000000200012120000000002112 11?01?110????
Philander_frenata	10111000000002001100112011000001021002100101210110010021111 1?10?0001111
Philander_mcilhennyi	10121000000002001100112011000001021002100101210110010021111121000001111
Philander_opossum	10121000000002001100112011000001021002100101210110010021111121000001111
Thylamys_macrurus	00100100001002010–10200010000000100022110101101000000021121100 1?0000000
Thylamys_pallidior	10100100001002 01???020001001000010002210110110100000002112110012000000
Thylamys_pusillus	00100100001002010–10200010010000100022111101101000000021121100110000000
Thylamys_venustus	00100100001002 01???020001001000010002211110110100000002112110012000000
Tlacuatzin_canescens	00100000010102000–00200010000000010002010101000000000011121000020001111

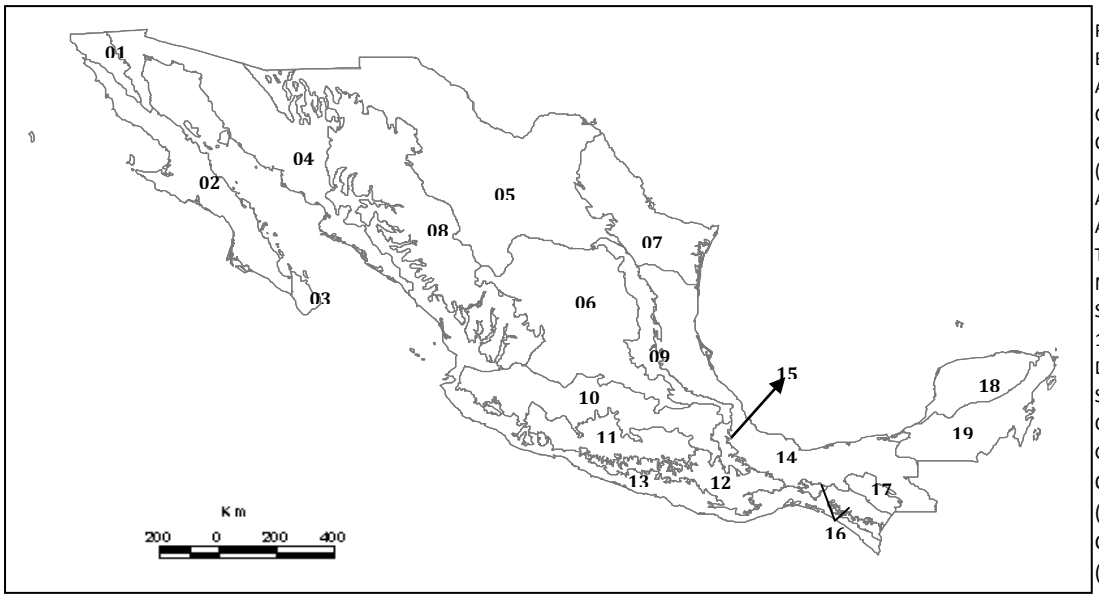


Figure 1. Mexican Biogeographic Provinces by Arriaga *et al*. (1997). 01 California (clf); 02 Baja California (bc); 03 del Cabo (cab); 04 Sonora (son); 05 Altiplano Norte (apn); 06 Altiplano Sur (aps); 07 Tamaulipeca (tam); 08 Sierra Madre Occidental (smo); 09 Sierra Madre Oriental (sme); 10 Eje Volcánico (vol); 11 Depresión del Balsas (bal); 12 Sierra Madre del Sur (sms); 13 Costa del Pacífico (pac); 14 Golfo de México (gm); 15 Oaxaca (oax); 16 Soconusco (scn); 17 Los Altos de Chiapas (chi); 18 Yucatán (yuc) and 19 Petén (ptn).

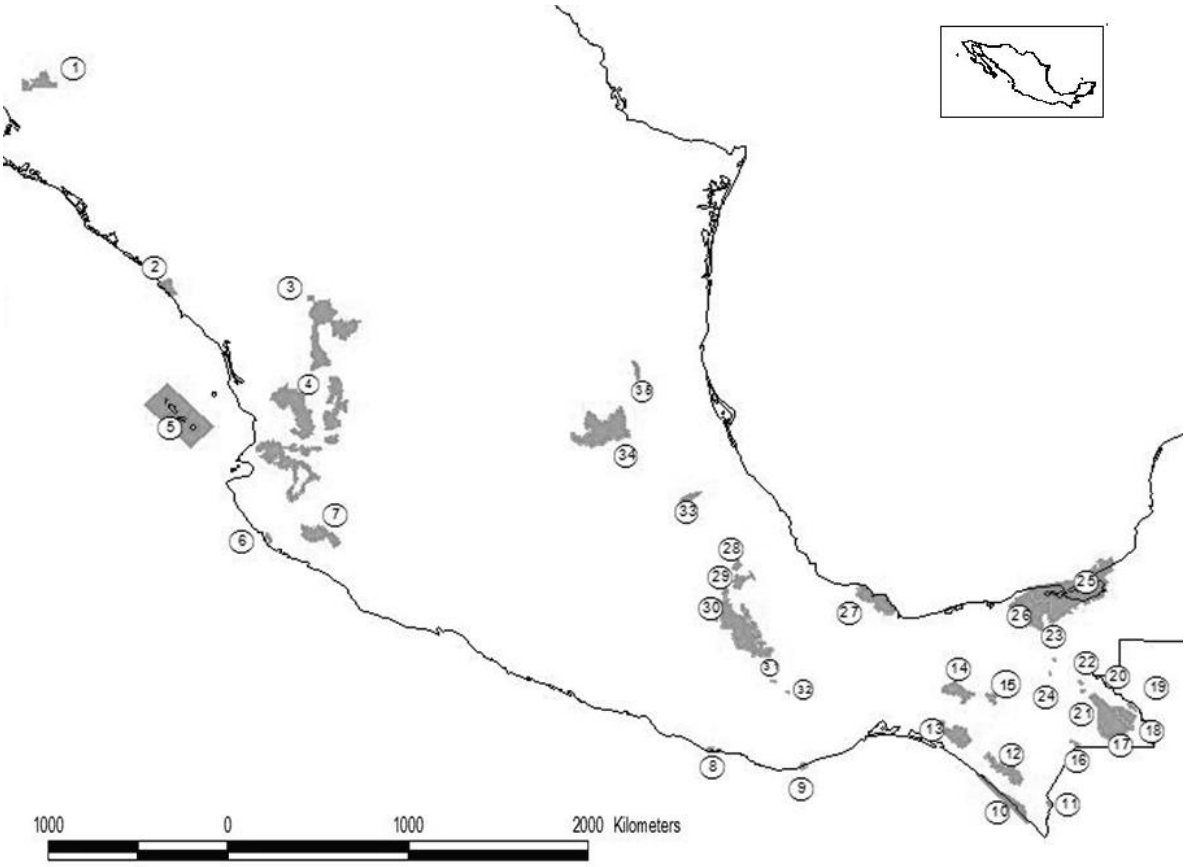


Figure 2. Protected areas used for gap analysis. (1) Sierra de Álamo, (2) Meseta de Cacaxtla, (3) La Michilia, (4) Cuenca Alimentadora del Distrito de Riego 043 del Estado de Nayarit, (5) Islas Marías, (6) Chamela-Cuixmala, (7) Sierra de Manantlán, (8) Lagunas de Chacahua, (9) Huatulco, (10) La Encrucijada, (11) volcán Tacana, (12) El Triunfo, (13) La Sepultura, (14) Selva El Ocote, (15) Cañón El Sumidero, (16) Lagunas de Montebello, (17) Montes Azules, (18) Lacan-Tun, (19) Chan-Kin, (20) Bonampak, (21) Naha, (22) Metzabok, (23) Palenque, (24) Cascada de Agua Azul, (25) Laguna de Terminos, (26) Pantanos de Centla, (27) Los Tuxtlas, (28) Pico de Orizaba, (29) Cañón de Río Blanco, (30) Tehuacan-Cuicatlán, (31) Benito Juárez, (32) Yagul, (33) Cuenca Hidrográfica del Río Necaxa, (34) Sierra Gorda, (35) Sierra del Abra-Tanchipa.

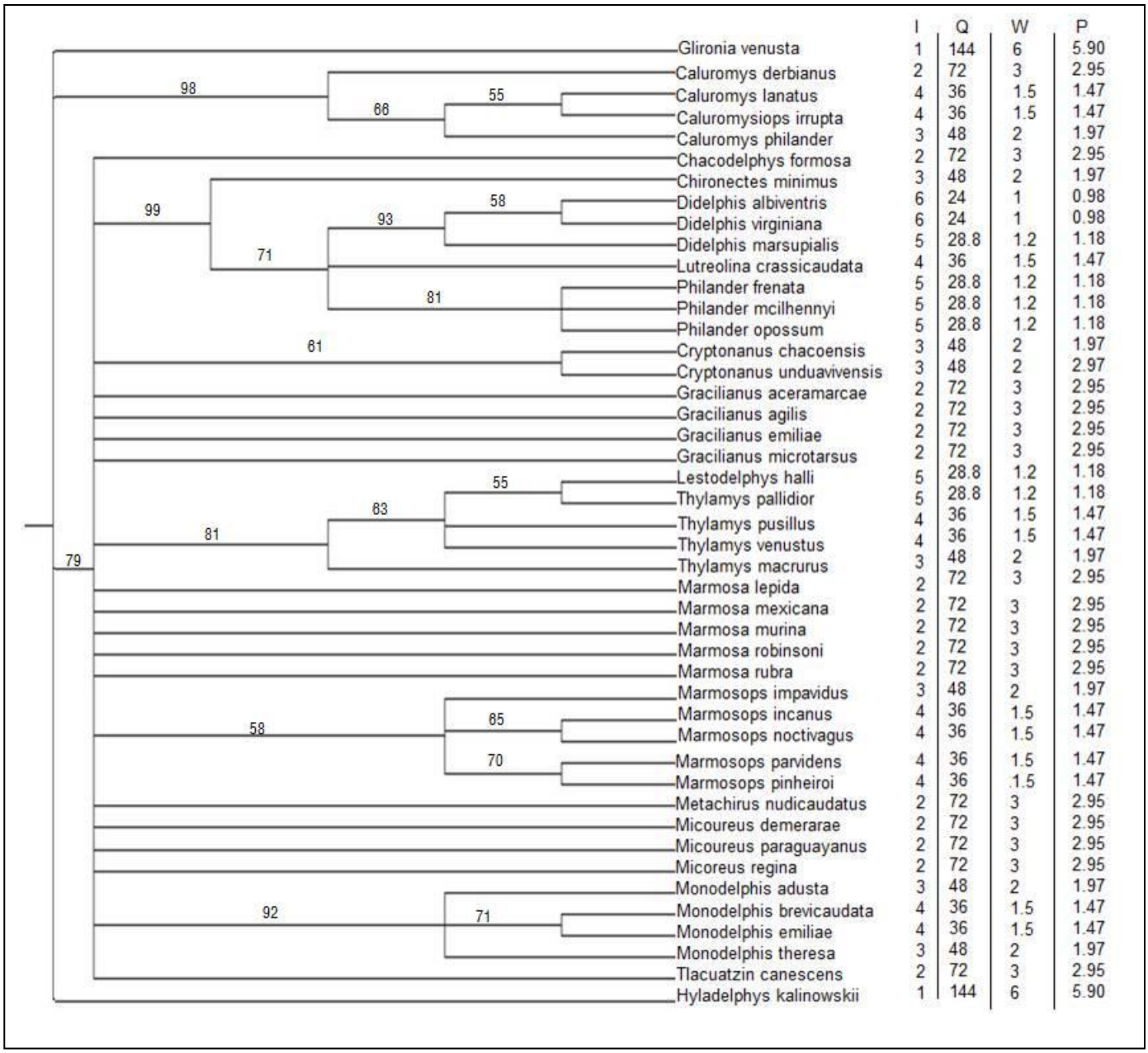
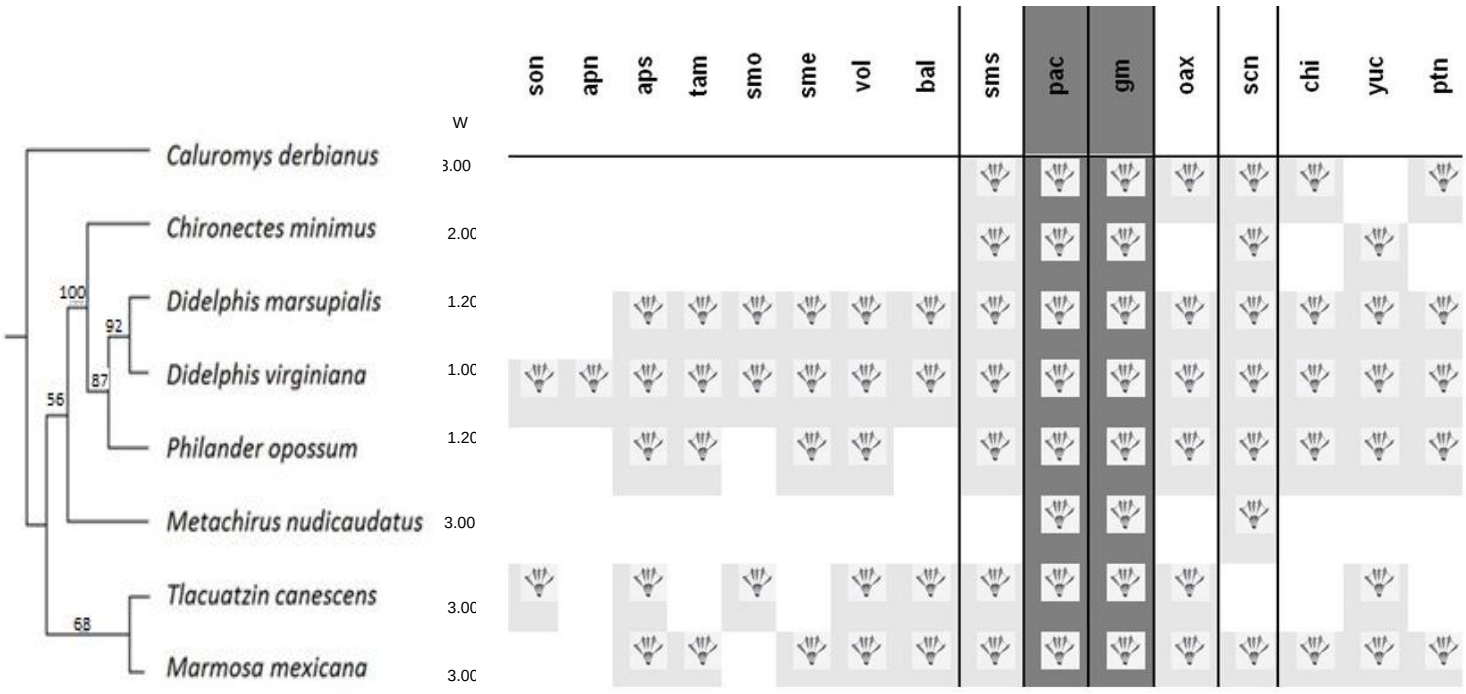


Figure 3. Didelphimorph phylogenetic relationships with bootstrap values indicated above the branches of the tree. Taxonomic weight measures are showed in columns, (I) corresponds to the number of taxonomic groups,(Q) the basal phylogenetic weight; (W) number of taxa that contribute to the total diversity of the group and (P) percentage of the W value for each taxon. The total value for (I) was 144 and for (W) 101.7.



Total	20.40	4.00	1.00	9.40	6.40	5.20	6.40	9.40	8.20	17.40	20.40	20.40	15.40	17.40	15.40	11.40
P1 (%)		19.60	4.90	20.4	31.37	25.49	31.37	0.46	40.19	**85.29**	**100.00**	**100.00**	75.49	**85.29**	75.49	55.38
P2 (%)		14.70	*	14.70	*	14.70	*	14.70	14.70	14.70	*	*	14.70	14.70	*	14.70

Figure 4. Taxonomic weight, taxonomic dispersion and priority conservation areas for the Mexican species of didelphimorphs. The phylogenetic relationships of Mexican didelphimorphs and bootstrap values (Voss and Jansa 2003, modified by Medina-Romero 2007) are shown on the left, the distribution of each taxon by biogeographic province is given on the right. The letter W corresponds to the taxonomic weight obtained on fig 2. P1 indicates the percentage of taxonomic weight for each area, P2 shows the taxonomic weight without first choice areas, this means areas that contain lacking taxa. The biogeographic provinces are abreviated as follows: Sonora (son), Altiplano Norte (apn), Altiplano Sur (aps), Tamaulipeca (tam), Sierra Madre Occidental (smo), Sierra Madre Oriental (sme), Eje Volcanico (vol), Depresion del Balsas (bal), Sierra Madre del Sur (sms), Costa del Pacífico (pac), Golfo de México (gm), Oaxaca (oax), Soconusco (scn), Los Altos de Chiapas (chi), Yucatán (yuc) and Petén (ptn). Gray areas show maximum taxonomic dispersion, those delimited with a line follow in order of importance

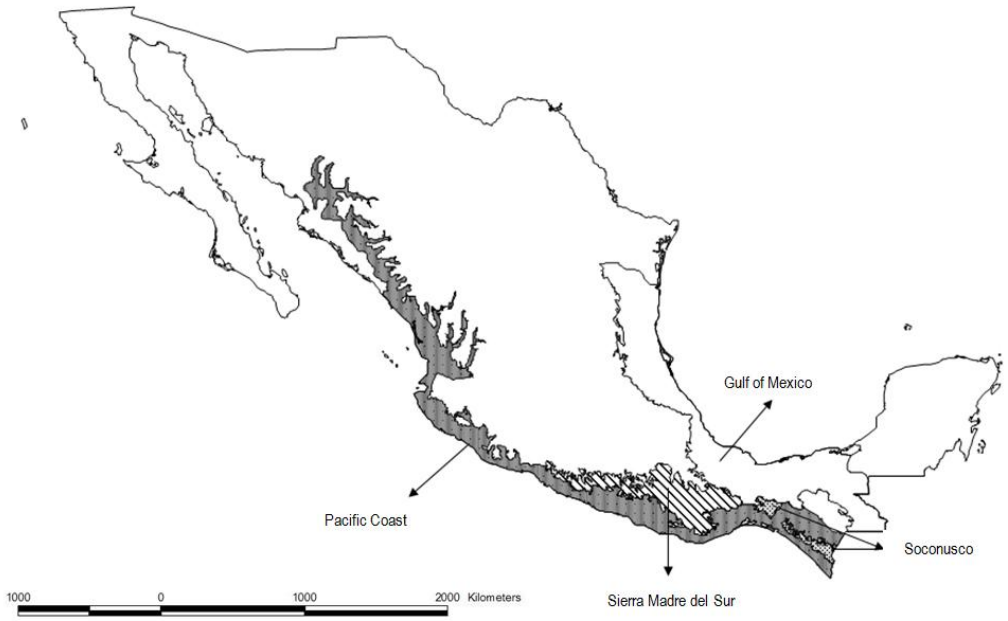
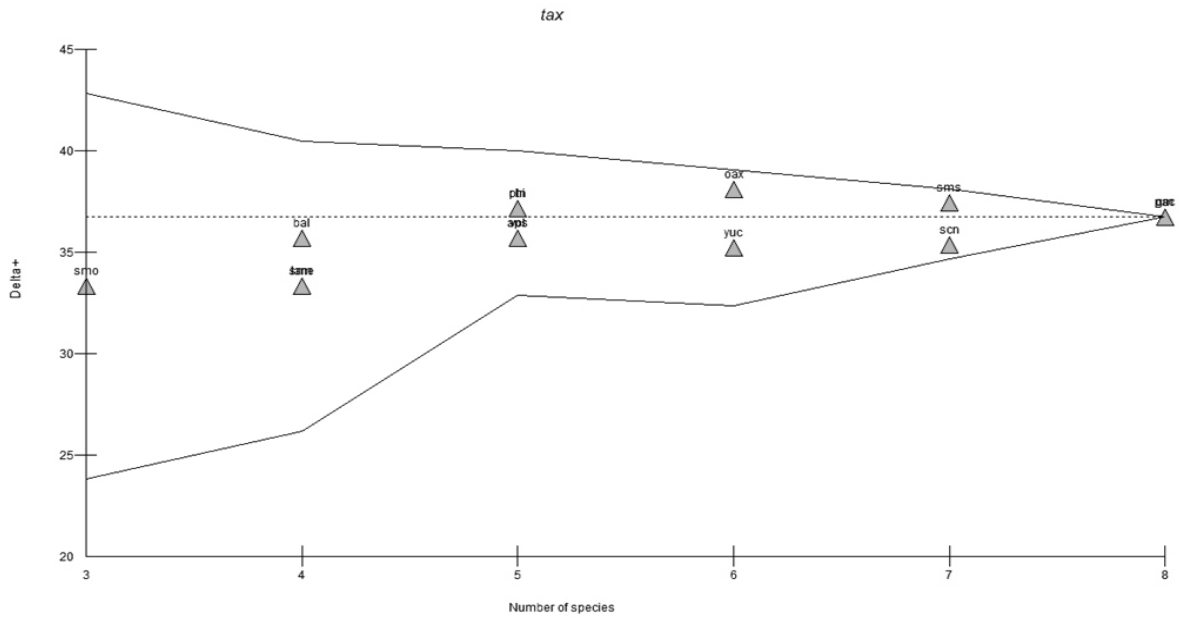


Figure 5. Mexican Biogeographic Provinces (areas) with maximum taxonomic dispersion. The biogeographic province of the Pacific Coast shown in gray and Gulf of Mexico in white represent the areas with the maximum taxonomic dispersion containing all the species of didelphimorphs (eight species). The province of Soconusco represented with dots and Sierra Madre del Sur with lines follow in importance because both include at least one species from each node in the phylogeny of the Mexican didelphimorphs (seven species).



provinces	aps	tam	smo	sme	vol	bal	sms	pac	gm	oax	scn	chi	yuc	ptn
species	5	4	3	4	5	4	7	8	8	6	7	5	6	5
Delta+	35.71	33.33	33.33	33.33	35.71	35.71	37.41	36.73	36.73	38.1	35.37	37.14	35.24	37.14

Figure 6. Funnel graph obtained with Primer 5, on the “x-axis” the species richness and on the “y-axis” the taxonomic distinctness or delta+ values. Triangles correspond to the biogeographic provinces where didelphimorphs are distributed, the maximum taxonomic richness are in the provinces of Gulf of Mexico and Pacific Coast, the maximum taxonomic distinctness is located in the Oaxaca province with a value of 38.1. The table below shows the values of the delta+ and the richness for each biogeographic province.

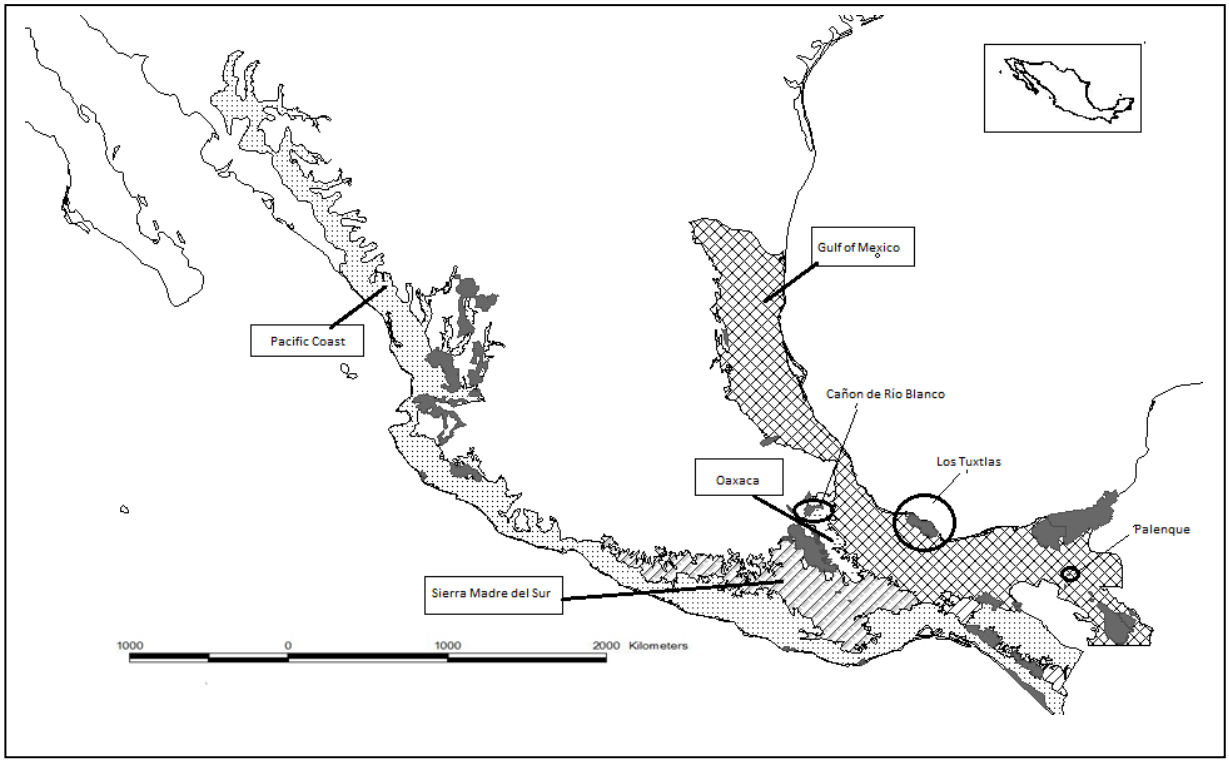


Figure 7. Combination of the results of all analysis: taxonomic weighting, taxonomic dispersion, taxonomic distinctness and gap analysis indicating the biogeographic provinces with its highest species number (Pacific Coast (8 species), Gulf of Mexico (8 species), Sierra Madre del Sur (7 species), Soconusco (7 species) and Oaxaca (delta value of 38.1).Results for the Gap Analysis, in dark gray are showed the protected areas contained in the biogeographic areas mentioned above; circles indicate the Protected areas containing maximum number of didelphimorph's species for conservation Palenque (5 species), Los Tuxtlas and Cañón de Río Blanco (4 species respectively see table 3).