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Discovering the biogeographic history using predefined areas and explicit geographical data in the South American *Liolaemus elongatus* group (Iguania: Liolaemidae)

Table S1. Comparison between the results obtained in DEC applying two different adjacency matrices.

	-lnL	Dispersal rates	Extinction rates
Matrix I	204.468	0.020	0.015
Matrix II	203.686	0.015	0.015

Table S2. Ancestral reconstructions of the *Liolaemus elongatus* group and the clades recovered inside for the different adjacency matrices.

Group/clade	MATRIX I Area/range	MATRIX II Area/range
Liolaemus elongatus	F; P: 0.89	*CF; P: 0.87*
Liolaemus punmahuida	F; P: 1	*F; P: 1*
Liolaemus elongatus-petrophilus	CF; P: 0.91	*CF; P: 1*
Liolaemus petrophilus	CF; P: 0.91	*CF; P: 1*
Liolaemus capillitas	C; P: 1	*C; P: 1*
Liolaemus elongatus-kriegi	F; P: 0.72	*F; P: 0.86*
Liolaemus elongatus sensu stricto	F; P: 1	*F; P: 0.86*
Liolaemus kriegi	FG; P: 0.53	*FG; P: 0.78*

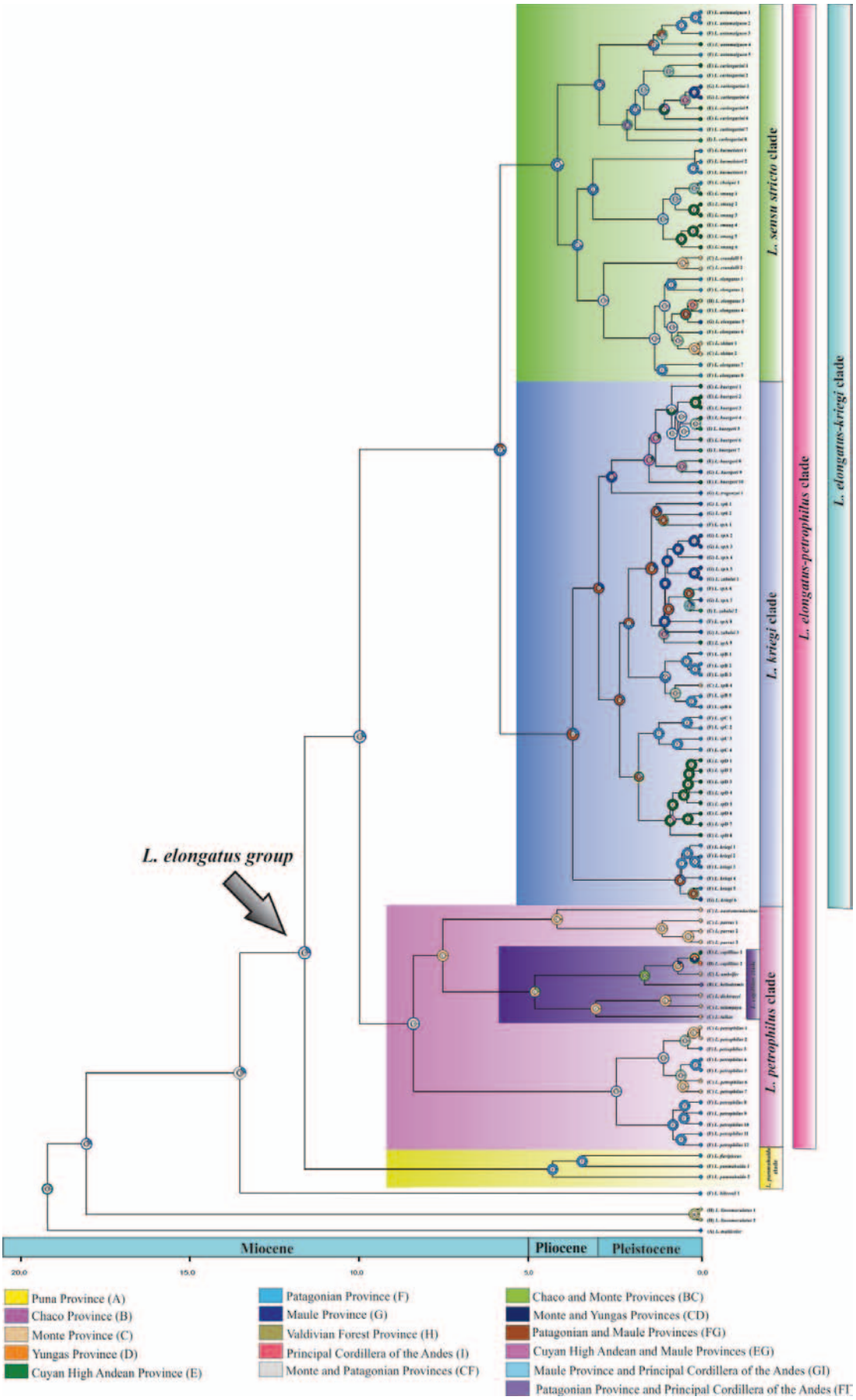

Figure S1. Ancestral area of distribution obtained by DEC. Pie charts of each node depict the relative probabilities of ancestral area/ranges and the assigned area (central circle). Circles around pie charts represent events: blue circle: dispersal event; green circle: vicariance. See "MATERIAL AND METHODS" for area names shown in map. Time axis (in Myr) is annotated with major geological events.

S1 File Specimens studied and accession numbers of sequences used.

Species assignation	Collection ID	GenBank accession no.		
		12S	Cytochrome b	KIF 24
L. lineomaculatus	SDSU 4268	AY367846	AY173860	MG660180
L. bibronii	LJAMM-CNP 8212	MG660059	MG660009	KF968144
L. multicolor	LJAMM-CNP 12006	KF969085	KF968893	KY127559
L. antumalguen	LJAMM-CNP 10442	KY127454	KY127620	KY127593
L. antumalguen	LJAMM-CNP 5233	KY127490	KY127935	KY127600
L. antumalguen	LJAMM-CNP 6167	KY127495	KP121325	KY127606
L. antumalguen	LJAMM-CNP 7661	KY127502	KY128080	KY127599
L. antumalguen	LJAMM-CNP 6155	KY127494	KP121335	MG660176
L. austromendocinus	LJAMM 5147	AY367843	AY367815	KP121232
L. buergeri	LJAMM-CNP 5294	KJ493986	KJ494165	KJ493967
L. buergeri	LJAMM-CNP 14090	KJ494002	KJ494066	-
L. buergeri	LJAMM-CNP 14119	KJ494004	KJ494070	-
L. buergeri	LJAMM 2744	AY367840	AY173843	-
L. buergeri	LJAMM-CNP 5313	KJ493987	KJ494173	KP121238
L. buergeri	LJAMM-CNP 6439	KJ493989	KJ494208	KJ493968
L. buergeri	LJAMM-CNP 14096	KJ494003	KJ494068	MG660150
L. burmeisteri	LJAMM-CNP 7644	KY127501	KP121328	KY127605
L. burmeisteri	LJAMM-CNP 7637	KY127500	KP121327	MG660168
L. capillitas	LJAMM 2788	MG660051	AY173555	MG660167
L. capillitas	BYU47100	AY173913	AY173657	-
L. carlosgarini	LJAMM-CNP 14027	KY127465	KY127725	-
L. carlosgarini	LJAMM-CNP 14074	KY127469	KY127743	KY127575
L. carlosgarini	LJAMM-CNP 14182	KY127472	KY127753	KY127576
L. carlosgarini	LJAMM-CNP 14185	KY127473	KY127755	KY127584
L. carlosgarini	LJAMM-CNP 3435	KY127481	KY127850	KY127596
L. carlosgarini	LJAMM-CNP 5335	KY127491	KY127966	KY127601
L. carlosgarini	LJAMM-CNP 6418	KY127496	KY128034	KY127602
L. carlosgarini	LJAMM-CNP 6468	KY127497	KY128044	KY127564
L. crandalli	LJAMM-CNP 12225	KY127671	KP121318	KY127563
L. crandalli	LJAMM-CNP 12220	KY127458	KY127666	KP121240
L. choique	LJAMM-CNP 7770	MG660038	KP121329	MG660169
L. dicktracyi	LJAMM-CNP 5816	MG660052	MG660002	KY127612
L. elongatus	LJAMM-CNP 8085	KY127509	KY128122	KY127560
L. elongatus	LJAMM-CNP 10975	KY127455	KY127635	KY127565
L. elongatus	LJAMM-CNP 12987	KY127460	KY127690	KY127587
L. elongatus	LJAMM-CNP 3573	KY127484	KY127883	KY127591
L. elongatus	LJAMM-CNP 4872	KY127489	KY127922	KY127588
L. elongatus	LJAMM-CNP 3578	KY127485	KY127888	KY127603
L. elongatus	LJAMM-CNP 6853	KY127498	KY128060	KY127612
L. elongatus	LJAMM-CNP 8085	KY127509	KY128122	KP121241
L. flavipiceus	LJAMM-CNP 7906	MG660056	KP121330	MG660163
L. heliodermis	LJAMM-CNP 8569	MG660048	MG660001	KP121227
L. kriegi	LJAMM-CNP 2613	KP121213	KJ494114	KP121233
L. kriegi	LJAMM-CNP 5562	KJ493993	KJ494190	KJ493962
L. kriegi	LJAMM-CNP 13870	KJ493997	KJ494246	MG660143
L. kriegi	LJAMM-CNP 3565	MG660025	KJ494150	-
L. kriegi	LJAMM-CNP 2733	MG660026	KJ494124	MG660144
L. kriegi	LJAMM-CNP 5383	MG660027	KJ494184	-
L. parvus	LJAMM 2704	AY173905	AY173610	MG660171
L. parvus	BYU 47106	AY173906	AY367809	MG660171
L. parvus	LJAMM-CNP 2711	AY173906	AY367809	MG660166
L. petrophilus	LJAMM-CNP 11355	KP121211	KP789552	KP789577

Species assignation	Collection ID	GenBank accession no.		
		12S	Cytochrome b	KIF 24
L. petrophilus	LJAMM-CNP 6982	KP121216	KP121326	MG660164
L. petrophilus	LJAMM-CNP 5481	MG660049	JN846994	-
L. petrophilus	BYU 47098	AY173867	AY173672	MG660165
L. petrophilus	LJAMM-CNP 11224	MG660050	JN847096	-
L. petrophilus	BYU 47089	AY173865	AY173674	-
L. petrophilus	BYU 47094	AY173880	AY173811	KF968331
L. petrophilus	LJAMM-CNP 11121	KF969091	KF968901	-
L. petrophilus	BYU 47095	AY173882	AY173677	KF968151
L. petrophilus	LJAMM-CNP 11122	KF969092	-	KP121228
L. punmahuida	LJAMM-CNP 2649	MG660424	KP121336	KY127603
L. shitan	LJAMM-CNP 6853	KY127498	KY128060	KP121229
L. smaug	LJAMM-CNP 2679	KY127477	KY127823	KY127582
L. smaug	LJAMM-CNP 2764	KY127479	KY127836	KY127610
L. smaug	LJAMM-CNP 7770	KY127505	KY128095	KY127611
L. smaug	LJAMM-CNP 7916	KY127506	KY128105	-
L. smaug	LJAMM-CNP 7887	-	KY128098	-
L. smaug	LJAMM-CNP 14061	-	KY127736	KJ493966
L. sp A	LJAMM-CNP 13991	KJ494001	KJ494060	KJ493974
L. sp A	LJAMM-CNP 5339	KJ493992	KJ494180	-
L. sp A	LJAMM-CNP 14152	KJ494006	KJ494074	-
L. sp A	LJAMM-CNP 14197	KJ493980	KJ494087	-
L. sp A	LJAMM-CNP 14187	KJ494005	KJ494082	KJ493972
L. sp A	LJAMM-CNP 3433	-	KJ494142	-
L. sp A	LJAMM-CNP 3293	KJ493985	KJ494140	-
L. sp A	LJAMM-CNP 5388	-	KJ494185	-
L. sp A	LJAMM-CNP 6462	-	KJ494211	KJ493976
L. sp B	LJAMM-CNP 5756	KJ494193	KJ493991	KJ493970
L. sp B	LJAMM-CNP 2667	KJ494008	KJ494120	-
L. sp B	LJAMM-CNP 7758	KJ493988	KJ494213	-
L. sp B	LJAMM-CNP 7962	-	KJ494220	-
L. sp B	LJAMM-CNP 8694	-	KJ494224	-
L. sp B	LJAMM-CNP 12174	KJ493996	KJ494240	KJ493961
L. sp C	LJAMM-CNP 12148	KJ493995	KJ494020	KJ493969
L. sp C	LJAMM-CNP 2615	-	-	-
L. sp C	LJAMM-CNP 6159	-	KJ494199	-
L. sp C	LJAMM-CNP 7660	-	KJ494212	KJ493971
L. sp D	LJAMM-CNP 2758	KJ494130	KJ493984	
L. sp D	LJAMM-CNP 2754	KJ494127		KJ493977
L. sp D	LJAMM-CNP 5797	-	KJ494195	-
L. sp D	LJAMM-CNP 5808	-	KJ494197	-
L. sp D	LJAMM-CNP 7893	-	KJ494214	-
L. sp D	MIC 1602	-	KJ494234	-
L. sp D	LJAMM-CNP 2682	-	KJ494122	-
L. sp D	LJAMM 2744	KJ493983	AY367810	-
L. sp 6	LJAMM-CNP 2532	KJ493981	KJ494105	KJ493963
L. sp 6	LJAMM-CNP 13907	KJ493998	KJ494035	MG660160
L. talampaya	LJAMM-CNP 2737	MG660043	AY173552	KJ493965
L. tregenzai	LJAMM-CNP 13918	KJ494000	KJ494039	MG660201
L. tulkas	LJAMM-CNP 4227	AY367842	AY367813	MG660161
L. umbrifer	LJAMM-CNP 5031	MG660046	MG659999	

S2 File. Taxonomic composition of each clade of the *Liolaemus elongatus* group.

***Liolaemus elongatus* group**

***Liolaemus punmahuida* clade**

- *Liolaemus flavipiceus*
- *Liolaemus punmahuida*

***Liolaemus elongatus-petrophilus* clade**

***Liolaemus petrophilus* clade**

- *Liolaemus austromendocinus*
- *Liolaemus parvus*
- *Liolaemus petrophilus*

***Liolaemus capillitas* clade**

- *Liolaemus capillitas*
- *Liolaemus dicktracyi*
- *Liolaemus heliodermis*
- *Liolaemus talampaya*
- *Liolaemus tulkas*
- *Liolaemus umbrifer*

***Liolaemus elongatus-kriegi* clade**

***Liolaemus elongatus sensu stricto* clade**

- *Liolaemus antumalguen*
- *Liolaemus burmeisteri*
- *Liolaemus carlosgarini*
- *Liolaemus choique*
- *Liolaemus crandalli*
- *Liolaemus elongatus*
- *Liolaemus shitan*
- *Liolaemus smaug*

***Liolaemus kriegi* clade**

- *Liolaemus buergeri*
- *Liolaemus kriegi*
- *Liolaemus tregenzai*
- *Liolaemus zabalai*
- *Liolaemus sp A*
- *Liolaemus sp B*
- *Liolaemus sp C*
- *Liolaemus sp D*
- *Liolaemus sp 6*

S3 File. Results obtained by DEC.

We compare the results obtained by DEC. The best Likelihood scores were obtained with the Matrix II to which a cost of geographic barriers was applied (Table S1). Based on this, we show the results of DEC+j recovered with Matrix II.

The biogeographic reconstructions recovered with DEC, under different matrices show some incongruence (Table S2 and Fig. S1). The ancestral area of the *Liolaemus elongatus* group corresponds to Area F (Patagonian Province; P: 0.89) for the Matrix I. However, for Matrix II the ancestral range of the *L. elongatus* group is formed by CF (Monte Province; P: 0.87). From here, the *L. elongatus* group diversifies into two clades: *L. punmahuida* and the *L. elongatus-petrophilus* clade. The *L. punmahuida* clade originates from the ancestral area F (Patagonian Province; P:1) for both matrices. The ancestral range of the *L. elongatus-petrophilus* clade corresponds to CF (Monte Province and Patagonian Province; P:0.91 for Matrix I; P:1 for Matrix II).

Inside the *L. elongatus-petrophilus* clade, the *L. petrophilus* clade remained in its ancestral range, CF (Provincia de Monte and Provincia Patagonica; P:0.91 for Matrix I; P:1 for Matrix II). Inside the *L. petrophilus* clade, the ancestral range of the *L. capillitas* clade is most likely in C (Provincia de Monte; P: 1).

On the other hand, the group sister of the *L. petrophilus* clade is the *L. elongatus-kriegi* clade, and the ancestral range of it most likely to corresponds F (Provincia Patagonica; P:0.72 for Matrix I; P:0.86 for Matrix II). The ancestral range of the *L. kriegi* clade corresponds to FG (Provincia de Maule and Provincia Patagonica; P:0.53 for Matrix I; P:0.78 for Matrix II). Finally, the *L. elongatus* sensu stricto clade has its ancestral area in F (Provincia Patagonica M1 P:1, M2 P:0.86).