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SUPPLEMENTARY ONLINE MATERIAL FOR

**Growth dynamics and body size evolution of South American  
long-necked chelid turtles: a bone histology approach**

Maria Eugenia Pereyra, Paula Bona, Ignacio Alejandro Cerda, Juan Marcos

Jannello, Marcelo Saúl De La Fuente, and Bárbara Desántolo

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**Supplementary Online Material**

Table 1. Cumulative growth, yearly growth rate, daily growth rate, and LAG circumference of each individual.

Table 2. Cumulative growth, yearly growth rate, and daily growth rate of the humerus of *Yaminuechelys maior* MPEFPV-599.

Fig. 1. Charts showing the measurements taken in the humerus and femur of *Hydromedusa tectifera* MLPR-6411 and in the humerus of *Yaminuechelys maior* MPEFPV-599.

Fig. 2. Comparison of dorsal carapaces and plastrons.

Fig. 3. Transverse sections showing the growth marks of each sample.

Fig. 4. Transverse sections showing the growth marks of each sample of *Hydromedusa tectifera*.

Table 1. Cumulative growth, yearly growth rate, daily growth rate, and LAG circumference of each individual.

Specimen	Element		Cumulative thickness in each main axis of the bone (mm)				Mean distance between the LAGs (mm)	Rate of growth/year (mm)	Rate of growth/day (245 days of activity) ( $\mu\text{m}$ )	Rate of growth/day (365 days of activity) ( $\mu\text{m}$ )	Circumference of LAGs (mm)
			Medial	Dorsal	Lateral	Ventral					
MLPR 6411	Humerus	LAG 1	0.764	1.051	0.982	0.584	0.845	-	-	-	5.540
		LAG 2	0.814	1.082	1.018	0.653	0.892	0.047	0.190	0.127	5.825
		LAG 3	0.872	1.128	1.079	0.798	0.969	0.078	0.316	0.212	6.297
		LAG 4	0.968	1.189	1.139	0.961	1.064	0.095	0.388	0.260	6.929
		LAG 5	1.074	1.236	1.234	1.074	1.155	0.090	0.368	0.247	7.398
		LAG 6	1.183	1.323	1.281	1.181	1.242	0.087	0.357	0.240	7.498
		LAG 7	1.262	1.395	1.315	1.338	1.328	0.086	0.349	0.234	8.445
		LAG 8	1.328	1.494	1.375	1.494	1.423	0.095	0.389	0.261	8.999
		LAG 9	1.419	1.569	1.421	1.563	1.493	0.070	0.287	0.192	9.431
		LAG 10	1.458	1.604	1.460	1.631	1.538	0.045	0.185	0.124	9.769
		LAG 11	1.515	1.669	1.508	1.740	1.608	0.070	0.285	0.191	10.219
		LAG 12	1.638	1.736	1.579	1.822	1.694	0.086	0.350	0.235	10.712
		LAG 13	1.711	1.803	1.635	1.910	1.765	0.071	0.290	0.195	11.158
		LAG 14	1.770	1.829	1.681	1.994	1.819	0.054	0.219	0.147	11.485
		LAG 15	-	1.852	-	-	1.852	0.034	0.137	0.092	-
		LAG 16	-	1.874	-	-	1.874	0.022	0.090	0.060	-
	subperiosteal	1.801	1.903	1.724	2.061	-	-	-	-	11.896	
	Femur	LAG 1	0.781	1.256	0.751	0.830	0.905	-	-	-	5.868
		LAG 2	0.935	1.452	0.916	0.969	1.068	0.164	0.660	0.440	6.753
		LAG 3	1.100	1.607	1.103	1.206	1.254	0.186	0.750	0.510	7.985
		LAG 4	1.256	1.770	1.296	1.481	1.451	0.197	0.800	0.530	9.239
		LAG 5	1.419	1.931	1.497	1.766	1.653	0.203	0.820	0.550	10.291
		LAG 6	1.603	2.045	1.557	1.909	1.779	0.125	0.510	0.340	11.041
		LAG 7	1.689	2.132	1.660	1.912	1.848	0.070	0.280	0.190	11.884
		LAG 8	1.770	2.215	1.792	2.048	1.956	0.108	0.440	0.290	12.598
		LAG 9	1.854	2.306	1.881	2.119	2.040	0.084	0.340	0.220	13.142
LAG 10		1.942	2.390	2.003	2.210	2.136	0.096	0.390	0.260	13.702	
subperiosteal		2.052	2.486	2.060	2.287	-	-	-	-	14.320	

MLPR-6291	Humerus	LAG 1	0.781	0.772	0.726	0.485	0.691	-	-	-	5.356
		LAG 2	1.012	0.974	1.049	0.844	0.970	0.279	1.14	0.764	6.074
		subperiosteal	1.191	1.106	1.161	1.123	-	-	-	-	7.179
	Femur	LAG 1	0.691	0.571	0.575	0.817	0.664	-	-	-	4.257
		LAG 2	0.860	0.890	0.823	1.053	0.907	0.243	1.14	0.764	5.69
		subperiosteal	1.077	1.159	1.067	1.238	-	-	-	-	7.244
MLPR-6747	Humerus	subperiosteal	0.91	0.752	0.91	0.859	-	-	-	-	5.387
	Femur	LAG 1	0.702	0.786	0.676	0.782	-	-	-	-	4.747
		subperiosteal	0.769	0.883	0.769	0.858	-	-	-	-	5.215

Table 2. Cumulative growth, yearly growth rate, and daily growth rate of the humerus of *Yaminuechelys maior* MPEFPV-599.

	Cumulative thickness in the dorsal area (mm)	Rate of growth/year (mm)	Rate of growth/day (249 days of activity) ( $\mu\text{m}$ )	Rate of growth/day (371 days of activity) ( $\mu\text{m}$ )
LAG 1	4.199		1.489	1
LAG 2	4.570	0.371	0.763	0.512
LAG 3	4.760	0.190	0.389	0.261
LAG 4	4.857	0.097	0.297	0.199
LAG 5	4.931	0.074	0.244	0.164
LAG 6	4.992	0.061	0.273	0.183
LAG 7	5.060	0.068	0.14	0.094
LAG 8	5.095	0.035	0.112	0.075
LAG 9	5.123	0.028	0.104	0.070
LAG 10	5.149	0.026	0.128	0.086
LAG 11	5.181	0.032	0.184	0.123
LAG 12	5.227	0.046	0.128	0.086
LAG 13	5.259	0.032	0.0963	0.065
LAG 14	5.283	0.024	0.0602	0.040
LAG 15	5.298	0.015	0.0803	0.054
LAG 16	5.318	0.020	0.116	0.078

LAG 17	5.347	0.029	0.0722	0.049
LAG 18	5.365	0.018	0.0923	0.062
LAG 19	5.388	0.023	0.0763	0.051
LAG 20	5.407	0.019	0.0883	0.059
LAG 21	5.429	0.022	0.112	0.075
LAG 22	5.457	0.028	0.265	0.178
LAG 23	5.523	0.066	0.08433	0.057
LAG 24	5.544	0.021	0.0441	0.030
LAG 25	5.555	0.011	0.112	0.075
LAG 26	5.583	0.028	0.0722	0.049
LAG 27	5.601	0.018	0.0803	0.054
LAG 28	5.621	0.020	0.05622	0.038
LAG 29	5.635	0.014	0.0441	0.030
LAG 30	5.646	0.011	0.0522	0.035
LAG 31	5.659	0.013	0.0963	0.065
LAG 32	5.683	0.024	0.0722	0.049
LAG 33	5.701	0.018	0.0722	0.049
LAG 34	5.719	0.018	0.0481	0.032
LAG 35	5.731	0.012	0.0963	0.065
LAG 36	5.755	0.024	0.0522	0.035
LAG 37	5.768	0.013	0.0763	0.051
LAG 38	5.787	0.019	0.0722	0.049
LAG 39	5.805	0.018	0.0803	0.054
LAG 40	5.825	0.020	0.0883	0.093
LAG 41	5.847	0.022	0.0722	0.049
LAG 42	5.865	0.018	0.0642	0.043
LAG 43	5.881	0.016	0.0722	0.049
LAG 44	5.899	0.018		

Fig. 1. Charts showing the measurements taken in the humerus and femur of *Hydromedusa tectifera* MLPR-6411 and in the humerus of *Yaminuechelys maior* MPEFPV-599: A: mean of the cumulative cortical thickness taken in the four main axes of the bones; B: Annual cortical thickness taken from the cumulative thickness; C and D: Daily cortical thickness taken by the supposition of 365 and 241 days of active growth; E: cumulative cortical thickness of the dorsal area of *Yaminuechelys* and *Hydromedusa*.

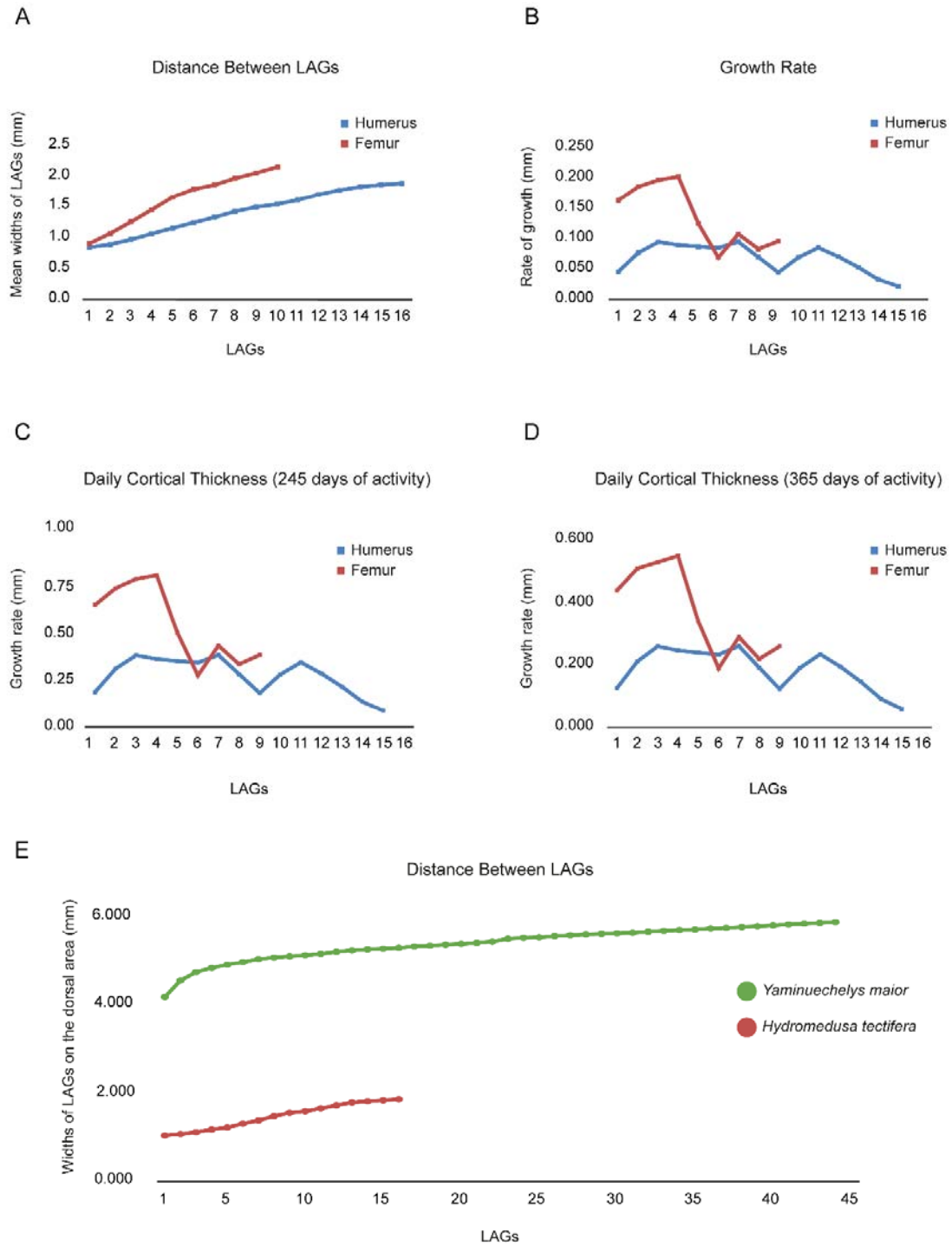


Fig. 2. Comparison of dorsal carapaces and plastrons. A: *Hydromedusa tectifera* (MLPR-6747), juvenile dorsal carapace (top) and plastron (bottom); B and D: *Hydromedusa tectifera* MLP-AC dorsal carapaces (top), and plastrons (bottom) of subadult and adult specimens, respectively; E and F: *Yaminuechelys maior* (MPEFP V 1275) anterior fragment of a dorsal carapace (left) and left hypoplastron (right) of subadult and adult specimens, respectively (modified from Bona and de la Fuente ,2005). Carapace fontanelles indicated in red.

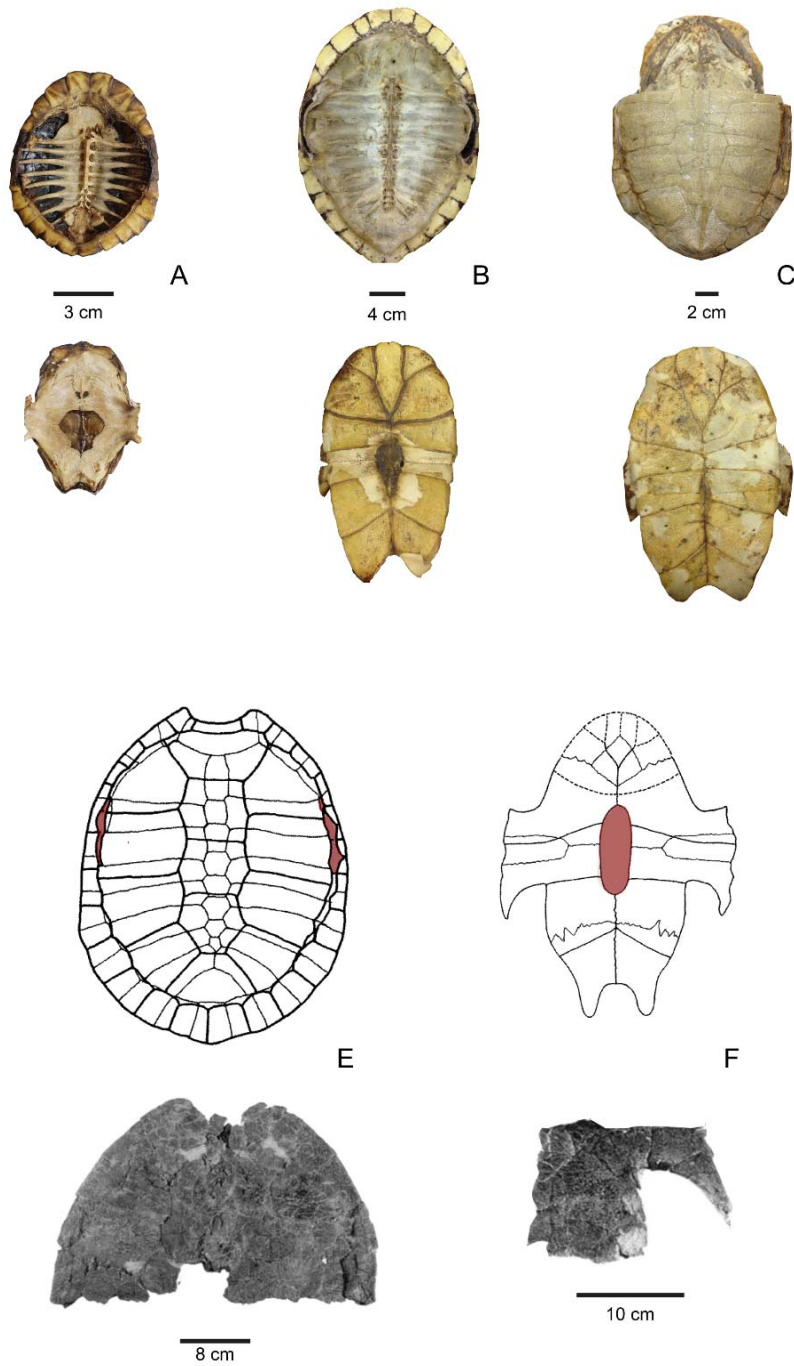


Fig. 3. Transverse sections showing the growth marks of each sample (arrows). A-I, *Yaminuechelys maior*. A, humerus of MPEFPV-599. B-C, detail of figure A. D, humerus of MLP-14-9-23-1. E-G, detail of figure D. H, femur of MPEFPV-599. I, detail of figure H. J-L, *Hydromedusa tectifera*. J, humerus of MLPR-6474. K, femur of MLPR-6474. L, humerus of MLPR-6291.

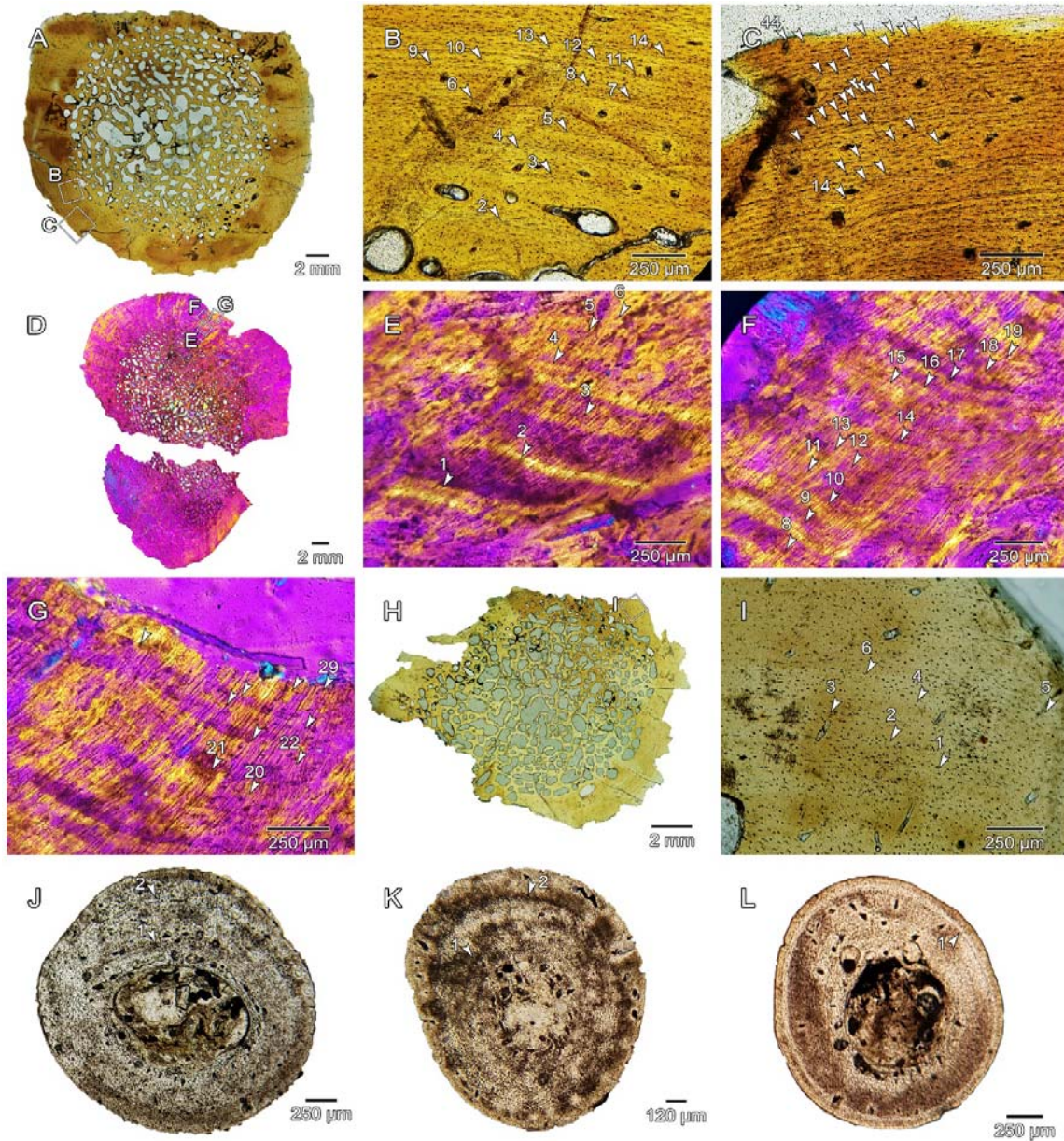


Fig. 4. Transverse sections showing the growth marks of each sample of *Hydromedusa tectifera* (color lines). A, humerus of MLPR-6411. B, femur of MLPR-6411.

