

Phylogeography and morphological evolution of *Pseudechiniscus* (Heterotardigrada: Echiniscidae)

Piotr Gąsiorek^{*†}, Katarzyna Vončina^{*}, Krzysztof Zając & Łukasz Michalczyk^{†‡}

Department of Invertebrate Evolution, Institute of Zoology and Biomedical Research, Faculty of Biology, Jagiellonian University, Gronostajowa 9, 30-387 Kraków, Poland

^{*}Equal contribution.

[†]Corresponding authors: piotr.lukas.gasiorek@gmail.com, LM@tardigrada.net

[‡]Senior authorship.

Supplementary Table 6. Spearman correlation coefficients for bioclimatic variables selected to use in ecological niche modelling for *Pseudechiniscus (M.) cf. angelus alas* and *Pseudechiniscus (P.) cf. ehrenbergi*; coefficients > |0.85| are marked in red font and bioclimatic variables selected for model calibration and projection are bolded.

Variable	bio 1	bio 2	bio 3	bio 4	bio 5	bio 6	bio 7	bio 10	bio 11	bio 12	bio 13	bio 14	bio 15	bio 16	bio 17
bio 1		0.599	0.768	-0.622	0.959	0.980	-0.445	0.975	0.986	0.610	0.600	0.393	-0.230	0.636	0.406
bio 2	0.599		0.591	-0.177	0.703	0.493	0.095	0.652	0.533	0.180	0.246	0.015	0.092	0.256	-0.003
bio 3	0.768	0.591		-0.857	0.670	0.803	-0.701	0.682	0.809	0.481	0.524	0.133	0.020	0.518	0.192
bio 4	-0.622	-0.177	-0.857		-0.456	-0.718	0.952	-0.491	-0.706	-0.442	-0.453	-0.090	0.007	-0.445	-0.174
bio 5	0.959	0.703	0.670	-0.456		0.899	-0.249	0.993	0.913	0.494	0.483	0.318	-0.208	0.525	0.322
bio 6	0.980	0.493	0.803	-0.718	0.899		-0.571	0.923	0.998	0.663	0.639	0.436	-0.274	0.674	0.462
bio 7	-0.445	0.095	-0.701	0.952	-0.249	-0.571		-0.299	-0.547	-0.396	-0.398	-0.073	0.000	-0.383	-0.161
bio 10	0.975	0.652	0.682	-0.491	0.993	0.923	-0.299		0.934	0.525	0.514	0.345	-0.218	0.554	0.350
bio 11	0.986	0.533	0.809	-0.706	0.913	0.998	-0.547	0.934		0.659	0.641	0.421	-0.255	0.675	0.445
bio 12	0.610	0.180	0.481	-0.442	0.494	0.663	-0.396	0.525	0.659		0.958	0.769	-0.440	0.978	0.818
bio 13	0.600	0.246	0.524	-0.453	0.483	0.639	-0.398	0.514	0.641	0.958		0.629	-0.220	0.990	0.676
bio 14	0.393	0.015	0.133	-0.090	0.318	0.436	-0.073	0.345	0.421	0.769	0.629		-0.768	0.676	0.968
bio 15	-0.230	0.092	0.020	0.007	-0.208	-0.274	0.000	-0.218	-0.255	-0.440	-0.220	-0.768		-0.292	-0.774
bio 16	0.636	0.256	0.518	-0.445	0.525	0.674	-0.383	0.554	0.675	0.978	0.990	0.676	-0.292		0.719
bio 17	0.406	-0.003	0.192	-0.174	0.322	0.462	-0.161	0.350	0.445	0.818	0.676	0.968	-0.774	0.719	

Supplementary Table 7. Results of the jackknife test of variable importance according to regularized training gain with each variable used in isolation for *Pseudechiniscus (M.) cf. angelus alas* and *Pseudechiniscus (P.) cf. ehrenbergi*. Variables selected for model calibration and projection are bolded.

Variable	Regularised training gain	
	<i>P. (M.) cf. angelus alas</i>	<i>P. (P.) cf. ehrenbergi</i>
bio1	1.503	1.443
bio2	1.086	1.094
bio3	1.927	1.712
bio4	2.041	1.922
bio5	1.493	1.372
bio6	1.723	1.642
bio7	1.984	1.780
bio10	1.836	1.832
bio11	1.815	1.788
bio12	1.254	1.166
bio13	1.147	1.090
bio14	1.120	1.071
bio15	1.147	1.107
bio16	1.163	1.107
bio17	1.116	1.071

Supplementary Table 8. Results of selection of the best settings of the regularization multiplier and feature classes in the Maxent for modelling of *Pseudechiniscus (M.) cf. angelus alas* and *Pseudechiniscus (P.) cf. ehrenbergi*, according to such criteria as statistical significance and omission rate at 10%.

Model	Mean AUC ratio	Partial ROC	Omission rate	Number of parameters
<i>Pseudechiniscus (M.) cf. angelus alas</i>				
M_0.1_F_h	1.994	0	0	42
M_0.1_F_lh	1.994	0	0	45
M_0.1_F_qh	1.994	0	0	39
M_0.1_F_ph	1.994	0	0	56
M_0.1_F_lqh	1.994	0	0	47
M_0.1_F_lph	1.994	0	0	52
M_0.1_F_qph	1.994	0	0	53
M_0.1_F_lqph	1.994	0	0	47
M_0.2_F_h	1.992	0	0	24
M_0.2_F_lh	1.992	0	0	20
<i>Pseudechiniscus (P.) cf. ehrenbergi</i>				
M_0.7_F_h	1.984	0	0	60
M_0.8_F_h	1.983	0	0	58
M_0.9_F_h	1.983	0	0	57
M_1_F_h	1.985	0	0	61