

Environmental correlates of the European common toad hybrid zone

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Supplementary information

TABLE S1 Locality information, sample sizes and results of molecular species identifications (b – *Bufo bufo*, s – *B. spinosus* and x – admixed). The localities and taxonomic affiliation of toad populations can also be explored through a .kml file at <https://www.repository.naturalis.nl/record/710370>. This file can be opened e.g. with Google Earth.

Population	Latitude	Longitude	Sample size	Molecular species identification
B000	49.9149	3.8468	25	b
B001	48.3449	2.7779	11	b
B002	50.8213	1.6019	22	b
B003	50.5740	1.6080	8	b
B005	50.3993	1.6059	7	b
B006	50.3006	1.6628	1	b
B008	50.0909	1.8105	4	b
B009	49.9691	1.5836	8	b
B011	49.7819	1.6058	9	b
B012	49.5975	1.1109	4	b
B013	48.2396	-0.5519	26	s
B017	48.2602	-0.4857	3	s
B018	48.5949	-0.5528	8	s
B019	48.7257	-0.2732	8	s
B020	48.9897	-0.0722	6	x
B021	49.1988	0.3273	34	x
B022	49.4348	0.7044	8	b
B023	49.6051	0.7825	3	b
B025	48.7299	3.3781	5	b

B026	48.9241	3.3781	5	b
B027	49.1188	3.4988	5	b
B028	49.2535	3.1786	5	b
B029	49.5384	3.4224	3	b
B030	49.1577	2.4995	15	b
B031	49.3484	2.7734	2	b
B032	48.0884	2.9627	1	b
B033	47.8535	2.6782	5	b
B034	48.3396	2.3832	2	b
B035	48.6612	1.8801	23	b
B036	48.3892	1.1997	10	x
B037	48.6227	0.6249	9	x
B038	48.4034	0.5492	8	s
B039	48.3948	0.3132	22	s
B040	48.3341	0.0047	8	s
B041	48.4473	-0.2010	8	s
B042	48.6538	-0.0211	8	s
B043	48.7687	0.0984	8	s
B044	48.8841	0.2514	7	x
B045	49.0399	0.5758	12	x
B046	49.4042	0.9870	1	x
B047	49.4424	0.9946	8	b
B048	49.3686	1.4808	5	b
B049	49.2608	1.1434	3	b
B050	49.1206	1.7598	7	b
B051	49.0696	1.4518	8	b

B052	49.0010	1.0988	9	b
B053	48.7585	1.2703	11	b
B054	48.6120	0.8852	2	x
B055	48.6115	0.8918	9	x
B056	48.8198	0.8355	11	x
B057	48.1019	4.0775	6	b
B058	48.0535	3.5237	8	b
B059	47.8237	3.7451	6	b
B060	47.9090	3.1969	8	b
B061	47.8916	2.4825	12	b
B062	48.0469	2.1608	8	b
B063	47.7598	1.8691	8	s
B064	47.5877	1.1557	7	x
B065	47.4933	0.4380	15	s
B066	47.3278	0.4180	7	s
B067	47.3761	0.2695	19	s
B068	47.9288	1.1106	8	s
B069	49.0184	0.2056	13	x
B070	48.4037	0.5512	19	s
B071	49.1589	0.8629	7	b
B072	49.4060	1.4867	8	b
B073	49.6167	0.7890	8	b
B074	49.3067	0.6627	8	b
B075	48.3535	0.3986	9	s
B076	48.4033	-0.2133	8	s
B077	48.0519	-0.2687	8	s

B078	47.8916	-0.2845	8	s
B079	47.8755	-0.2828	8	s
B080	47.7483	-0.2193	8	s
B081	47.5260	-0.0195	8	s
B082	47.3696	1.0847	8	s
B083	48.1284	0.9028	8	s
B084	48.1897	1.3486	8	x
B085	48.3914	2.0296	8	b
B086	47.9626	1.9765	8	b
B087	47.8993	1.6566	13	x
B088	47.6214	1.6800	8	s
B089	47.3301	1.5789	8	s
B090	47.3440	2.1116	8	s
B091	47.4454	2.5914	12	x
B092	47.6310	2.9313	8	b
B093	47.1870	2.4399	13	s
B094	47.0072	2.0946	8	s
B095	46.8233	2.0823	8	s
B096	46.6494	2.6930	8	b
B097	46.3007	2.9488	8	x
B098	46.6614	3.1848	8	b
B099	46.9644	3.2576	1	b
B100	46.9693	3.2858	8	b
B101	46.8138	3.5821	8	b
B102	47.0174	3.9855	8	b
B103	46.8126	4.2778	20	b

B104	46.5771	4.0161	20	b
B105	46.2317	3.6929	3	b
B106	46.2367	3.6792	20	b
B107	44.9794	4.1686	4	s
B108	44.9256	4.5675	8	s
B109	45.0117	4.8338	2	s
B110	44.8712	4.8496	11	s
B111	44.8907	5.0002	7	s
B112	44.9614	5.1564	20	s
B113	45.0579	5.4193	1	s
B114	45.0138	5.7816	1	b
B115	45.0290	5.7874	8	b
B116	46.3077	4.7233	8	b
B117	46.6687	4.7078	20	b
B118	47.3519	4.1044	8	b
B119	47.1853	3.5700	8	b
B120	46.8460	2.6224	8	x
B121	47.3040	3.1344	6	b
B122	47.5009	3.5882	8	b
B123	47.6458	2.4130	8	s
B124	48.5607	1.5848	7	b
B125	48.3108	1.0340	7	s
B126	45.9646	3.4962	8	b
B127	45.9152	4.2250	8	b
B128	45.9892	5.6170	1	b
B129	45.9624	5.5833	8	b

B130	45.2875	6.0758	2	b
B131	45.2788	5.4659	1	b
B132	45.2487	3.7135	28	s
B133	45.6559	3.9196	30	x
B134	46.3550	2.1839	6	s
B135	46.1349	2.5464	15	x
B136	45.8131	2.3013	8	s
B137	45.7007	2.0379	3	s
B138	49.2000	-2.2000	27	s
B139	48.5719	0.5949	22	s
B140	48.5999	0.6389	20	x
B141	48.6792	0.7463	52	x
B142	48.7194	0.8320	10	x
B143	48.5433	0.5076	32	s
B144	48.4475	-0.2012	8	s
B145	48.8957	1.3633	10	b
B146	47.6716	-0.2654	8	s
B147	47.3098	-0.2194	1	s
B148	47.2814	-0.1320	11	s
B149	48.7997	1.0162	23	x
B150	45.7761	2.2858	6	s
B151	46.1340	2.5456	4	x
B152	45.9300	2.4120	1	s
B153	45.9956	2.4663	1	s
B155	45.8769	2.3700	18	s
B156	46.0441	2.4980	10	x

B158	46.1646	2.5230	11	x
B159	45.7806	2.2967	8	s
B160	47.7950	0.3720	8	s
B161	44.6284	6.1295	8	s
B162	44.5408	6.0117	9	s
B163	44.5544	5.9869	9	s
B164	45.7684	6.5080	9	b
B165	45.0730	5.8553	9	b
B166	44.4857	6.1086	9	s
B167	44.4025	6.2639	9	s
B168	44.0666	6.2529	8	s
B169	45.1561	5.8744	7	b
B170	44.8630	5.8585	7	s
B171	51.9532	4.5421	7	b
B172	52.3430	4.5538	10	b
B173	52.3596	4.5549	10	b
B174	46.3154	6.8087	10	b
B175	46.2728	6.7707	14	b
B176	47.5600	-0.4800	8	s
B177	47.5600	-0.4720	8	s
B178	47.5580	-0.4120	8	s
B179	47.4400	-0.4600	7	s
B180	50.6100	1.5900	8	b
B181	52.7510	-1.4103	19	b
B182	52.6732	-1.3344	24	b
B183	52.7575	-1.2991	17	b

B184	52.6579	-0.7684	8	b
B185	52.6194	-1.3574	17	b
B186	48.7237	0.8267	18	x
B187	48.8862	1.3809	23	b
B188	48.4434	-0.1317	20	s
B189	42.7364	-0.7604	5	s
B190	42.6634	-0.1126	3	s
B191	42.5876	-0.0131	2	s
B192	42.2787	2.5902	2	s
B194	41.1610	-3.3150	3	s
B195	39.3313	-7.3233	3	s
B196	36.9739	-3.3226	4	s
B197	36.8706	-4.0802	2	s
B198	40.3757	-8.3663	3	s
B199	41.4017	-1.8199	1	s
B200	39.8514	-4.0144	2	s
B201	38.0070	-8.4338	7	s
B202	36.5167	-4.9817	1	s
B203	39.5176	-5.3480	2	s
B204	40.2531	-5.2758	9	s
B205	40.3112	-5.7135	1	s
B206	42.8847	2.7333	9	s
B207	43.3591	3.3554	9	s
B208	43.0457	-1.0736	6	s
B209	43.8725	-1.2591	4	s
B210	40.2301	-5.5734	4	s

B211	40.2184	-5.5889	10	s
B212	43.5857	4.7762	9	s
B213	43.6109	4.7904	6	s
B214	44.2202	4.7447	14	s
B215	44.2883	4.5913	7	s
B216	44.4268	4.6457	21	s
B217	44.7964	4.7240	20	s
B218	44.7738	5.3467	22	s
B219	44.9334	5.2612	29	s
B220	44.6440	5.4202	20	s
B221	44.5569	5.1116	31	s
B222	44.2419	5.9618	10	s
B223	43.9618	5.2724	10	s
B224	43.9511	5.2554	2	s
B225	43.7656	5.3525	6	s
B226	43.3806	5.2963	33	s
B227	43.5315	5.5149	32	s
B228	43.5678	5.9949	8	s
B229	43.2829	5.9177	20	s
B230	43.1359	6.2033	21	s
B231	43.3266	6.3991	13	s
B232	43.5898	6.3902	20	s
B233	43.5204	6.8838	10	s
B234	43.6567	6.6806	24	s
B235	43.6143	6.9658	17	s
B236	43.9378	6.5371	1	s

B237	45.7867	5.7449	20	b
B238	45.9727	6.1430	25	b
B239	46.4021	5.7886	26	b
B240	46.3580	5.5556	13	b
B241	46.1801	4.7625	14	b
B242	45.9036	5.3043	9	b
B243	45.5927	5.4506	16	b
B244	45.5648	4.9561	23	b
B245	45.3772	5.0997	29	b
B246	45.3093	4.6480	26	x
B247	45.3927	4.2440	17	x
B248	45.6669	4.3606	25	b
B249	43.1672	5.7851	12	s
B250	43.3390	6.1891	11	s
B251	43.6561	5.9101	20	s
B252	43.7623	5.5008	26	s
B254	43.6260	6.2201	3	s
B255	43.5597	6.0219	1	s
B256	43.7509	5.2017	1	s
B257	43.7840	5.0181	1	s
B258	43.7895	5.0439	9	s
B259	43.9125	5.1053	1	s
B260	44.2152	4.7916	2	s
B261	44.2174	4.7500	1	s
B262	44.6161	4.7120	1	s
B263	44.7751	4.7366	1	s

B264	44.8117	5.1059	28	s
B265	45.1700	5.2356	42	b
B266	45.2229	5.2364	29	b
B267	45.2820	5.2129	3	b
B268	45.4177	5.1095	10	b
B269	45.4721	4.2829	21	b
B270	45.5002	4.1994	8	x
B271	45.6094	4.3331	2	b
B272	45.7134	4.5575	20	b
B273	45.8202	4.6336	19	b
B274	46.3056	5.0072	2	b
B275	46.2969	5.0138	17	b
B276	46.3681	5.0495	6	b
B277	46.3631	5.2232	4	b
B278	46.3947	5.6048	27	b
B279	46.4173	5.6489	1	b
B280	46.3865	5.6978	19	b
B281	46.3292	5.6292	1	b
B282	46.2809	5.3591	10	b
B283	46.0808	5.2790	12	b
B284	46.0430	6.2469	41	b
B285	46.1391	6.4197	24	b
B286	45.5324	6.0562	42	b
B287	45.5354	5.5387	6	b
B288	45.5321	5.3684	21	b
B289	45.5114	5.4247	1	b

B290	45.4967	5.4114	2	b
B291	45.4091	5.2690	11	b
B292	44.7251	5.2671	5	s
B293	44.7165	5.3508	4	s
B294	44.7038	5.1065	5	s
B295	44.6952	5.1218	1	x
B296	44.6953	5.3508	1	s
B297	44.6638	5.2716	1	s
B298	44.6611	5.2761	1	s
B299	44.6476	5.2899	1	s
B300	44.6313	5.2964	1	s
B301	44.6297	5.3026	1	s
B302	44.6336	5.3042	1	s
B303	44.5778	5.3985	1	s
B304	44.5052	5.3508	11	s
B305	44.4767	5.4525	1	s
B306	44.4735	5.3711	2	s
B307	44.5128	5.2271	1	s
B308	44.5513	5.1404	1	s
B309	44.4939	5.0400	1	s
B310	44.3909	4.9972	19	s
B311	44.2569	5.1479	1	s
B312	44.2165	5.2557	1	s
B313	44.1826	5.3718	1	s
B314	44.1780	5.3999	10	s
B315	43.9167	5.4519	25	s

B316	43.9586	5.7384	11	s
B317	44.3685	5.7673	25	s
B318	43.8574	6.5064	23	s
B319	43.7954	6.9703	2	s
B320	43.8142	7.1843	18	s
B321	43.9467	7.0175	1	s
B322	43.9521	6.9442	4	s
B323	43.9291	7.1047	22	s
B325	43.5777	6.9309	17	s
B326	43.4226	6.7059	1	s
B327	43.4076	6.6954	19	s
B328	43.4712	6.4676	4	s
B329	43.4061	6.4641	14	s
B330	43.2068	6.4013	17	s
B331	43.1190	6.3185	20	s
B332	43.1622	6.1229	21	s
B333	43.3506	6.1782	22	s
B334	43.3950	5.9738	21	s
B335	43.2591	5.7975	21	s
B336	43.2718	5.6794	1	s
B337	43.4594	5.2700	20	s
B338	44.2079	6.9789	20	s
B339	44.0698	7.2284	20	s
B340	44.0415	7.2923	2	s
B341	43.9829	7.3410	1	s
B342	43.9222	7.4075	1	s

B343	43.9077	7.4115	15	s
B344	43.9816	7.5466	20	s
B345	44.0610	7.6599	23	s
B346	43.8909	7.4855	22	s
B347	43.9266	7.3292	19	s
B348	43.8757	7.2236	2	s
B349	44.4808	6.3157	1	s
B350	44.5214	6.3934	1	s
B351	44.5564	6.3192	26	s
B352	44.6660	6.1799	20	s
B353	44.7379	6.5787	22	s
B354	44.6154	6.5561	21	s
B355	43.7996	4.6739	20	s
B356	44.1108	5.1077	19	s
B357	43.8996	4.7561	19	s
B358	44.0562	5.0517	17	s
B359	51.0401	5.8533	6	b
B360	48.3560	2.7090	8	b
B361	60.0418	5.2651	12	b
B362	59.6328	5.2361	33	b
B363	50.6770	-2.109	9	b
B364	50.6500	-2.1170	9	b
B365	52.0000	2.0000	14	b
B366	57.0000	4.0000	3	b
B367	51.2797	-2.7020	4	x
B368	51.2624	-2.6770	2	b

B369	51.2608	-2.6507	8	b
B370	51.2393	-2.0933	7	b
B371	57.5880	-4.5840	22	b
B372	44.3434	8.4965	17	b
B373	44.6299	8.5687	20	b
B374	44.7162	7.3257	20	b
B375	44.9299	7.3650	35	b
B376	45.5111	7.8734	25	b
B377	44.8291	9.0381	20	b
B378	44.2695	9.4585	22	b
B379	44.1996	8.2845	1	s
B380	43.9365	8.0188	3	s
B381	43.8844	7.7722	1	s
B383	44.3057	9.2103	25	b
B384	44.5945	8.3548	8	b
B385	44.6262	7.4574	20	b
B386	44.3505	7.5344	1	b
B387	45.2194	7.5409	21	b
B388	44.4670	10.5026	27	b
B389	44.3596	11.1077	21	b
B390	44.4290	10.7775	20	b
B391	43.9786	12.1416	20	b
B392	43.4279	13.0437	9	b
B393	42.6873	13.7207	20	b
B394	42.3611	13.2650	30	b
B395	42.4306	12.8860	20	b

B396	42.6081	12.5582	23	b
B397	43.1115	12.2486	21	b
B398	43.5555	11.5685	30	b
B399	45.7917	10.0101	9	b
B400	47.6989	1.6637	6	s
B402	44.9503	2.4877	10	s
B403	44.6823	2.6675	9	s
B404	44.5986	2.6529	10	s
B405	44.2971	3.0404	10	s
B406	44.0461	4.5461	10	s
B407	45.0238	4.7770	21	s
B408	45.0470	4.7864	15	s
B409	45.0676	4.7229	19	s
B410	45.0829	4.7930	30	x
B411	45.1128	4.7402	30	x
B412	45.1476	4.7501	30	x
B413	45.1787	4.7502	30	x
B414	45.3244	4.7202	19	b
B415	45.4502	4.7307	30	x
B416	45.2469	4.7582	26	x
B417	44.9934	4.7497	33	x
B418	44.9332	4.7094	23	x
B419	44.8679	4.6822	8	s
B420	44.7782	4.6823	29	s
B421	45.1407	5.8669	90	b
B422	45.1872	5.9008	38	b

B424	45.1298	5.5876	8	b
B425	50.8760	-1.8905	20	b
B426	52.4826	0.8835	19	b
B427	50.7365	-1.3368	23	x
B428	50.6826	-1.2910	15	x
B429	50.6818	-1.2785	18	b
B430	50.6231	-1.2448	22	x
B431	50.6438	-1.3626	6	b
B432	50.6481	-1.3846	29	x
B433	45.8670	5.0823	12	b
B434	44.7000	4.2500	14	s
B435	43.7876	7.6769	15	s
B436	44.6323	8.7047	1	b
B437	45.7337	8.5527	9	b
B438	44.4286	9.0118	22	b
B439	44.0551	9.9716	10	b
B440	44.9217	9.2525	13	b
B441	44.8911	9.2648	17	b
B442	44.4412	10.6906	20	b
B443	44.4530	10.6039	20	b
B444	44.3772	10.8998	18	b
B445	43.3298	11.9377	20	b
B446	45.8652	10.9198	2	b
B447	52.7174	-1.3515	3	b
B448	52.6196	-1.3988	4	b
B449	52.7333	-1.3128	3	b

B450	52.6194	-1.3574	4	b
B451	52.7333	-1.3084	4	b
B452	52.7419	-1.3956	3	b
B453	52.7510	-1.4103	3	b
B454	52.7429	-1.4237	3	b
B455	52.7605	-1.3539	4	b
B456	52.6927	-1.2735	3	b
B457	52.7326	-1.3439	3	b
B458	52.6196	-1.4003	3	b
B459	52.6384	-1.3764	4	b
B460	52.7687	-1.3671	4	b
B461	52.7936	-1.0597	2	b
B462	52.7963	-1.0567	3	b
B463	52.6350	-1.4074	4	b
B464	46.2829	2.9273	9	b
B465	45.0167	5.1347	18	x
B466	45.0957	5.1837	22	x
B467	44.3180	7.3216	22	b
B469	43.8963	7.7429	8	s
B470	43.9922	7.7761	19	s
B471	44.0726	7.8119	16	s
B472	50.4700	6.1300	7	b
B474	50.4700	6.1500	3	b
B475	50.4700	6.1600	9	b
B476	50.4700	6.1500	9	b
B477	44.2765	8.1975	19	b

B478	44.2382	8.1125	20	b
B479	44.2031	8.0199	26	x
B480	44.1534	7.9198	12	x
B481	44.0952	7.8733	20	s
B482	44.1092	7.6142	20	s
B483	44.3118	7.5670	20	b
B484	45.9350	13.9229	18	b
B485	45.6778	10.7808	20	b
B486	45.9462	12.0133	20	b
B487	46.4625	13.4491	20	b
B488	45.8975	13.9888	20	b
B489	46.1102	13.7702	18	b
B490	45.9193	13.4276	13	b
B491	46.3160	13.2524	12	b
B492	45.8402	13.1831	11	b
B493	46.4167	13.9921	12	b
B494	46.2126	13.4135	12	b
B495	46.4749	12.6172	12	b
B496	45.8298	3.5220	20	b
B497	45.6408	3.4999	20	x
B498	45.7046	3.7026	1	s
B499	45.4986	3.6077	4	x
B500	45.5096	3.5907	1	s
B501	45.3195	3.7138	20	s
B502	45.2822	3.2676	18	s
B504	44.9832	3.2026	16	s

B506	45.4000	3.9569	20	x
B507	45.5217	3.9151	20	x
B508	45.7805	1.8575	4	s
B509	45.7510	2.0593	5	s
B510	45.6284	1.8520	5	s
B511	45.8200	2.0342	1	s
B512	46.0564	3.0168	2	s
B514	50.6500	-2.1117	358	b
Norway_A1	60.0835	05.2384	5	b
Norway_A3	60.0091	05.1935	18	b
Norway_B1	59.7841	05.2553	5	b
Norway_B2	59.8201	05.1810	7	b
Norway_B4	59.7359	05.2905	7	b
Norway_FB	60.3035	05.5061	20	b
Norway_FN	60.1656	05.9369	20	b
Norway_FV	59.6538	05.6744	23	b
Norway_M1	59.6992	05.3794	20	b
Norway_M2	59.7037	05.3937	21	b
Norway_S10	59.9089	05.3758	14	b
Norway_S1	59.7772	05.4685	12	b
Norway_S12	59.7765	05.3678	14	b
Norway_S3	59.9482	05.3302	21	b
Norway_S6	59.7725	05.4775	19	b
Norway_S8	59.8245	05.3336	21	b
Norway_T1	60.0172	05.4853	2	b
Norway_T2	59.9092	05.6029	26	b

Norway_T3	59.9884	05.6848	4	b
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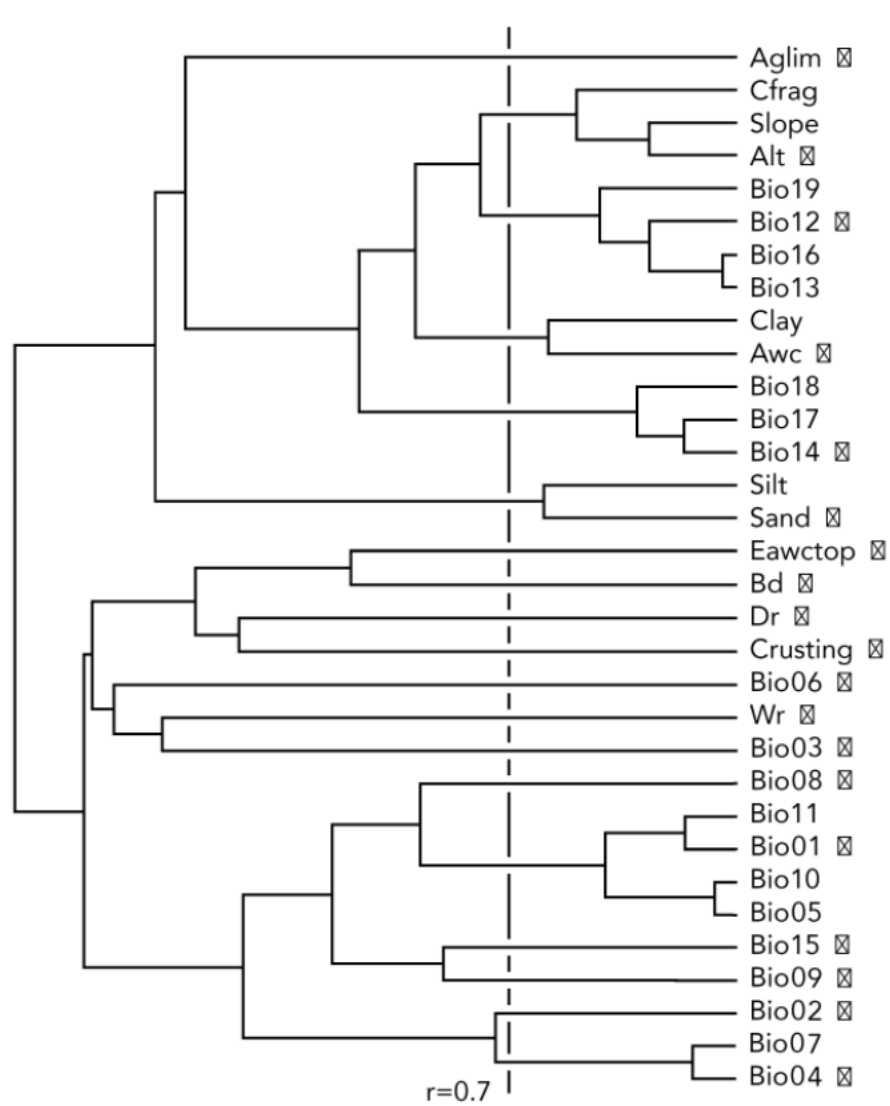


FIGURE S1 Analysis of colinearity for 32 environmental explanatory variables from the WorldClim and ESDAC databases extracted for all continental localities with *Bufo bufo* and *B. spinosus* populations located within the area covered by fig. 1. Pearson correlation coefficients were subjected to clustering with UPGMA in Primer-e software (Clarke and Gorley, 2006). Variables were retained using criteria of partial independence at $r < 0.7$ and subsequently selected in alphanumeric order. Selected variables are shown by boxes and described in table 1. Note that the categorical Corine land use classification was dealt with separately.

Reference

Clarke, K.R. & Gorley, R.N. (2006) *Manual PRIMER-e Software*. PRIMER-e Ltd., Plymouth.