

Supplementary Material for

Genetic and morphological differences among relict marginal occurrences of *Stenobothrus eurasius* (Orthoptera)

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Table S1. Habitats of the studied *Stenobothrus eurasius* specimens (fm=female, m=male)

Code	Locality/coordinates	Natura 2000 habitat type ¹	Studied specimens
BE	Bélapátfalva: Békő 48.041°N; 20.368°E	6190 Rupicolous pannonic grasslands (<i>Stipo-Festucetalia pallentis</i>)	1 m 1 fm
BO	Bódvarákó: Esztramos 48.516°N; 20.745°E	6240* Sub-pannonic steppic grasslands and 6190 Rupicolous pannonic grasslands (<i>Stipo-Festucetalia pallentis</i>)	2 fm
BU	Budaörs: Odvas-hegy 47.467°N; 18.947°E	6240* Sub-pannonic steppic grasslands	1 m 4 fm
CE	Cerna: Munții Măcinului 45.117°N; 28.248°E	62C0*Ponto-Sarmatic steppes	2 m 1 fm
FU	Füzér: Kopaszka 48.542°N; 21.467°E	6240* Sub-pannonic steppic grasslands	1 m
GR	Greci: Munții Măcinului 45.181°N; 28.264°E	62C0* Ponto-Sarmatic steppes	1 fm
HA	Hainburg: Braunsberg 48.153°N; 16.953°E	6190 Rupicolous pannonic grasslands (<i>Stipo-Festucetalia pallentis</i>) and 6240* Sub-pannonic steppic grasslands	1 fm
IZ	Izovoarele: Dealul Consul 45.028°N; 28.517°E	62C0 *Ponto-Sarmatic steppes	1 m 2 fm
MI	Mirotslav: Mirotslavské kopce 48.937°N; 16.305°E	6240* Sub-pannonic steppic grasslands	1m Chládek (2018)
MKV	Malé Kršteňan: Veľký vrch 48.649°N; 18.453°E	6190 Rupicolous pannonic grasslands (<i>Stipo-Festucetalia pallentis</i>)	2 m 3 fm
MN	Mnichov: Oblik 50.411°N; 13.809°E	6240* Sub-pannonic steppic grasslands	1 m 2 fm
RA	Raná: Raná N50.405; 13.771°E	6240* Sub-pannonic steppic grasslands	3 m
SZ	Szárliget: Nagy-Széna-hegy 47.478°N; 18.469°E	6240* Sub-pannonic steppic grasslands	1 m 4 fm
TE	Tés: Bér-hegy 47.215°N; 18.061°E	6240* Sub-pannonic steppic grasslands	1 m 2 fm
TO	Tokaj: Kopasz-hegy 48.114°N; 21.372°E	6240* Sub-pannonic steppic grasslands	1 fm

¹based on <https://cdr.eionet.europa.eu/help/natura2000> and <https://eunis.eea.europa.eu/references/2435>

Table S2. Habitats of the involved *Stenobothrus nigromaculatus* specimens (fm=female, m=male)

Code	Locality	Natura 2000 habitat type ¹	Studied specimens
CS	Csór: Száraz-horog-völgy 47.232°N; 18.254°E	6190 Rupicolous pannonic grasslands (<i>Stipo-Festucetalia pallentis</i>)	3 fm
HO	Horenc: Čičov 50.461°N; 13.802°E	6240* Sub-pannonic steppic grasslands	2 m 1 fm
LA	Lábatlan: Pisznice 47.699°N; 18.501°E	6240* Sub-pannonic steppic grasslands	1 fm
MI	Mirosslav: Mirosslavské kopce 48.937°N; 16.305°E	6240* Sub-pannonic steppic grasslands	3 fm
NI	Nitra: Zobor Hill 48.352°N; 18.083°E	6240* Sub-pannonic steppic grasslands	2 m 2 fm
PE	Perbál: Meszes-hegy 47.591°N; 18.815°E	6190 Rupicolous pannonic grasslands (<i>Stipo-Festucetalia pallentis</i>) and 6240* Sub-pannonic steppic grasslands	2 m 7 fm
RA	Raná: Raná 50.405°N; 13.771°E	6240* Sub-pannonic steppic grasslands	1 fm
TE	Tés: Bér-hegy 47.215°N; 18.061°E	6240* Sub-pannonic steppic grasslands	2 fm
VE	Vevcice: Rudlické kopce 48.964°N; 16.053°E	6240* Sub-pannonic steppic grasslands	1 m

¹ based on <https://cdr.eionet.europa.eu/help/natura2000> and <https://eunis.eea.europa.eu/references/2435>

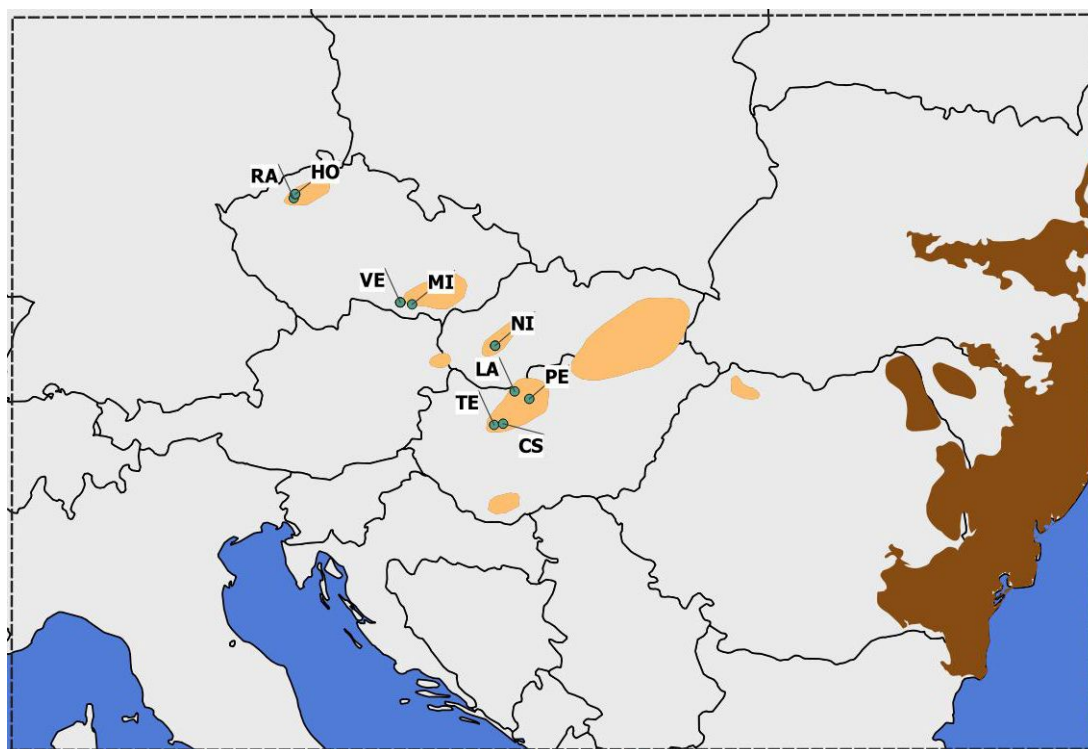


Table S3. Used data for morphological analysis (the meaning of the codes see in Fig. 2. and Table S1) (var1=b/a, var2=c/b, var3=e/d, var4=g/f, var5=i/h)

Male specimens

Code	Measured parameters (mm)					Variables		
	a	b	c	d	e	var1	var2	var3
BE1	12.055	2.768	0.929	0.616	0.595	0.230	0.336	0.966
RA1	11.464	2.705	0.851	0.639	0.329	0.236	0.315	0.515
RA2	13.225	2.641	0.836	0.704	0.446	0.200	0.317	0.634
RA3	10.901	2.714	0.916	0.606	0.372	0.249	0.338	0.614
CE1	13.473	3.022	0.988	0.711	0.455	0.224	0.327	0.640
CE2	12.848	2.755	0.918	0.703	0.415	0.214	0.333	0.590
TE1	12.061	2.978	0.951	0.697	0.415	0.247	0.319	0.595
FU1	11.384	2.599	0.857	0.681	0.488	0.228	0.330	0.717
MN1	11.55	2.558	0.881	0.561	0.372	0.221	0.344	0.663
SZ1	11.299	2.928	1.055	0.663	0.286	0.259	0.360	0.431
BU1	11.8	2.715	0.883	0.652	0.495	0.230	0.325	0.759
IZ1	12.906	2.771	0.931	0.675	0.445	0.215	0.336	0.659
MKV1								
1	11.71	2.499	0.974	0.632	0.434	0.213	0.390	0.687
MKV2								
2	12.698	2.746	0.916	0.647	0.282	0.216	0.334	0.436
MI1	13.687	3.198	0.933	0.634	0.321	0.234	0.292	0.506
Sts	13.167	3.395	1.108	0.763	0.496	0.258	0.326	0.650
Stb	14.794	3.695	1.223	0.923	0.485	0.250	0.331	0.525
Ste	14.958	3.835	1.234	0.907	0.54	0.256	0.322	0.595

MI1= *St. e. moravicus* (holotype, Miroslav) after Chládek (2018), Sts=*St. e. slovacus* (topotype, Domico), Stb= *St. e. bohemicus* (paratype, Mily), Ste= *St. e. eurasius* (topotype, Russia) after figures of Willemse (1974)

Female specimens

Code	Measured parameters (mm)				Variables	
	f	g	h	i	var4	var5
MN1	13.576	2.673	0.667	0.448	0.197	0.672
MN2	12.619	2.489	0.618	0.424	0.197	0.686
IZ1	12.596	2.416	0.474	0.476	0.192	1.004
IZ2	13.202	2.714	0.633	0.485	0.206	0.766
GR1	13.79	2.813	0.709	0.421	0.204	0.594
CE1	14.214	2.556	0.646	0.62	0.180	0.960
TO1	14.648	2.597	0.754	0.445	0.177	0.590
BO1	14.295	2.681	0.71	0.244	0.188	0.344
BO2	13.971	2.65	0.576	0.368	0.190	0.639
TE1	13.231	2.602	0.701	0.438	0.197	0.625
TE2	13.306	2.665	0.597	0.424	0.200	0.710
HA1	14.674	2.683	0.572	0.368	0.183	0.643
SZ1	14.337	2.735	0.616	0.327	0.191	0.531
SZ2	13.694	2.625	0.725	0.263	0.192	0.363
SZ3	14.642	2.947	0.649	0.436	0.201	0.672
SZ4	13.717	2.603	0.798	0.374	0.190	0.469
MKV1	13.304	2.497	0.593	0.393	0.188	0.663
MKV2	13.147	2.34	0.758	0.399	0.178	0.526
MKV3	13.162	2.686	0.689	0.329	0.204	0.478
BU1	12.658	2.84	0.652	0.468	0.224	0.718
BU2	11.991	2.667	0.61	0.604	0.222	0.990
BU3	13.504	2.506	0.644	0.439	0.186	0.682
BU4	14.179	2.73	0.556	0.345	0.193	0.621

Table S4. GenBank accession numbers of *S. eurasius* and *S. nigromaculatus*. In the brackets the length of DNA fragments was presented.

Species	Sample code	GenBank accession number			
		COI (569 bp)	cytB (516 bp)	12S-CR (472 bp)	ITS1-5.8S-ITS2 (715 bp)
<i>S. eurasius</i>	BO STE 1	OR454364	OR641180	OR463439	-
	BO STE 2	OR454365	OR641181	-	-
	BE STE 1	OR454366	OR641182	OR463440	OR455062
	BE STE 2	-	OR641183	OR463441	-
	BU STE 1	OR454367	OR641184	OR463442	-
	BU STE 2	OR454368	OR641185	-	-
	BU STE 3	OR454369	OR641186	-	OR455063
	BU STE 4	OR454370	OR641187	-	-
	BU STE 5	-	OR641188	-	-
	CE STE 1	OR454373	OR641191	OR463443	OR455065
	CE STE 3	OR454374	-	-	-
	CE STE 2	OR454375	OR641192	-	OR455066
	FU STE 1	OR454376	OR641193	OR463444	-
	GR STE 1	OR454377	OR641194	OR463445	OR455067
	HA STE 1	OR454378	OR641195	OR463446	-
	IZ STE 1	OR454381	OR641197	-	OR455069
	IZ STE 3	OR454382	OR641198	-	-
	IZ STE 2	OR454383	OR641199	-	OR455070
	MN STE 1	OR454388	OR641202	OR463450	-
	MN STE 2	OR454389	OR641203	OR463451	-
	MN STE 3	OR454390	-	-	-
	RA STE 1	-	OR641210	OR463456	-
	RA STE 2	OR454402	-	-	OR455083
	RA STE 3	OR454403	OR641211	-	OR455084
	SZ STE 1	OR454405	OR641213	OR463458	-
	SZ STE 2	OR454406	OR641215	OR463459	-
	SZ STE 3	OR454407	OR641216	OR463460	-
	SZ STE 4	OR454408	OR641217	OR463461	-
	SZ STE 5	OR454409	OR641214	-	-
	TO STE 1	OR454410	OR641218	OR463462	-
	TE STE 1	OR454411	OR641219	-	OR455085
	TE STE 2	OR454412	-	-	-
	<i>S. nigromaculatus</i>	CS STN 1	OR454371	OR641189	-
CS STN 2		-	OR641190	-	OR455064
CS STN 3		OR454372	-	-	-
HO STN 1		OR454379	OR641196	OR463447	OR455068
HO STN 2		OR454380	-	-	-
LA STN 1		OR454384	OR641200	OR463448	OR455071
MI STN 1		OR454385	-	OR463449	OR455072
MI STN 2		OR454386	OR641201	-	OR455073
MI STN 3		OR454387	-	-	OR455074
NI STN 1		OR454391	OR641204	OR463452	OR455075
NI STN 3		OR454392	-	-	OR455077
NI STN 2		OR454393	OR641205	OR463453	OR455076
NI STN 4		OR454394	-	-	-
PE STN 1		OR454395	OR641206	OR463454	OR455078
PE STN 2		OR454396	OR641207	-	OR455079
PE STN 5		OR454397	-	-	OR455082
PE STN 3		OR454398	OR641208	-	OR455080
PE STN 4	OR454399	OR641209	-	OR455081	
PE STN 6	OR454400	-	-	-	

Species	Sample code	GenBank accession number			
		COI (569 bp)	cytB (516 bp)	12S-CR (472 bp)	ITS1-5.8S-ITS2 (715 bp)
	PE STN 7	OR454401	-	OR463455	-
	RA STN 1	OR454404	OR641212	OR463457	-
	TE STN 1	OR454413	-	OR463463	-
	TE STN 2	OR454414	-	-	-
	VE STN 1	-	-	OR463464	-