Amphibia-Reptilia

Review

Evaluating taxonomic inflation: towards evidence-based species delimitation in Eurasian vipers (Serpentes: Viperinae)

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Supplementary material

Table S1. List of taxa (names according to publications) and acronyms meaning, corresponding haplotypes for cyt *b* (196 bp) as depicted in supplementary fig. S2, total length of concatenated sequences used for mtDNA Bayesian inference and Genbank accession numbers for mtDNA sequences. Length of each sequence is shown in the header. * Haplotype for *V. shemakhensis* was inferred from a smaller sequence (180 bp).

Taxa	**Acronyms meaning**	**Cyt *b* haplotype (196 bp) no.**	**Total bp**	**Cyt *b*** (1141 bp)	**ND4** (836 bp)	**16S** (530 bp)	**CR** (1137 bp)	**ND2** (1012 bp)	**ND5** (605 bp)	**COI** (920 bp)
V. berus - E Europe	Eastern European clade	35	2868	DQ186050		AJ275781	DQ186006			KC122718
V. berus - W Europe	Western European clade	34	3358	DQ186034	FR727036		DQ185985	AY321075		
V. berus - C Europe	Central European clade	34	3344	DQ186058	EU624233	KJ128962	DQ185992			KJ128676
V. berus - Carpathians		36	1553	DQ186061			DQ186009			
V. berus nikolskii		33	2574	KX694843		KX694673		EU625372		KU986308
V. berus bosniensis		39	2297	DQ186079	LT220999		DQ186022			
V. berus - Italy		38	2967	DQ186070	FR727037		DQ186014			KP697872
V. barani		37	654	AY321092						
V. seoanei		27	4622	KC176748	FR727035	AJ275782	DQ185984	AY321071		KC122736
V. renardi tienshanica - WT	Western Tien-Shan lineage	43	2021	KC176772						KC122758
V. renardi tienshanica - ET	Eastern Tien-Shan lineage	42	3379	KC316103	FR727032		JN204719			KC122756
V. lotievi - LD	Dagestan lineage	47	2821	KC176742						KC122728
V. lotievi - LC	Chechnya lineage	49	2835	FR727097	FR727030					KC122725
V. lotievi - LI	Ingushetia lineage	51	1575	KC316097						KC122726
V. dinniki		53	966	MK624990						
V. lotievi - CN Caucasus	Central North Caucasus lineage	50	2021	KC176744						KC122732
V. renardi - Crimea		48	3825	KC176764	FR745893		JN204706			KC122751
V. renardi - W	Western lineage, Eastern European lowland steppes	46	2607	KC316104			JN204713			KC122761

V. renardi - NW Caucasus	North Western Caucasus lineage	48	1995	KC176765						KC122752
V. lotievi - E	Eastern lineage	44	2021	KC176729						KC122731
V. renardi - E	Eastern lineage	44	2821	KC176766	FR727033					KC122753
V. altaica - E	Eastern lineage	45	2021	KC176743						KC122717
V. eriwanensis		41	4169	FR727092	FR727021	KX694672	JN204716			KC122722
V. shemakhensis		**	682	MG729486						
V. ebneri		40	2772	FR727095	FR727025					KC122733
V. ursinii ursinii		56	3796	FR727046	FR726970			AY321069		KC122750
V. ursinii ssp		55	2937	FR727054	FR726984		JN204695			
V. ursinii moldavica		57	2740	JN204702	FR745897		JN204701			
V. ursinii rakosiensis		58	2945	FR745953	FR727008		JN204697			
V. ursinii macrops		58	2722	KC176758	FR726983					KC122746
V. orlovi - Russia		52	1920	KC176746						KC122734
V. kaznakovi - Russia		53	2021	KC176736						KC122724
V. graeca		54	1917	FR727088	FR727018					
Vipera sakoi		31	695	MG543295						
V. darevskii – Turkey		30	2749	MT232988	MT232992	MT232989	MT232987			
V. darevskii uzumorum		30	695	MG543297						
V. darevskii - Armenia		29	699	MG543304						
V. darevskii - Georgia		29	700	MG543307						
V. darevskii kumlutasi		29	695	MG543300						
V. olguni		29	695	MG543301						
V. kaznakovi - Georgia		28	2418	KC176731		AJ275773				KC122719
V. walser		32	2537	KX357735	KX357731	KX357754	KX357718			
V. anatolica		59	1952	KC316113						KC122762
V. latastei - Iberia East NSC	Eastern Iberian	5	2271	MG875552	MG875562			MT157189		

	lineage, Northeast-Southeast Central North group									
V. latastei - Iberia East Sou	Eastern Iberian lineage, South group	6	2268	MG875553	JX649576			MT157202		
V. latastei - Iberia south	Southern Iberian lineage	9	2271	MG875551	MG875563			MT157183		
V. latastei - Iberia West CWS	Western Iberian lineage, Central West-South group	7	2271	MG875549	MG875561			MT157184		
V. latastei - Iberia West CNSW	Western Iberian lineage, Central Northwest-Southwest group	8	2271	KM244720	KM244721			MT157205		
V. latastei - NA WH-Atlas	North African clade, Western High Atlas	4	2270	MG875540	MG875560			MT157192		
V. latastei - NA Rif-E Atlas	North African clade, Rif and Eastern High Atlas	3	2273	MG875535	MG875556					
V. latastei - NA Algeria	North African clade, Algeria	1	2273	MG875547	JX649599			MT157207		
V. monticola (NA CH-Atlas)	North African clade, Central High Atlas	2	2272	MG875548	MG875558			MT157193		
V. aspis zinnikeri		24	2933	MT156828	MT157026		DQ168601	MT157187		
V. aspis aspis - France		23	3577	MT156870	MT157069		DQ168596	MT157197		KP697881
V. aspis aspis - SW Alps	South Western Alps	25	2933	AM944739	MT157114		DQ168597	AM944739		
V. aspis aspis - NW Italy	North Western Italy	26	2823	AM944366	MT232993		AM944366	AM944366		
V. aspis francisciredi - North		22	2824	AM944765	MT157115		AM944765	AM944765		
V. aspis francisciredi - Central		22	2824	AM944753	MT157112		AM944753	AM944753		

V. aspis francisciredi - South		21	2824	AM944780	MT157110		AM944780	AM944780		
V. aspis hugyi		20	2824	AM944789	MT157103		AM944789	AM944789		
V. ammodytes - NW	North Western Clade	10	2761	DQ186507		DQ186099	DQ186184	AY581259		
V. ammodytes - Montenegro		11	1761	DQ186520		DQ186102	DQ186197			
V. ammodytes - NE	North Eastern Clade	18	1763	DQ186513		DQ186100	DQ186194			
V. ammodytes - SW	South Western Clade	13	1763	DQ186500		DQ186093	DQ186177			
V. ammodytes - Cyclades		12	1763	DQ186496		DQ186092	DQ186171			
V. ammodytes - Peloponnese		19	1763	DQ186493		DQ186088	DQ186168			
V. ammodytes - South		14	1763	DQ186483		DQ186084	DQ186159			
V. ammodytes - East		15	2756	DQ186489		DQ186085	DQ186162	AY321072		
V. transcaucasiana - Turkey		16	1761	DQ186492		DQ186086	DQ186167			
V. transcaucasiana - Asia Minor		17	2771	DQ186477		DQ186083	DQ186153	AY321070		
M. lebetina		70	1717	KJ415300	DQ897729	KX694652		MT232996		KJ950727
M. schweizeri		69	994	AJ275715		AJ275768				
M. razii		68	1043	MF445994						
M. kuhrangica		75	2427	MG021056	MG042028					MG021056
M. latifii		76	2772	KX168744		JN870199			KX168948	KJ950741
M. albicornuta		77	2302	KX168718					KX168921	KJ950728
M. raddei		78	2302	KX168758					KX168970	KJ950736
M. kurdistanica		77	2302	KX168750					KX168960	KJ950738
M. bornmuelleri		79	2061	KX168731		AJ275779			KX168934	
M. bulgardaghica		82	2061	KX168739		AJ275783			KX168943	
M. albizona		81	2704	KX168723	EU624231	AJ275780		MT232997	KX168926	
M. wagneri		80	2714	KX168772	JN870213	AJ275778			KX168984	
M. xanthina - Greece		73	1664	KX168794					KX169007	

M. xanthina - Aegean		72	1664	KX168782	MT232994			MT232998	KX168994	
M. xanthina - Lycia		74	1664	KX168792	MT232995	MT232990			KX169005	
M. xanthina - Taurus		71	1664	KX168809					KX169022	
D. mauritanica - W-Atlas	Western High Atlas	65	1019	MF140583	MF140628					
D. mauritanica - Rif-Atlas	Rif and Central High Atlas	64	1019	MF140571	MF140618					
D. mauritanica - Drâa A	Drâa Valley, lineage A	66	1019	MF140553	MF140603					
D. mauritanica - Drâa B	Drâa Valley, lineage B	65	1019	MF140556	MF140606					
D. mauritanica - Anti-Atlas		65	1019	MF140535	MF140588	MT232991		MT232999		
D. mauritanica - C-East	Central East	67	1019	MF140543	MF140594					
D. mauritanica - Drâa C	Drâa Valley, lineage C	66	1019	MF140563	MF140612					
D. palaestinae		60	1416	MF140586	MF140630	AJ275775				
D. siamensis – Thailand		63	1992	AY165090	AY165065	AY352712		AY165078		
D. siamensis - China		62	1490	AY165082	AY165056			AY165069		
D. russelii		61	2545	AY165088	AY165063	AJ275776		AY165076		

Table S2. Sequences used in nuDNA inferences.

Taxa	**PRLR** (516 bp)	**NT3** (469 bp)	**Bfib** (815 bp)	**RAG1** (2343 bp)	**MC1R** (656 bp)	**CMOS** (616 bp)	**BDNF** (643 bp)
V. berus (UK)	MT233011						
V. berus (Finland)	MT233010						
V. berus bosniensis	LT221008	LT220981					LT220963
V. berus - Italy				KX357727			
V. berus nikolskii	LT221018	LT220991		KX695120		KX694795	LT220973
V. seoanei	MG875589	MG875575	MG875523	KY762212	KY762248	KY762084	
V. renardi - Crimea	LT221023	LT220996					LT220978
V. eriwanensis		KX695056				KX694794	KX694770
V. ursinii ursinii	LT221024	LT220997					LT220979
V. ursinii ssp	LT221009	LT220982					LT220964
V. ursinii moldavica	LT221017	LT220990					LT220972
V. ursinii rakosiensis	LT221019	LT220992					LT220974
V. ursinii macrops	LT221013	LT220986					LT220968
V. graeca	LT221012	LT220985					LT220967
V. walser				KX357728			
V. latastei - Iberia East NSCS	MG875587	MG875569	MG875534				
V. latastei - Iberia East Sou	MG875588	MG875572	MG875531				
V. latastei - Iberia south	MG875586	MG875566	MG875532				
V. latastei - Iberia West CWS	MG875584	MG875567	MG875530				
V. latastei - Iberia West CNSW	MT156793	MT156771	MG875533				
V. latastei - NA WH-Atlas	MG875579	MG875570	MG875528				
V. latastei - NA Rif-E Atlas	MG875591	MG875577	MG875525				
V. latastei - NA Algeria	MG875582	MG875574	MG875529				
V. monticola (NA CH-Atlas)	MG875583	MG875568	MG875526				
V. aspis zinnikeri	MT156798	MT156750			KY762247	KY762083	
V. aspis aspis - France	MG875590	MT156752					

V. aspis aspis - SW Alps	MT156809	MT156760					
V. aspis francisciredi - Central	MT156808	MT156759					
V. aspis francisciredi - South	MT156807	MT156758					
V. aspis hugyi	MT156803	MT156755				AY611906	
V. ammodytes - NW				KX357729			
M. lebetina	MT233013	KX695028	MT233000	KX695096		KX694785	KX694736
M. latifii				KX169140	KX169073		
M. albicornuta				KX169128	KX169059		
M. raddei		KX695031		KX169144	KX169079	KX694787	KX694739
M. kurdistanica				KX169142	KX169076		
M. bornmuelleri				KX169134	KX169065		
M. bulgardaghica				KX169138	KX169068		
M. albizona	MT233012			KX169130	KX169061		
M. wagneri				KX169145	KX169084		
M. xanthina - Greece					KX169091		
M. xanthina - Aegean	MT233014	MT233006		KX169147	KX169089		
M. xanthina - Lycia	MT233015	MT233007		KX169150	KX169094		
M. xanthina - Taurus				KX169155	KX169098		
D. mauritanica - W-Atlas			MT233002				
D. mauritanica - Rif-Atlas			MT233003				
D. mauritanica - C-East			MT233004				
D. mauritanica - Drâa C			MT233005				
D. mauritanica – Anti Atlas	MT233017	MT233008					
D. palaestinae			MT233001				
D.siamensis	MT233016	MT233009					
D. russellii				EU402843		AF471156	EU402636

Table S3. Uncorrected genetic distances derived from a small fragment of the cyt *b* (196 bp).

Among genera and subgenera

	Daboia	*Montivipera*	*Macrovipera*	*Pelias*	*Vipera* 1	*Vipera* 2
Daboia						
Montivipera	0.238					
Macrovipera	0.234	0.141				
Pelias	0.200	0.212	0.197			
Vipera 1	0.218	0.219	0.224	0.135		
Vipera 2	0.221	0.225	0.194	0.117	0.152	

Within *Daboia*

	D. mauritanica - W-Atlas	*D. mauritanica* - Rif-Atlas	*D. mauritanica* - C-East	*D. mauritanica* - Drâa A	*D. mauritanica* - Drâa B	*D. mauritanica* - Drâa C	*D. mauritanica* - Anti-Atlas	*D. siamensis* - China	*D. siamensis* - Thailand	*D. russelii*	*D. palaestinae*
D. mauritanica - W-Atlas											
D. mauritanica - Rif-Atlas	0.00										
D. mauritanica - C-East	0.01	0.01									
D. mauritanica - Drâa A	0.01	0.02	0.01								
D. mauritanica - Drâa B	0.01	0.01	0.01	0.01							
D. mauritanica - Drâa C	0.01	0.01	0.01	0.01	0.01						
D. mauritanica - Anti-Atlas	0.01	0.01	0.01	0.01	0.00	0.01					
D. siamensis - China	0.17	0.17	0.16	0.17	0.16	0.17	0.17				
D. siamensis - Thailand	0.17	0.17	0.16	0.17	0.16	0.17	0.16	0.02			
D. russelii	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.11	0.09		
D. palaestinae	0.15	0.16	0.15	0.16	0.16	0.16	0.15	0.21	0.15	0.14	

Within *Montivipera* and *Macrovipera*

	M. albizona	*M. bulgardaghica*	*M. wagneri*	*M. bornmuelleri*	*M. xanthina* - Aegean	*M. xanthina* - Greece	*M. xanthina* - Lycia	*M. xanthina* - Taurus	*M. raddei*	*M. albicornuta*	*M. latifii*	*M. kurdistanica*	*M. kuhrangica*	*M. schweizeri*	*M. lebetina*	*M. razii*
M. albizona																
M. bulgardaghica	0.020															
M. wagneri	0.020	0.020														
M. bornmuelleri	0.030	0.040	0.030													
M. xanthina - Aegean	0.050	0.050	0.050	0.060												
M. xanthina - Greece	0.050	0.050	0.050	0.060	0.020											
M. xanthina - Lycia	0.050	0.050	0.050	0.060	0.040	0.050										
M. xanthina - Taurus	0.060	0.060	0.060	0.060	0.060	0.050	0.060									
M. raddei	0.090	0.080	0.090	0.090	0.090	0.090	0.090	0.090								
M. albicornuta	0.080	0.080	0.090	0.090	0.090	0.090	0.090	0.090	0.010							
M. latifii	0.080	0.080	0.080	0.080	0.090	0.100	0.090	0.100	0.020	0.020						
M. kurdistanica	0.080	0.080	0.090	0.090	0.090	0.090	0.090	0.090	0.000	0.010	0.020					
M. kuhrangica	0.090	0.090	0.090	0.100	0.100	0.100	0.100	0.100	0.020	0.020	0.020	0.020				
M. schweizeri	0.070	0.080	0.070	0.070	0.100	0.110	0.100	0.090	0.100	0.100	0.080	0.100	0.100			
M. lebetina	0.100	0.090	0.100	0.080	0.100	0.110	0.110	0.110	0.100	0.100	0.070	0.100	0.120	0.020		
M. razii	0.140	0.130	0.130	0.140	0.130	0.130	0.130	0.130	0.140	0.140	0.150	0.140	0.150	0.090	0.100	

Within *Vipera* 1 and *Vipera* 2

	V. latastei - NA Rif-E Atlas	*V. monticola* (NA CH-Atlas)	*V. latastei* - NA Algeria	*V. latastei* - NA WH-Atlas	*V. latastei* - Iberia West CNSW	*V. latastei* - Iberia West CWS	*V. latastei* - Iberia East NSC	*V. latastei* - Iberia East Sou	*V. latastei* - Iberia south	*V. aspis zinnikeri*	*V. aspis aspis* - France	*V. aspis aspis* - SW Alps	*V. aspis aspis* - NW Italy	*V. aspis francisciredi* - North	*V. aspis francisciredi* - Central	*V. aspis francisciredi* - South	*V. aspis hugyi*	*V. ammodytes* - NE	*V. ammodytes* - Montenegro	*V. transcaucasiana* - Asia Minor	*V. ammodytes* - South	*V. ammodytes* - East	*V. transcaucasiana* - Turkey	*V. ammodytes* - Peloponnese	*V. ammodytes* - Cyclades	*V. ammodytes* - SW	*V. ammodytes* - NW
V. latastei - NA Rif-E Atlas																											
V. monticola (NA CH-Atlas)	0.060	mont. CH-Atlas																									
V. latastei - NA Algeria	0.030	0.060	lat. Algeria																								
V. latastei - NA WH-Atlas	0.050	0.060	0.050	lat. WH-Atlas																							
V. latastei - Iberia West CNSW	0.070	0.080	0.080	0.070	lat. West CNSW																						
V. latastei - Iberia West CWS	0.070	0.080	0.080	0.080	0.030	lat. West CWS																					

V. latastei - Iberia East NSC	0.080	0.080	0.080	0.070	0.060	0.060	lat. East NSC																			
V. latastei - Iberia East Sou	0.080	0.090	0.090	0.070	0.070	0.070	0.040	lat East Sou																		
V. latastei - Iberia south	0.080	0.080	0.090	0.090	0.070	0.070	0.060	0.070	lat. Iberia south																	
V. aspis zinnikeri	0.110	0.100	0.110	0.100	0.100	0.100	0.090	0.090	0.100	*V. aspis zinnikeri*																
V. aspis aspis - France	0.110	0.100	0.110	0.100	0.100	0.100	0.100	0.090	0.100	0.020	*V. a. aspis* - France															
V. aspis aspis - SW Alps	0.100	0.100	0.110	0.100	0.100	0.100	0.090	0.090	0.100	0.020	0.010	*V. a. aspis* – SW Alps														
V. aspis aspis - NW Italy	0.110	0.100	0.110	0.100	0.100	0.100	0.090	0.090	0.100	0.020	0.010	0.010	*V. a. aspis* – NW Italy													
V. aspis franciscirediі - North	0.100	0.100	0.110	0.100	0.100	0.100	0.100	0.090	0.100	0.050	0.050	0.040	0.040	*V. aspis franciscirediі* - North												
V. aspis franciscirediі - Central	0.100	0.100	0.100	0.100	0.090	0.090	0.100	0.090	0.100	0.040	0.040	0.040	0.040	0.010	*V. aspis franciscirediі* - Central											
V. aspis franciscirediі - South	0.100	0.100	0.110	0.100	0.100	0.100	0.100	0.090	0.100	0.050	0.040	0.040	0.040	0.020	0.010	*V. aspis franciscirediі* - South										
V. aspis hugyi	0.110	0.110	0.110	0.100	0.100	0.100	0.100	0.100	0.100	0.050	0.050	0.050	0.050	0.030	0.030	0.030	*V. aspis hugyi*									
V. ammodytes - NE	0.130	0.130	0.140	0.130	0.130	0.120	0.130	0.120	0.120	0.120	0.120	0.130	0.130	0.110	0.110	0.110	0.120	*V. ammodytes* - NE								
V. ammodytes - Montenegro	0.140	0.120	0.140	0.130	0.130	0.120	0.130	0.120	0.130	0.120	0.130	0.130	0.130	0.110	0.110	0.110	0.120	0.030	*V. ammodytes* Montenegro							
V. transcaucasiana - Asia Minor	0.170	0.170	0.170	0.170	0.170	0.170	0.180	0.170	0.180	0.170	0.170	0.170	0.170	0.160	0.160	0.160	0.160	0.040	0.040	*V. transcaucasiana* - Asia Minor						
V. ammodytes - South	0.150	0.150	0.150	0.150	0.150	0.140	0.140	0.150	0.150	0.130	0.140	0.130	0.130	0.130	0.120	0.120	0.120	0.050	0.040	0.030	*V. ammodytes* - South					
V. ammodytes - East	0.160	0.170	0.160	0.160	0.170	0.160	0.170	0.160	0.170	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.140	0.050	0.040	0.040	0.020	*V. ammodytes* - East				
V. transcaucasiana - Turkey	0.140	0.150	0.150	0.150	0.140	0.140	0.150	0.150	0.140	0.140	0.140	0.140	0.140	0.130	0.120	0.120	0.120	0.040	0.040	0.020	0.030	0.030	*V. ammodytes* - Turkey			
V. ammodytes - Peloponnese	0.150	0.140	0.150	0.140	0.140	0.140	0.150	0.150	0.140	0.140	0.140	0.140	0.140	0.120	0.120	0.120	0.130	0.040	0.040	0.040	0.050	0.050	0.040	*V. ammodytes* Peloponnese		
V. ammodytes - Cyclades	0.160	0.140	0.150	0.140	0.150	0.140	0.150	0.150	0.150	0.130	0.140	0.130	0.130	0.130	0.120	0.120	0.130	0.040	0.040	0.040	0.050	0.050	0.050	0.040	*V. ammodytes* - Cyclades	
V. ammodytes - SW	0.130	0.120	0.150	0.130	0.140	0.130	0.130	0.130	0.130	0.120	0.130	0.130	0.130	0.120	0.110	0.110	0.120	0.030	0.030	0.040	0.040	0.040	0.040	0.040	0.040	*V. ammodytes* - SW
V. ammodytes - NW	0.180	0.180	0.180	0.180	0.180	0.180	0.190	0.170	0.180	0.170	0.170	0.170	0.170	0.160	0.160	0.160	0.160	0.040	0.030	0.060	0.060	0.060	0.050	0.050	0.050	0.040

Within *Pelias*

	V. seoanei	*V. berus* - Italy	*V. berus bosniensis*	*V. berus* - W Europe	*V. berus* - C Europe	*V. berus* - E Europe	*V. berus* - Carpathians	*V. walser*	*V. barani*	*V. berus nikolskii*	*V. renardi* - W	*V. renardi* - Crimea	*V. renardi* - NW Caucasus	*V. lotievi* - CN Caucasus	*V. lotievi* - LI	*V. altaica* - E	*V. lotievi* - E	*V. renardi* - E	*V. lotievi* - LD	*V. renardi tienshanica* - WT	*V. renardi tienshanica* - ET	*V. ursinii macrops*	*V. kasnakovi* - Russia	*V. orlovi* - Russia	*V. kasnakovi* - Georgia	*V. anatolica*	*V. lotievi* - LC	*V. eriwanensis*	*V. ebneri*	*V. ursinii rakosiensis*	*V. ursinii ursinii*	*V. ursinii* ssp	*V. ursinii moldavica*	*V. graeca*	*V. darevskii* - Turkey	*V. darevskii* - Armenia	*V. darevskii kumlutasi*	*V. darevskii uzumorum*	*V. olgami*	*V. saki*	*V. darevskii* - Georgia	*V. shemakhensis*	*V. dinniki*
V. seoanei																																											
V. berus - Italian	0.05	*V. berus* - Italy																																									
V. berus bosniensis	0.06	0.02	*V. berus bosniensis*																																								
V. berus - W Europe	0.05	0.02	0.02	*V. berus* - W Europe																																							
V. berus - C Europe	0.05	0.02	0.02	0.00	*V. berus* - C Europe																																						
V. berus - E Europe	0.05	0.02	0.02	0.01	0.01	*V. berus* - E Europe																																					
V. berus - Carpathians	0.06	0.02	0.02	0.01	0.02	0.02	*V. berus* - Carpathians																																				
V. walser	0.08	0.06	0.06	0.04	0.05	0.05	0.04	*V. walser*																																			
V. barani	0.05	0.01	0.01	0.01	0.01	0.01	0.01	0.05	*V. barani*																																		
V. berus nikolskii	0.05	0.03	0.03	0.02	0.02	0.02	0.02	0.04	0.02	*berus nikolskii*																																	
V. renardi - W	0.08	0.06	0.06	0.05	0.05	0.05	0.05	0.06	0.05	0.03	*V. renardi* - W																																
V. renardi - Crimea	0.08	0.07	0.07	0.05	0.06	0.06	0.05	0.06	0.06	0.04	0.01	*V. renardi* - Crimea																															
V. renardi - NW Caucasus	0.08	0.07	0.07	0.05	0.06	0.06	0.05	0.06	0.06	0.04	0.01	0.00	*V. renardi* - NW Caucasus																														
V. lotievi - CN Caucasus	0.09	0.08	0.08	0.07	0.07	0.07	0.07	0.08	0.07	0.05	0.02	0.01	0.01	*V. lotievi* - CN Caucasus																													
V. lotievi - LI	0.09	0.08	0.07	0.07	0.07	0.07	0.07	0.08	0.07	0.05	0.02	0.01	0.01	0.02	*V. lotievi* - LI																												
V. altaica - E	0.09	0.08	0.08	0.06	0.06	0.06	0.06	0.07	0.06	0.04	0.01	0.01	0.01	0.02	0.02	*V. altaica* - E																											
V. lotievi - E	0.09	0.08	0.08	0.07	0.07	0.07	0.06	0.08	0.07	0.05	0.02	0.01	0.01	0.02	0.02	0.01	*V. lotievi* - E																										
V. renardi - E	0.09	0.08	0.08	0.07	0.07	0.07	0.06	0.08	0.07	0.05	0.02	0.01	0.01	0.02	0.02	0.01	0.00	*V. renardi* - E																									
V. lotievi - LD	0.08	0.07	0.07	0.05	0.06	0.06	0.05	0.05	0.06	0.04	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	*V. lotievi* - LD																							
V. renardi tienshanica - WT	0.09	0.08	0.08	0.07	0.08	0.08	0.06	0.08	0.07	0.05	0.02	0.02	0.02	0.03	0.03	0.02	0.02	0.02	0.03	*V. renardi tienshanica* - WT																					
V. renardi tienshanica - ET	0.09	0.08	0.08	0.06	0.06	0.06	0.06	0.07	0.06	0.04	0.01	0.01	0.01	0.02	0.02	0.01	0.01	0.01	0.02	0.01	*V. renardi tienshanica* - ET																				
V. ursinii macrops	0.09	0.06	0.06	0.05	0.05	0.05	0.05	0.08	0.05	0.04	0.05	0.05	0.05	0.07	0.07	0.06	0.05	0.05	0.05	0.06	0.05	*V. ursinii macrops*																			
V. kasnakovi - Russia	0.09	0.08	0.08	0.07	0.07	0.07	0.07	0.06	0.07	0.05	0.05	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.04	0.06	0.05	0.07	*V. kasnakovi* - Russia																		
V. orlovi - Russia	0.09	0.09	0.09	0.07	0.08	0.08	0.07	0.07	0.08	0.06	0.05	0.05	0.05	0.06	0.06	0.05	0.06	0.06	0.05	0.07	0.05	0.07	0.01	*V. orlovi* - Russia																	
V. kasnakovi - Georgia	0.12	0.09	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.09	0.09	0.09	0.10	0.10	0.10	0.11	0.11	0.08	0.11	0.10	0.10	0.10	0.10	*V. kasnakovi* - Georgia																
V. anatolica	0.09	0.06	0.06	0.04	0.05	0.05	0.04	0.06	0.05	0.05	0.07	0.07	0.07	0.08	0.07	0.07	0.07	0.07	0.07	0.07	0.06	0.06	0.07	0.07	0.08	*V. anatolica*															
V. lotievi - LC	0.09	0.08	0.06	0.06	0.06	0.06	0.06	0.07	0.06	0.04	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.01	0.06	0.05	0.05	0.09	0.07	*V. lotievi* - LC														

V. eriwanensis	0.09	0.08	0.08	0.06	0.07	0.07	0.06	0.08	0.07	0.04	0.02	0.03	0.03	0.04	0.04	0.03	0.03	0.03	0.03	0.03	0.02	0.05	0.06	0.07	0.11	0.08	0.03	*V. eriwanensis*															
V. ebneri	0.08	0.07	0.07	0.05	0.06	0.06	0.05	0.06	0.06	0.03	0.01	0.02	0.02	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.01	0.04	0.05	0.06	0.09	0.06	0.02	0.01	*V. ebneri*														
V. ursinii rakosiensis	0.09	0.06	0.06	0.05	0.05	0.05	0.05	0.08	0.05	0.04	0.05	0.05	0.05	0.07	0.07	0.06	0.05	0.05	0.05	0.06	0.05	0.00	0.07	0.07	0.10	0.06	0.06	0.05	0.04	*V. ursinii rakosiensis*													
V. ursinii ursinii	0.09	0.06	0.05	0.05	0.05	0.05	0.05	0.06	0.05	0.04	0.05	0.04	0.04	0.05	0.04	0.05	0.04	0.04	0.04	0.05	0.04	0.04	0.05	0.06	0.08	0.04	0.04	0.05	0.04	0.04	*V. ursinii ursinii*												
V. ursinii ssp	0.11	0.08	0.08	0.06	0.06	0.06	0.06	0.07	0.06	0.05	0.05	0.04	0.04	0.05	0.04	0.05	0.04	0.04	0.04	0.05	0.04	0.04	0.05	0.06	0.08	0.04	0.05	0.05	0.04	0.04	0.03	*V. ursinii ssp*											
V. ursinii moldavica	0.10	0.07	0.07	0.05	0.06	0.06	0.05	0.08	0.06	0.05	0.05	0.05	0.05	0.06	0.06	0.05	0.05	0.05	0.06	0.05	0.04	0.01	0.06	0.06	0.11	0.05	0.05	0.06	0.05	0.01	0.03	0.04	*V. ursinii moldavica*										
V. graeca	0.08	0.06	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.04	0.03	0.04	0.04	0.05	0.05	0.04	0.04	0.04	0.03	0.04	0.03	0.04	0.05	0.05	0.08	0.05	0.04	0.04	0.03	0.04	0.03	0.03	0.04	*V. graeca*									
V. darevskii - Turkey	0.11	0.08	0.08	0.06	0.07	0.07	0.06	0.06	0.07	0.07	0.08	0.07	0.07	0.08	0.08	0.08	0.08	0.08	0.07	0.09	0.08	0.09	0.07	0.08	0.04	0.05	0.08	0.09	0.08	0.09	0.07	0.05	0.08	0.07	*V. darevskii* - Turkey								
V. darevskii - Armenia	0.10	0.08	0.08	0.06	0.06	0.06	0.06	0.06	0.06	0.07	0.07	0.08	0.08	0.09	0.09	0.08	0.09	0.09	0.07	0.09	0.08	0.08	0.08	0.08	0.04	0.06	0.08	0.09	0.08	0.08	0.07	0.06	0.09	0.06	0.01	*V. darevskii* - Armenia							
V. darevskii kumlutasi	0.10	0.08	0.08	0.06	0.06	0.06	0.06	0.06	0.06	0.07	0.07	0.08	0.08	0.09	0.09	0.08	0.09	0.09	0.07	0.09	0.08	0.08	0.08	0.08	0.04	0.06	0.08	0.09	0.08	0.08	0.07	0.06	0.09	0.06	0.01	0.00	*V. darevskii kumlutasi*						
V. darevskii uzumorum	0.11	0.08	0.08	0.06	0.07	0.07	0.06	0.06	0.07	0.07	0.08	0.07	0.07	0.08	0.08	0.08	0.08	0.08	0.07	0.09	0.08	0.09	0.07	0.08	0.04	0.05	0.08	0.09	0.08	0.09	0.07	0.05	0.08	0.07	0.00	0.01	0.01	*V. darevskii uzumorum*					
V. olguni	0.10	0.08	0.08	0.06	0.06	0.06	0.06	0.06	0.06	0.07	0.07	0.08	0.08	0.09	0.09	0.08	0.09	0.09	0.07	0.09	0.08	0.08	0.08	0.08	0.04	0.06	0.08	0.09	0.08	0.08	0.07	0.06	0.09	0.06	0.01	0.00	0.00	0.01	*V. olguni*				
V. sakoi	0.10	0.08	0.09	0.07	0.08	0.08	0.07	0.06	0.08	0.08	0.08	0.09	0.09	0.10	0.10	0.09	0.10	0.10	0.08	0.11	0.09	0.09	0.08	0.09	0.05	0.08	0.09	0.10	0.09	0.09	0.08	0.07	0.10	0.07	0.05	0.04	0.04	0.05	0.04	*V. sakoi*			
V. darevskii - Georgia	0.10	0.08	0.08	0.06	0.06	0.06	0.06	0.06	0.06	0.07	0.07	0.08	0.08	0.09	0.09	0.08	0.09	0.09	0.07	0.09	0.08	0.08	0.08	0.08	0.04	0.06	0.08	0.09	0.08	0.08	0.07	0.06	0.09	0.06	0.01	0.00	0.00	0.01	0.00	0.04	*V. darevskii* - Georgia		
V. shemakhensis	0.08	0.07	0.06	0.05	0.06	0.05	0.05	0.07	0.06	0.03	0.02	0.02	0.02	0.03	0.03	0.03	0.02	0.02	0.02	0.03	0.02	0.04	0.06	0.07	0.09	0.06	0.02	0.01	0.01	0.04	0.04	0.05	0.05	0.03	0.08	0.08	0.08	0.08	0.08	0.09	0.08	*V. shemakhensis*	
V. dinniki	0.09	0.08	0.08	0.07	0.07	0.07	0.07	0.06	0.07	0.05	0.05	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.04	0.06	0.05	0.07	0.00	0.01	0.10	0.07	0.05	0.06	0.05	0.07	0.05	0.05	0.06	0.05	0.07	0.08	0.08	0.07	0.08	0.08	0.08	0.06	*V. dinniki*

Table S4. Haplotypes for each of the nuDNA markers depicted in fig. 3.

Taxa	PRLR	NT3	Bfib (1/2)	RAG1 (1/2)	MC1R	CMOS	BDNF
V. berus bosniensis	7	14					4,5
V. berus - Finland	6						
V. berus - UK	6	14					
V. berus - Italy				8/-			
V. berus nikolskii	6,8	14		-/5		1	4
V. seoanei	4	1,17	10,11/-		2		
V. renardi - Crimea	15,16	23,24					1
V. eriwanensis		20				1	8,9
V. ursinii ursinii	13	20					7
V. ursinii ssp	12	20					1
V. ursinii moldavica	10	20,21					1
V. ursinii rakosiensis	11	22					1
V. ursinii macrops	14	20					1
V. graeca	14	5					7
V. walser				7/-			
V. latastei - Iberia East NSC	19,20	11	1/-				
V. latastei - Iberia East Sou	21,22	2,3	1/-				
V. latastei - Iberia south	17,18	1,12	3/-				
V. latastei - Iberia West CWS	17	1,2	1/-				
V. latastei - Iberia West CNSW	17,22	2	4/-				
V. latastei - NA WH-Atlas	17	1	1,5/-				
V. latastei - NA Rif-E Atlas	17	1	2/-				
V. latastei - NA Algeria	17	1,13	1,8/-				
V. monticola (NA CH-Atlas)	17	1	1,6/-				
V. aspis zinnikeri	5	1,2	12,13/6,7		3		
V. aspis aspis - France	1,9	17,19					
V. aspis aspis - SW Alps	1	17,18					
V. aspis francisciredi - Central	1,3	10,16					
V. aspis francisciredi - South	1	15					
V. aspis hugyi	1,2	10				1	
V. ammodytes - NW				9/-			
M. lebetina	25	7	7/1	-/6		2	2
M. latifii				5/1	1		
M. albicornuta				6/4	1		
M. raddei		7		5/1	1	3	3
M. kurdistanica				5/1	1		
M. bornmuelleri				2/1	1		
M. bulgardaghica				2/1	1		
M. albizona	26			1,2/1,2	1		
M. wagneri				2/1	1		
M. xanthina - Greece	26				1		

M. xanthina - Aegean	26	4,9		5/1	1		
M. xanthina - Lycia		4,9		5/3	1		
M. xanthina - Taurus				3,4/1	1		
D. mauritanica - W-Atlas			-/3				
D. mauritanica - Rif-Atlas			-/2				
D. mauritanica - C-East			-/3,4				
D. mauritanica - Drâa C			-/3				
D. mauritanica – Anti-Atlas	23,24	8					
D. palaestinae			9/5				
D. siamensis	27	6		-/7,8		4	6

Table S5. Information on morphological variability for each of the 40 species of Eurasian vipers currently recognized in the Reptile Database (2019), including 14 morphological traits and criteria used to diagnose species (DIAGNOSIS). Morphological traits comprise: maximum total length (MTotL, in mm; for females, males, or for both sexes pooled when marked with **, from Phelps 2010); mode / range (minimum – maximum) for apical (APICA) and loreal (LOR) scales, and dorsal rows at midbody (D-ROWS); mean / range (minimum – maximum) for intercanthal + intrasupraocular (INTER), ventral (VENT), and subcaudal for females (SUBC-F) and males (SUBC-M) scales; range (minimum – maximum) for canthal (CAN), supraocular (SUPROC), supralabial (SUPRLAB), infralabial (INFRLAB) and periocular (PERIOC) scales, and number of dorsal marks (D-MARK); and description of dorsal coloration (D-COL). Main references for each species are listed (REF). In the case of the modal and mean values, information was retrieved for specific groups or subspecies from references signalled in bold. In ventral scales, mean values for females (F) and males (M) are provided when available. * indicates data retrieved from one specimen only;. NA indicates non-available data. Data highlighted in grey were retrieved from specimens measured by the authors. References are extended in supplementary list S1.

SPECIES	MTotL	APICA	INTER	CAN	SUPROC	SUPRLAB	INFRLAB	PERIOC	LOR	VENT	SUBC-F	SUBC-M	D-ROWS	D-COL	D-MARK	DIAGNOSIS	REF
Daboia mauritanica	1800**	3 / 2 - 3	55.33 / 33 - 79	2	2 - 4	9 - 12	13 - 15	11 - 18	16.94 / 12 - 24	F: 171.13 M: 170.75 / 157 - 176	31.58 / 44 - 51	39.28 / 40 - 51	27 / 25 - 29	blotches	21 - 34	dorsal draw, and head scalation and shape differ from *D. deserti* (now *D. mauritanica*)	**Nilson and Andren, 1988**; Herrmann et al., 1992; Martínez-Freiría et al., 2017
Daboia palaestinae	1143, 1200	2 / 1 - 2	34.27 / 20 - 43	2	1	8 - 12	10 - 15	11 - 15	9.45 / 6 - 13	165.95 / 158 - 171	34.28 / 33 - 38	39.9 / 36 - 45	25 / 23 - 27	blotches	28 - 37	differences in pigmentation in relation to *D. russelii*	**Volynchik, 2011**; Martínez-Freiría et al., 2017
Daboia russelii	1600**	3 / 2 -3	37.08 / 24 - 59	2	1	NA	NA	NA	12.75 / 8 - 17	F: 169.55 M: 164.26 / 153 - 180	46.66 / 41 - 56	50.55 / 43 - 63	29 / 27 - 33	blotches	19 - 34	genetic divergence and dorsal draw differs from *D. siamensis*	Wüster et al., 1992; Thorpe et al., 2007
Daboia siamensis	920, 1110	2 / 2	33.55 / 23 - 43	2	1	NA	NA	NA	11.92 / 9 - 15	F: 164 M: 163.5 / 157 - 176	44.5 / 44 - 45	45.5 / 43 - 48	29 / 27 - 31	blotches	22 - 34	genetic divergence and dorsal draw differs from *D. russelii*	**Wüster et al., 1992**; Thorpe et al., 2007
Macrovipera lebetina	2180**	3 / 2 - 4	60.03 / 37 - 73	2	1 - 5	9 - 11	9 - 15	11 - 18	13.53, 14.47, 15 / 5 - 13	F: 168.86 M: 165.62 / 146 - 177	43 / 35 - 49	43.87 / 41 - 51	25 / 25 - 27	blotches - bars	31 - 46	25 dorsal rows differ from *M. schweizeri*; scale accounts and shape from *M. razii*	Herrmann et al., 1992; **Oraie et al., 2018**
Macrovipera razii	1580**	1*	65*	2	1 - 3	10 - 12	13 - 17	13 - 18	F: 15.7 M: 15.2 / 12 - 20	F: 175.5 M: 173.6 / 171 - 178	46.15 / 42 - 52	NA / 35 - 53	25 / 24 - 27	bars, uniform	NA	genetic divergence and scale accounts (vent) and shape differ from *M. lebetina*	Moradi et al., 2014; **Oraie et al., 2018**

Macrovipera schweizeri	985**	2 / 2	58.09 / 30 - 72	2	2 - 3	10 - 11	11 - 13	14 - 16	12.09 / 11 - 17	F:151.7 M: 152.3 / 142 - 160	38 / 38 - 44	37 / 47 - 40	23 / 23 - 25	blotches - bars	32 - 36	low body size and 23 dorsal rows; geographic isolation from other *Macrovipera*	Herrmann et al., 1992; **Nilson et al., 1999**
Montivipera albizona	785, NA	2 / 2 - 2	54.5 / 53 - 56	1 - 2	1	9	11-12	12	NA	F: 156 M: 155 / 149 - 155	26 / 23 - 30	NA / 23 - 30	23 / 23 - 23	wide blotches	33 - 40	colour-pattern	Nilson et al., 1990; **Goçmen et al., 2009, 2014a**; Stümpel et al., 2016
Montivipera bornmuelleri	756, 565	3 / 3 - 3	50.1 / 42 - 61	1 - 2	1	8 - 9	11 - 13	11 - 15	10.33 / 6 - 13	F: 147.8 M: 148.4 / 142 - 153	25.6 / 23 - 26	26.4 / 28 - 31	23 / 23 - 25	blotches	29 - 65	head and body pholidotic and colour-pattern traits	**Nilson and Andren, 1986**; Stümpel et al., 2016
Montivipera bulgardaghica	750**	3 / 3 - 3	40.3 / 35 - 43	1	1	9	11 - 13	9 - 11	7.66 / 6 - 9	F: 145 M: 152 / 145 - 156	25 / 32 - 36	28 / NA	23 / 23 - 25	blotches	26 - 47	head scales and colour-pattern	**Nilson and Andren, 1986**; Stümpel et al., 2016
Montivipera kuhrangica	NA, 667*	3 / 3 - 3	44*	2	1	9 - 11*	13*	13 - 16*	8 / NA	F: NA M: 163 / NA	NA	37 / NA	23 / NA	blotches	NA	shape of the supraocular scales; pholidotic and colour-pattern traits	**Rajabizadeh et al., 2011**; Stümpel et al., 2016
Montivipera latifii	700, 780	3 / 2 - 3	41.6 / 35 - 48	2 - 3	1	8 - 12	9 - 13	10 - 15	8.44 / 7 - 10	F: 164.2 M: 165.4 / 157 - 169	32.4 / 29 - 39	36.48 / 34 - 38	23 / 21 - 25	zigzag, uniform, stripped	35 - 50	head and body pholidotic and colour-pattern traits	**Nilson and Andren, 1986**; **Rajabizadeh et al.,** 2011, **2012**; Stümpel et al.,2016
Montivipera raddei	790, 992	2 / 2 - 5	41.7, 44.2 / 30 - 52	1 - 3	1	9 - 10	10 - 14	12 - 18	8.1 / 5 - 11	F: 169, 170.7 M: 174.3 / 163 - 181	29.4, 30 / 27 - 34	31.9, 32.5 / 28 - 35	23 / 21 - 25	blotches	33 - 46	shape of the supraocular scales; head and body pholidotic and colour-pattern traits; size of the tail	**Nilson and Andren, 1986**; Rajabizadeh et al., 2011; Stümpel et al., 2016
Montivipera wagneri	1000**	2 / 2 - 4	43 / 43 - 47	1-2	1	9	12 - 13	12 - 14	8.64 / 6 - 11	F: 164.5 M: NA / 161 - 170	26.55 / 24 - 31	30.57 / 29 - 32	23 / 23 - 23	blotches	23 - 37	head and body pholidotic and colour-pattern traits	**Nilson and Andren, 1986**; **Goçmen et al., 2014a**; Stümpel et al., 2016
Montivipera xanthina	1300**	2 / 2 - 2	42.4 / 31 - 52	1	1	9 - 11	8 - 14	11 - 14	8.75 / 2 - 13	F: 153.4, 161.2 M: 155.5, 163.5 / 147 - 169	29.8, 31.2 / 27 - 33	32.1, 34.3 / 30 - 38	23 / 21 - 25	wide blotches	23 - 33	head and body pholidotic and colour-pattern traits	**Nilson and Andren, 1986**; Stümpel et al.,2016
Vipera altaica	399, 388	1 / 1 - 1	/ 7 - 19	2	1	9*	10*	10*	6 / -	F: 145.86 M: 145.86 / 142 - 155	27.2 / 24 - 29	35.4 / 33 - 38	21 / 19 - 22	angular zigzag, bars	65*	number of ventral scales, scalation and colouration differ from *V. renardi*; phylogenetically nested within *V. renardi*	**Nilson and Andren, 2001**; **Tuniyev et al., 2010**; Zinenko et al., 2015

Vipera ammodytes	712, 937	11.11, 12.06, 14.05 / 4 - 19	43.96, 45.43, 50.64 / 37 - 67	2	1	9 - 10	11 - 13	10 - 12	5, 6, 7 / 5 - 8	F: 138.22, 152.99, 154.57 M: 141.43 / 130 - 164	28, 29.68, 31.05 / 22 - 35	34.1, 36.03, 36.31 / 29 - 44	21 / 21 - 23	blotches, angular zigzag	25 - 59	very welll differentiated horn; high genetic divergence	**Saint-Girons, 1978**; Tomović & Džukić, 2003; Tomović, 2006; Tomović et al., 2010; Ursenbacher et al., 2008
Vipera anatolica	296, 368	1 / 1 - 2	13.43 / 10 - 18	1	1	8 - 9	9 - 11	9 - 11	5 / 4 - 7	F: 118.5, 122.1 M: 118.2, 122.1 / 114 - 124	23, 23.4 / NA	30.6, 32.4 / 30 - 31	19 / 19 - 21	blotches	34 - 42	low number of dorsal blotches, ventral scales and high number of loreal scales in relation to the *ursinii* complex; high genetic divergence	Billing, 1985; Nilson and Andren, 2001; **Goçmen et al., 2014b, 2017**
Vipera aspis	730, 705	2 / 2 - 3	23.88, 28, 37.53 / 7 - 56	2	1	9 - 11	11 - 13	9 - 11	4, 5, 6 / 4 - 6	F: 144.48, 147.58, 148.25 M: 143.46, 145.94, 146.63 / 135 - 158	34.09, 31.76, 32.27 / 27 - 42	39.03, 41.45, 41.7 / 33 - 50	21 / 19 - 23	variable: blotches, bars, zigzag, uniform, melanistic	20 - 75	moderate horn with 2-3 apical scales; high genetic divergence	**Saint-Girons, 1978**; Zuffi, 2002; Ursenbacher et al., 2006a; Barbanera et al., 2009
Vipera barani	574, 504	2 / 2 - 2	24.14 / 23 - 40	2	1	9 - 10	9 - 12	8 - 14	4.83 / 3 - 11	F: 143.7 M: 144 / 138 - 147	30.78 / 26 - 37	35 / 34 - 36	21 / 21 - 23	bars	51 - 53	geographic isolation and some morphological differences with *V. berus*	**Joger et al., 1997; Avci et al., 2004**
Vipera berus	705, 653	2 / 1 - 2	11.08, 14.94, 15.58 / 6 - 30	2	1	9	10 - 12	8 - 11	2, 3, 4 / 2 - 5	F: 144.9, 147.24, 153.5 M: 141.75, 144.18, 148.17 / 132 - 158	28.6, 30.78, 32.33 / 23 - 38	38.75, 38.87, 39.25 / 32 - 46	21 / 19 - 23	variable: bars, zigzag, uniform, melanistic	40 - 86	round snout, 2 apical scales; high genetic divergence	**Saint-Girons, 1978**; Ursenbacher et al., 2006b
Vipera darevskii	480, 450	2 / 1 - 2	6.6, 8.3 / 2 - 12	2	1	7 - 11	8 - 11	8 - 12	4.4 / 2 - 7	F: 134, 136.9 M: 134.5, 134.6 / 129 - 144	29.4, 29.64 / 24 - 33	34.6, 36 / 29 - 39	21 / 19 - 21	bars	58 - 68	morphological and colouration differences from *V. kaznakovi* and *V. dinniki*	Orlov and Tuniyev, 1990; Goçmen et al., 2014a; **Tuniyev et al., 2018a**
Vipera dinniki	486, 412	1 / 1 - 2	13.36 / 9 - 23	2	1	8 - 11	8 - 12	9 - 12	4.77 / 2 - 9	F: 133.9 M: 133.9 / 126 - 141	23.7 / 18 - 30	32.2 / 31 - 37	21 / 21 - 23	variable: uniform, bars, stripped, blotches	55 - 80	morphological and colouration differences from *V. kaznakovi* and *V. darevskii*; phylogenetically nested within *V. kaznakovi*	**Orlov and Tuniyev, 1990**; Nilson et al., 1994; Zinenko et al., 2015

Vipera eriwanensis	566, 420	1 / 1 - 2	12.07 / 9 - 19	2	1	8 - 8*	NA	9 - 9*	5.6 / 3 - 10	F: 137.6 M: 137.6 / 133 - 143	26 / 23 - 30	35 / 32 - 39	21 / 19 - 22	botches	54 - 79	It differs from other *Acridophaga* members in colouration, number of ventral scales and arrangements in the head scales; low-moderate divergence from *V. renardi*	Kutrup et al., 2005; Nilson and Andren, 2001; **Tuniyev et al., 2010**; Ferchaud et al., 2012; Zinenko et al., 2015
Vipera graeca	484, 460	1 / 1 - 2	10.82 / 7 - 20	2	1	NA	NA	NA	2.93 / 3 - 7	F: 126 M: 124.5 / 119 - 133	22 / 13 - 26	25 / 21 - 29	19 / 19 - 19	angular zigzag	45 - 58	morphological and colouration differences in relation to other *Acridophaga* members; high genetic divergence	**Nilson and Andren, 2001**; Mizsei et al., 2017
Vipera kaznakovi	600, 475	1 / 1 - 2	15.77 / 5 - 12	2	1	8 - 10	8 - 12	8 - 12	5 / 3 - 9	F: 138.43 M: 133.56 / 124 - 143	27.7 / 24 - 32	36.44 / 34 - 40	20 / 21 - 23	variable: wide blotches, melanistic, bars	46 - 90	morphological and colouration differences from *V. darevskii* and *V. dinniki;* paraphyletic	**Saint-Girons, 1978**; **Orlov and Tuniyev**, 1990; **Tuniyev and Ostrovskikh 2001**; Zinenko et al., 2015
Vipera latastei	720, 675	5 / 3 - 9	36.9, 41.363 / 25 - 51	2	1	9 - 10	11 -13	9 - 11	8 / 6 - 9	F: 131.07, 141.56 M: 130.64, 140.62 / 122 - 147	33.82, 34.65 / 29 - 39	40.9, 41.5 / 35 - 47	21 / 19 - 23	wide, wavy blotches, angular zigzag	23 - 59	horn with 3-9 apical scales ; high genetic divergence	**Saint-Girons, 1978**; Brito et al., 2006, 2008; Velo-Antón et al., 2012
Vipera lotievi	600**	1 / 1 - 1	/ 5 - 16	2	1	NA	NA	NA		F: 141.29 M: 141.29 / 137 - 146	25.3 / 23 - 27	35.5 / 33 - 38	21 / 20 - 21	blotches	59 - 81	It differs from other members of the *Acridophaga* complex in colouration, high number of ventral scales and particular arrangements in the head scales; nested within *V. renardi*	**Nilson and Andren, 2001**; **Tuniyev et al., 2010**; Ferchaud et al., 2012; Zinenko et al., 2015
Vipera magnifica	500**	1 / 1 - 2	9.8 / 8 - 11	2	1	NA	NA	NA		F: 140.5 M: 138.67 / 135 - 142	27.5 / 27 - 28	34.33 / 33 - 36	21 / 21 - 23	blotches	NA	geographic isolation and morphological differences from *V. kaznakovi*; hybrid taxa	**Tuniyev and Ostrovskikh, 2001**; Zinenko et al., 2016
Vipera monticola	360, 436	5 / 4 - 5	35.53 / 29 - 41	2	1	9 - 10	10 - 12	8 - 10	6 / 5 - 7	F: 133.67 M: 133 / 128 - 138	32.55 / 31 - 35	38.91 / 36 - 43	19 / 19 - 19	bars	42 - 61	low body size and low number of dorsal rows to diff from *V. latastei*	**Saint-Girons, 1978**; Beerli et al., 1986; Brito et al., 2006, 2008; Velo-Antón et al., 2012; Freitas et al., 2018

Vipera olguni	455, 483	1 / 1 - 2	10 / 4 - 15	2	1	7 - 11	8 - 10	7 - 11	3.75 / 2 - 6	F: 132.9 M: 130.4 / 127 - 136	27.3 / 24 - 31	33.3 / 31 - 35	21 / 19 - 23	blotches	63 - 83	Differences in size, body and head scales, and colouration in relation to *V. darevskii*	**Tuniyev et al., 2012**, 2018a
Vipera orlovi	650**	1 / 1 - 2	5.85 / 1 - 7	2	1	NA	NA	NA	/ -	F: 137.29 M: 131.5 / 126 - 141	30.57 / 27 - 34	36.83 / 34 - 39	21 / 21 - 23	blotches, zigzag	NA	geographic isolation and morphological differences from *V. kaznakovi*; sister taxa to *V. kaznakovi* from Russia	**Tuniyev and Ostrovskikh, 2001**; Zinenko et al., 2015, 2016
Vipera pontica	700**	2 / 1 - 1	30 / -	2	1	NA	NA	NA	5.25 / -	F: 145 M: 144.5 / 142 - 147	30.5 / -	34 / 32 - 36	21 / 21 - 23	blotches	NA	upturned but hornless snout, and different number of scalation and colour pattern characters	Billing et al., 1990; **Baran et al., 2001**
Vipera renardi	630, 615	1 / 1 - 1	10.34 / 6 - 22	2	1	9	9	10	4 / 2 - 10	F: 145.53 M: 143.8 / 129 - 151	26.73 / 23 - 30	35 / 28 - 38	21 / 21 - 21	blotches	41 - 73	different colouration, number of body scales (dorsal rows and ventrals) and size from other *Acridophaga* members; high divergence from *V. ursinii*; other taxa such as *V. altaica*, *V. dinniki* or *V. lotievi* are nested within it.	**Saint-Girons, 1978**; Nilson and Andren, 2001; Ferchaud et al., 2012; Zinenko et al., 2015
Vipera sakoi	475*, 410	1 / 1 - 2	5.875 / 3 - 9	2	1	9 - 12	8 - 11	5 - 10	2.88 / 1 - 4	F: 138.3 M: 136.3 / 135 - 141	27.7 / 26 - 31	36.8 / 33 - 41	21 / 19 - 21	bars	55 - 66	Genetic divergence from *V. darevskii* clade; morphological differentiation from *V. darevskii*, *V. eriwanensis* and *V. olguni*	**Tuniyev et al., 2018a**
Vipera seoanei	610, 575	2 / 2 - 2	19.6 / 8 - 37	2	1	8 - 11	9 - 14	7- 14	4.9 / 1 - 7	F: 139.85 M: 137.48 / 129 - 150	29.08 / 22 - 38	35.43 / 22 - 43	21 / 19 - 21	variable: bars, zigzag, melanistic, stripped, uniform	48 - 102	geographic isolation and high phylogenetic divergence from *V. berus*	Saint-Girons, 1978; Saint-Girons et al., 1986; **Martínez-Freiría & Brito, 2013;** Martínez-Freiría et al., 2015

Vipera shemakhensis	427, 452	2 / 1 - 2	15 / 10 - 18	2	1	9 - 10	9 - 10	9 - 11	9.25 / 4 - 7	F: 134.9 M: 134 / 129 - 141	26.3 / 24 - 30	33 / 32 - 36	21 / 21 - 23	blotches	93 - 133	morphological differences from *V. renardi*; later, phylogenetic divergence to *V. eriwanensis*	Kukushkin et al., 2012; **Tuniyev et al., 2013, 2018b**
Vipera transcaucasiana	562, 395	11.25 / 8 - 12	50 / 44 - 60	2	1	8 - 12	9 - 11	9 - 12	6.5 / 6 - 7	F: 158.25 M: 154.6 / 144 - 162	32 / 32 - 35	37.2 / 33 - 39	21 / 21 - 21	bars	40 - 50	morphological (colouration) differences and geographic isolation from *V. ammodytes*; nested within *V. ammodytes*	**Saint-Girons, 1978**; Tok and Kumlutas, 1996; Kutrup, 1998; Tomovic, 2006; Ursenbacher et al., 2008; Goçmen et al., 2014a
Vipera ursinii	510, 455	1 / 1 - 1	10.73, 11.57 / 5 - 20	2	1	8	8 - 9	8 - 9	3 / 2 - 3	F: 134.03 M: 131.36 / 120 - 145	24.57 / 20 - 32	32.28 / 27 - 41	19 / 17 - 21	blotches	42 - 63	morphological (dorsal rows, ventral and head scales) and colouration differences from other *Acridophaga* members; high phylogenetic divergence from *V. renardi*	**Saint-Girons, 1978**; Nilson and Andren, 2001; Ferchaud et al., 2012; Zinenko et al., 2015
Vipera walser	640, 505	2 / 1 - 3	14.4 / 7 - 30	2	1	NA	NA	8 - 12	4.42 / 2 - 7	F: 148.5 M: 143.3 / 138 - 156	27.96 / 25 - 32	35.06 / 30 - 38	21 / 19 - 22	variable, generally blotches	NA	genetic divergence from other *Pelias* members	**Ghielmi et al., 2016**

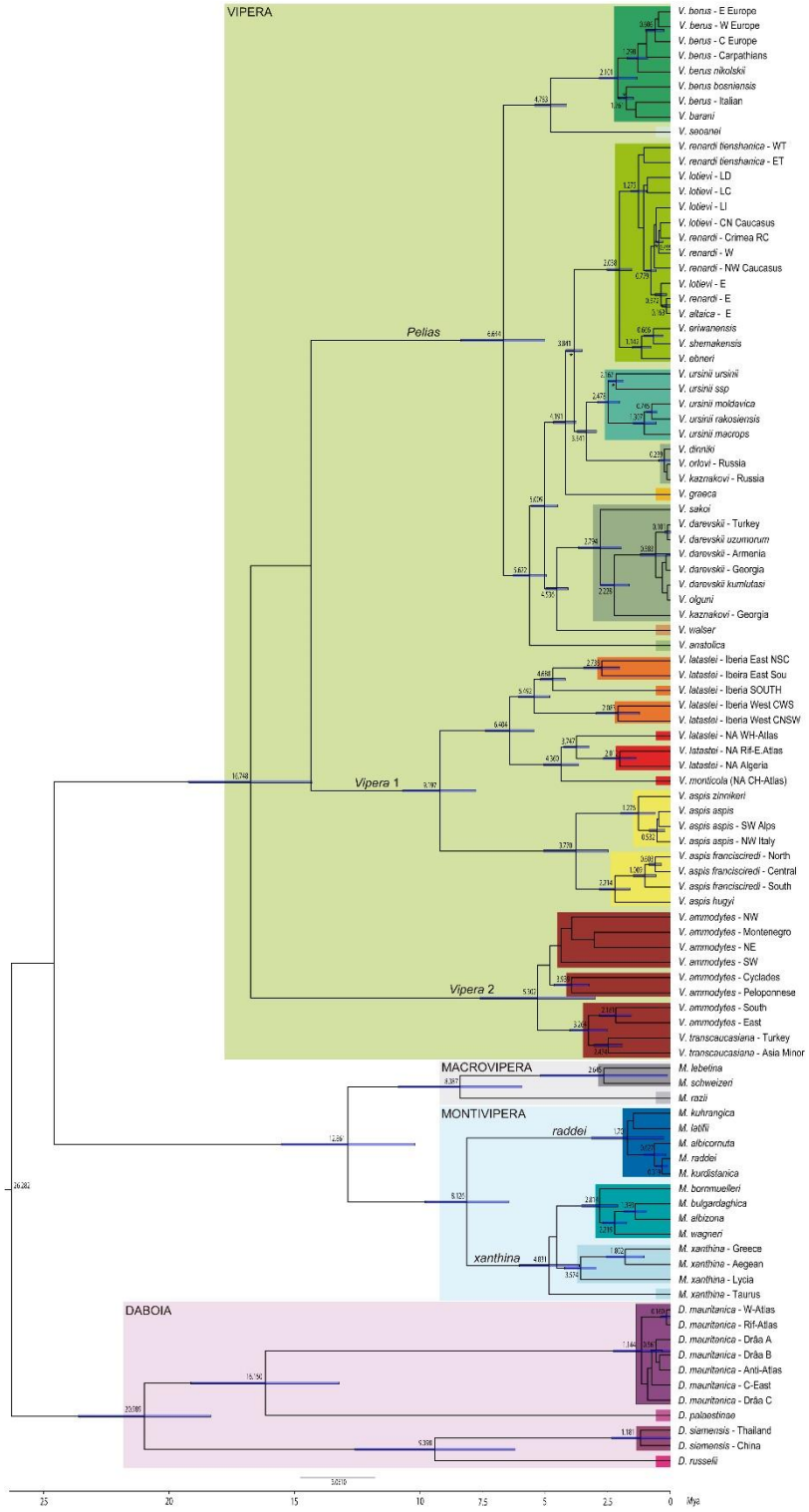

Figure S1. Dated Bayesian mitochondrial phylogenetic tree, obtained from the concatenated dataset of seven gene fragments, showing relationships for Eurasian vipers. The four genera (in uppercase) and major subclades within them (in italics) are signalled. Node numbers indicate mean values for TMRCA and bars 95 % confidence intervals; they are located on nodes with posterior probabilities higher than 0.95 and 0.90 (signalled with *). See supplementary table S1 for number of sequences, length and codes included in each taxa.

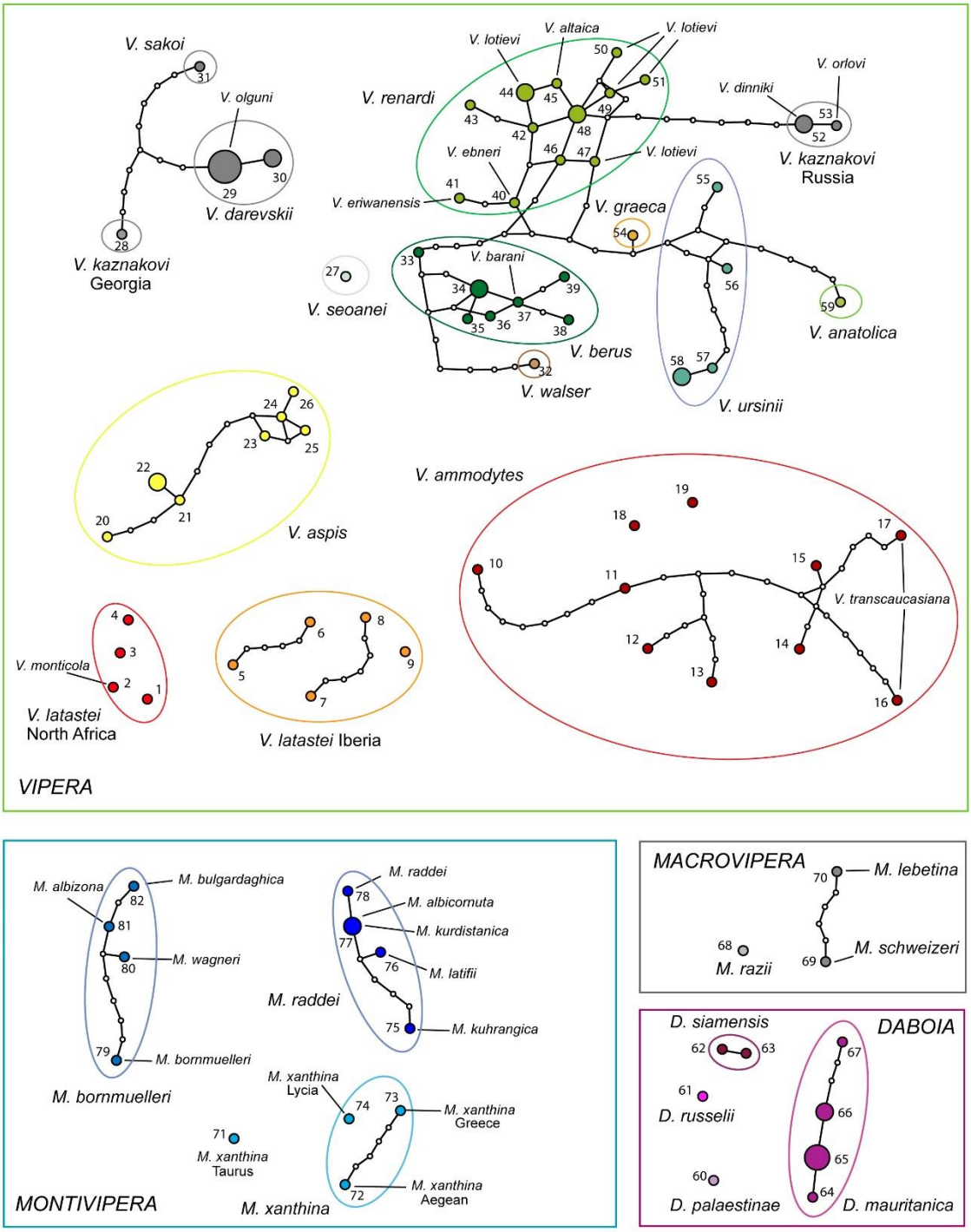

Figure S2. TCS mtDNA haplotype network for a small fragment of cyt *b* (196 bp) for Eurasian vipers. The single sequence available for *V. shemakhensis* (not included due to its small length) differed in one position from the sequences of *V. ebneri* (haplotype 40) and *V. eriwanensis* (haplotype 41). See supplementary table S1 for haplotype numbers identification.

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