

# Phylogeography and taxonomy of the barred grass snake (*Natrix helvetica*), with a discussion of the subspecies category in zoology

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## Supporting Information

**Table S1.** Grass snake samples used for the present investigation. In the columns ND4+tRNAs and *cyt b* the respective haplotypes are indicated (see Fig. 2). → [Excel Spreadsheet](#)

**Table S2.** European Nucleotide Archive (ENA) accession numbers of ND4 and *cyt b* haplotypes of *Natrix helvetica*.

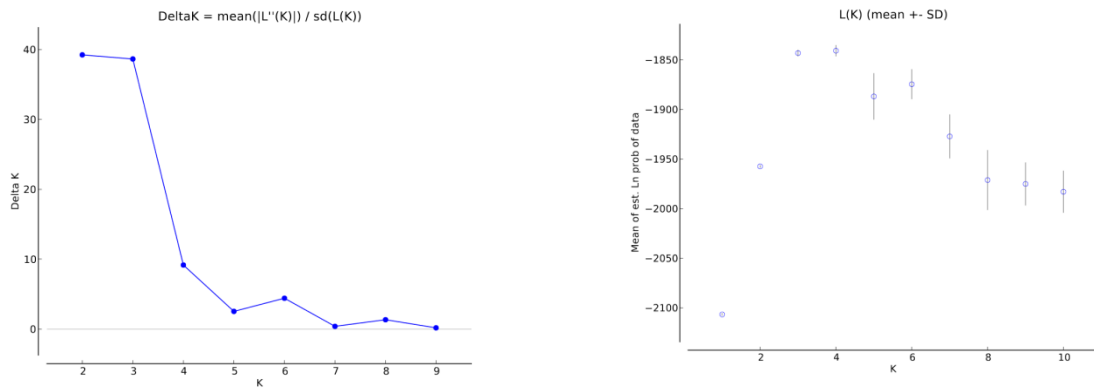
ND4 + tRNAs		cyt b		Reference
Haplotype	Accession number	Haplotype	Accession number	
<b>Lineage A of KINDLER <i>et al.</i> (2013)</b>				
a1	LT900410	a1	LT900452	KINDLER <i>et al.</i> (2018b)
a2	LT900411	a2	LT900453	KINDLER <i>et al.</i> (2018b)
a3	LT900412	a3	LT900454	KINDLER <i>et al.</i> (2018b)
		a4	LT900455	KINDLER <i>et al.</i> (2018b)
<b>Lineage B of KINDLER <i>et al.</i> (2013)</b>				
b1	LT900413	b1	LT900456	KINDLER <i>et al.</i> (2018b)
b2	LT900414	b2	LT900457	KINDLER <i>et al.</i> (2018b)
		b3	LT900458	KINDLER <i>et al.</i> (2018b)
		b4	LT900459	KINDLER <i>et al.</i> (2018b)
		b5	LT900460	KINDLER <i>et al.</i> (2018b)
<b>Lineage C of KINDLER <i>et al.</i> (2013)*</b>				
c1	LT839227	c1	LT839422	KINDLER <i>et al.</i> (2017)
		c5	LT900463	KINDLER <i>et al.</i> (2018b)
<b>Lineage D of KINDLER <i>et al.</i> (2013)</b>				
d1	AY873715	d1	AY487733	GUICKING <i>et al.</i> (2006)
<b>Lineage E of KINDLER <i>et al.</i> (2013)</b>				
h1	LT839092	h1	LT839229	KINDLER <i>et al.</i> (2017)
h2	LT839093	h2	LT839230	KINDLER <i>et al.</i> (2017)
h3	LT839094	h3	LT839231	KINDLER <i>et al.</i> (2017)
h4	LT839095	h4	LT839232	KINDLER <i>et al.</i> (2017)
h5	LT839096	h5	LT839233	KINDLER <i>et al.</i> (2017)
h6	LT839097	h6	LT839234	KINDLER <i>et al.</i> (2017)
h7	LT839098	h7	LT839235	KINDLER <i>et al.</i> (2017)
h8	LT839099	h8	LT839236	KINDLER <i>et al.</i> (2017)
h9	LT839100	h9	LT839237	KINDLER <i>et al.</i> (2017)
h10	LT839101	h10	LT839238	KINDLER <i>et al.</i> (2017)

■ Table S2 continued				
ND4 + tRNAs		cyt b		Reference
Haplotype	Accession number	Haplotype	Accession number	
<b>h11</b>	LT839102	<b>h11</b>	LT839239	KINDLER <i>et al.</i> (2017)
<b>h12</b>	LT839103	<b>h12</b>	LT839240	KINDLER <i>et al.</i> (2017)
		<b>h13</b>	LT839241	KINDLER <i>et al.</i> (2017)
		<b>h14</b>	LT839242	KINDLER <i>et al.</i> (2017)
		<b>h15</b>	LT839243	KINDLER <i>et al.</i> (2017)
		<b>h16</b>	LT839244	KINDLER <i>et al.</i> (2017)
		<b>h17</b>	LT839245	KINDLER <i>et al.</i> (2017)
		<b>h18</b>	LT839246	KINDLER <i>et al.</i> (2017)
		<b>h19</b>	LT839247	KINDLER <i>et al.</i> (2017)
		<b>h20</b>	LT839248	KINDLER <i>et al.</i> (2017)
		<b>h21</b>	LT839249	KINDLER <i>et al.</i> (2017)
		<b>h22</b>	LT839250	KINDLER <i>et al.</i> (2017)
		<b>h23</b>	LT839251	KINDLER <i>et al.</i> (2017)
		<b>h24</b>	LT839252	KINDLER <i>et al.</i> (2017)
<b>Lineage E of KINDLER <i>et al.</i> (2013)</b>				
		<b>h25</b>	LT839253	KINDLER <i>et al.</i> (2017)
		<b>h26</b>	LT839254	KINDLER <i>et al.</i> (2017)
		<b>h27</b>	LT839255	KINDLER <i>et al.</i> (2017)
		<b>h28</b>	LT839256	KINDLER <i>et al.</i> (2017)
		<b>h29</b>	LT839257	KINDLER <i>et al.</i> (2017)
<b>Lineage F of KINDLER <i>et al.</i> (2013)</b>				
<b>f1</b>	LT839228	<b>f1</b>	LT839424	KINDLER <i>et al.</i> (2017)
<b>f2</b>	LT900415	<b>f2</b>	LT900464	KINDLER <i>et al.</i> (2018b)
		<b>f3</b>	LT900465	KINDLER <i>et al.</i> (2018b)
		<b>f4</b>	LT900466	KINDLER <i>et al.</i> (2018b)
		<b>f5</b>	LT900467	KINDLER <i>et al.</i> (2018b)

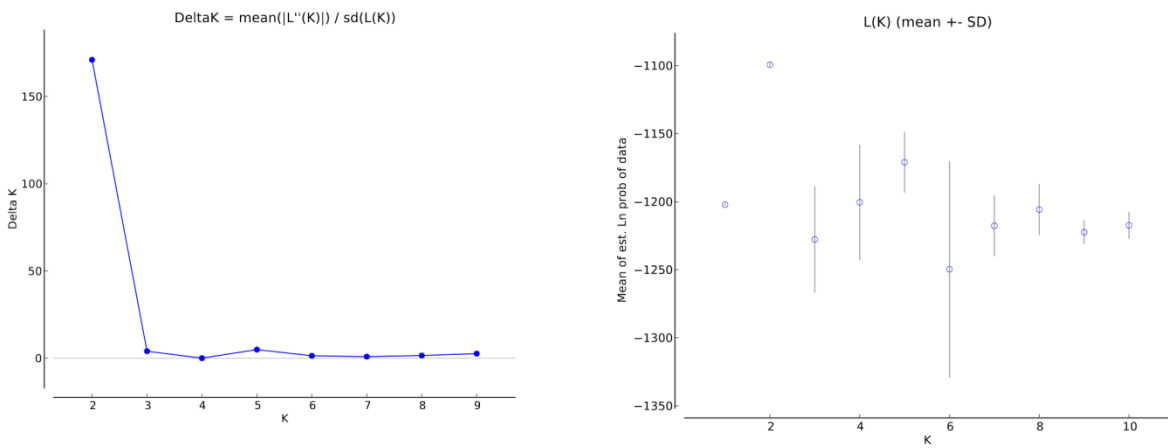
\* Additional haplotypes of lineage C are known from allochthonous snakes, outside the native range

**Table S3.** Mean uncorrected  $p$  distances (percentages) for ND4 + tRNA and *cyt b* haplotypes (HT) between and within different genetic lineages of *Natrix helvetica*. Below the diagonal: divergences between groups; on the diagonal: within group divergences in boldface.

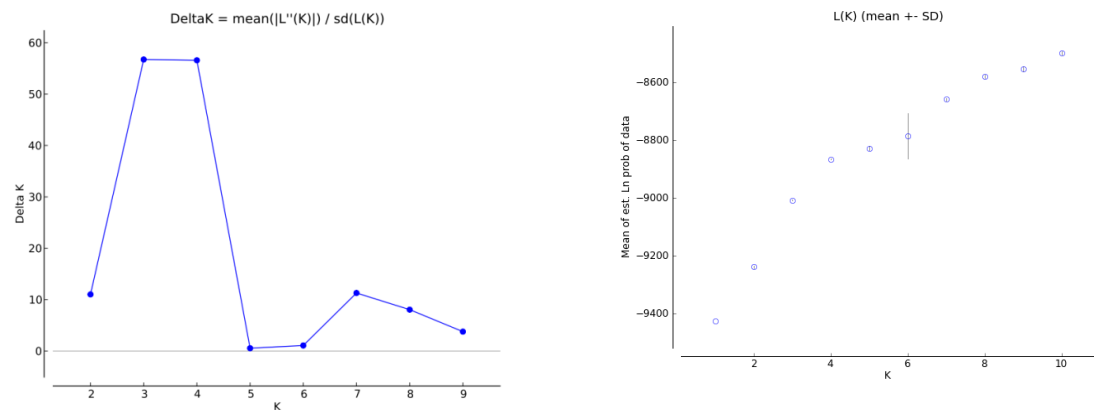
ND4 + tRNAs	$n$ (HT)	A	B	C	D	E	F
A	3	<b>0.19</b>					
B	2	4.47	<b>0.12</b>				
C	1	4.77	2.48	—			
D	1	6.01	3.38	3.02	—		
E	12	5.43	2.57	2.18	1.10	<b>0.21</b>	
F	2	5.24	2.66	2.37	1.22	0.63	<b>0.81</b>
<i>cyt b</i>	$n$ (HT)	A	B	C	D	E	F
A	4	<b>0.20</b>					
B	5	5.01	<b>0.25</b>				
C	2	4.63	3.07	<b>0.27</b>			
D	1	5.22	4.46	2.01	—		
E	29	5.06	3.55	2.56	1.27	<b>0.22</b>	
F	5	5.03	3.22	2.27	0.97	0.45	<b>0.13</b>



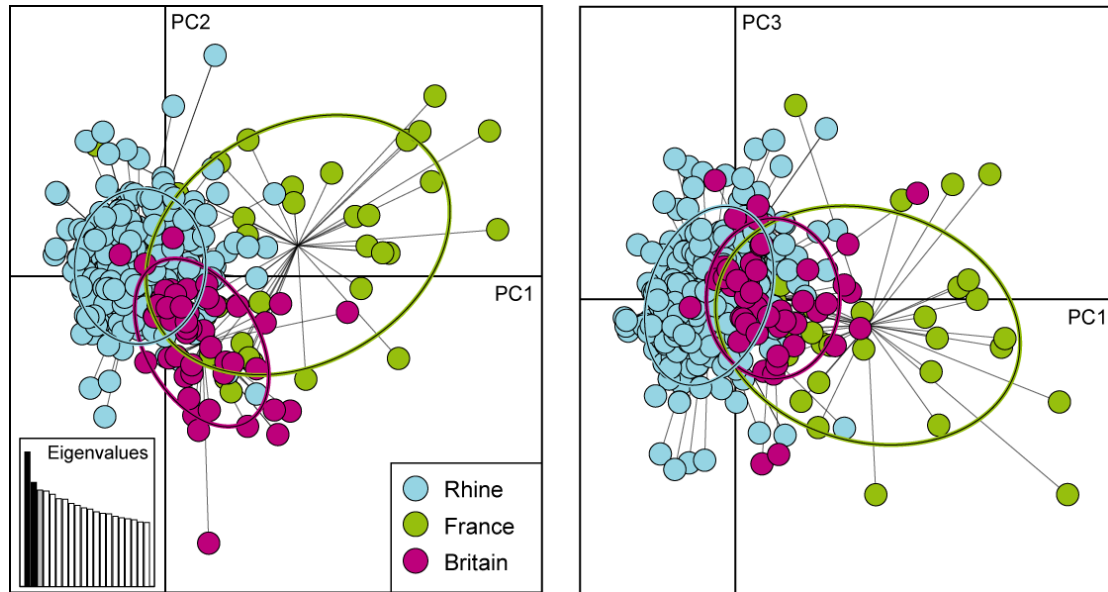
**Fig. S1.**  $\Delta K$  values (left) and posterior probabilities for  $K$ s (right) for the data set of 29 southern barred grass snakes and 20 *Natrix helvetica helvetica*.



**Fig. S2.**  $\Delta K$  values (left) and posterior probabilities for  $K$ s (right) for the data set of 27 southern barred grass snakes without influence of *Natrix helvetica helvetica*.



**Fig. S3.**  $\Delta K$  values (left) and posterior probabilities for  $K$ s (right) for the data set of 334 *Natrix helvetica helvetica*.



**Fig. S4.** PCA for microsatellite data of 334 samples of *Natrix helvetica helvetica* (lineage E) arranged in three geographical groups. The oval outlines represent 95% confidence intervals. The x axis (PC1) explains 4.2 % and the y axes 3.3% (PC2) and 3.0% (PC3) of variation.