

Genetic structure of Balkan chamois *(R. r. balcanica)*, conservation implications



Andrea Rezić, Laura Iacolina, Toni Safner, Ferdinand Bego, Dragan Gačić,
Vladimir Maletić, Georgi Markov, Dragana Milošević, Haritakis Papaioannou,
Elena Bužan, Nikica Šprem



INTRODUCTION



R. pyrenaica

- *ornata*
- *pyrenaica*
- *parva*

R. rupicabra

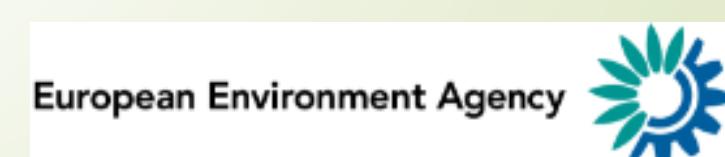
- *balcanica*
- *rupicabra*
- *tatica*
- *cartusiana*
- *carpatica*
- *asiatica*
- *caucasica*

Rodríguez et al. 2010

INTRODUCTION

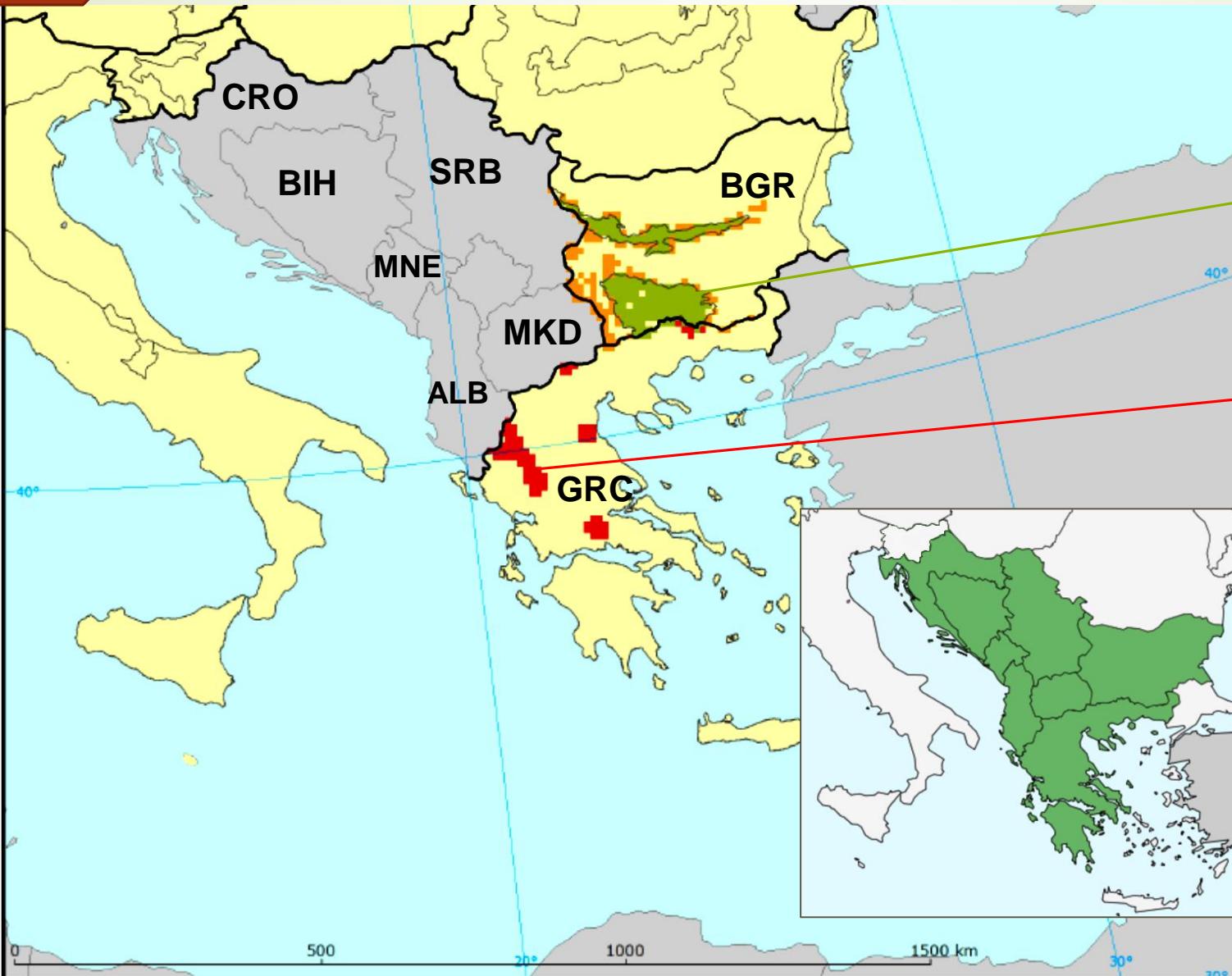


- ▶ Annexes II and IV of the EU Habitats Directive (Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora - consolidated version 01/01/2007)
- ▶ Annex III and Revised Annex I of Resolution 6 (1998) – Bern Convention



CONSERVATION
STATUS

INTRODUCTION



► Designated 20 Natura 2000 sites on EU territory

12 Natura 2000 sites in Bulgaria

8 Natura 2000 sites in Greece

► Distribution of Balkan chamois



INTRODUCTION



*Rupicapra
rupicapra
balcanica*

Country	No. of individuals
Croatia (HRV)	500 individuals (Šprem and Buzan, 2016)
Bosnia and Herzegovina (BIH)	< 1000 individuals (Adamič et al. 2006)
Serbia (SRB)	700 individuals (Corlatti et al. 2019)
Montenegro (MNE)	1400 individuals (Corlatti et al. 2019)
North Macedonia (MKD)	1400 individuals (Corlatti et al. 2019)
Albania (ALB)	450-600 individuals (Corlatti et al. 2019)
Bulgaria (BGR)	1700 individuals (Markov et al. 2016)
Greece (GRC)	1500 individuals (Papaioannou et al. 2019)
	ca. 9000



MAJOR THREATS

INTRODUCTION

- ▶ low population size ➔ inbreeding (Markov et al. 2016)
- ▶ overhunting and poaching (Markov et al. 2016; Papaioannou et al. 2019)
- ▶ re/introduction ➔ hybridization (Iacolina et al. 2019)
- ▶ habitat fragmentation
- ▶ increased tourism and activities in mountain areas
- ▶ competition with livestock and introduced species
- ▶ diseases



INTRODUCTION

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Featured Article

The Genetic Impact of Chamois Management in the Dinarides

NIKICA ŠPREM,¹ Faculty of Agriculture, Department of Fisheries, Beekeeping, Game Management and Special Zoology, University of Zagreb, Svetosimunska cesta 25, Zagreb 10000, Croatia

ELENA BUZAN, Science and Research Centre, Institute for Biodiversity Studies, University of Primorska, Garibaldijeva 1, Koper 6000, Slovenia

SHORT COMMUNICATION

Genetic variability and population structure of chamois in Greece (*Rupicapra rupicapra balcanica*)

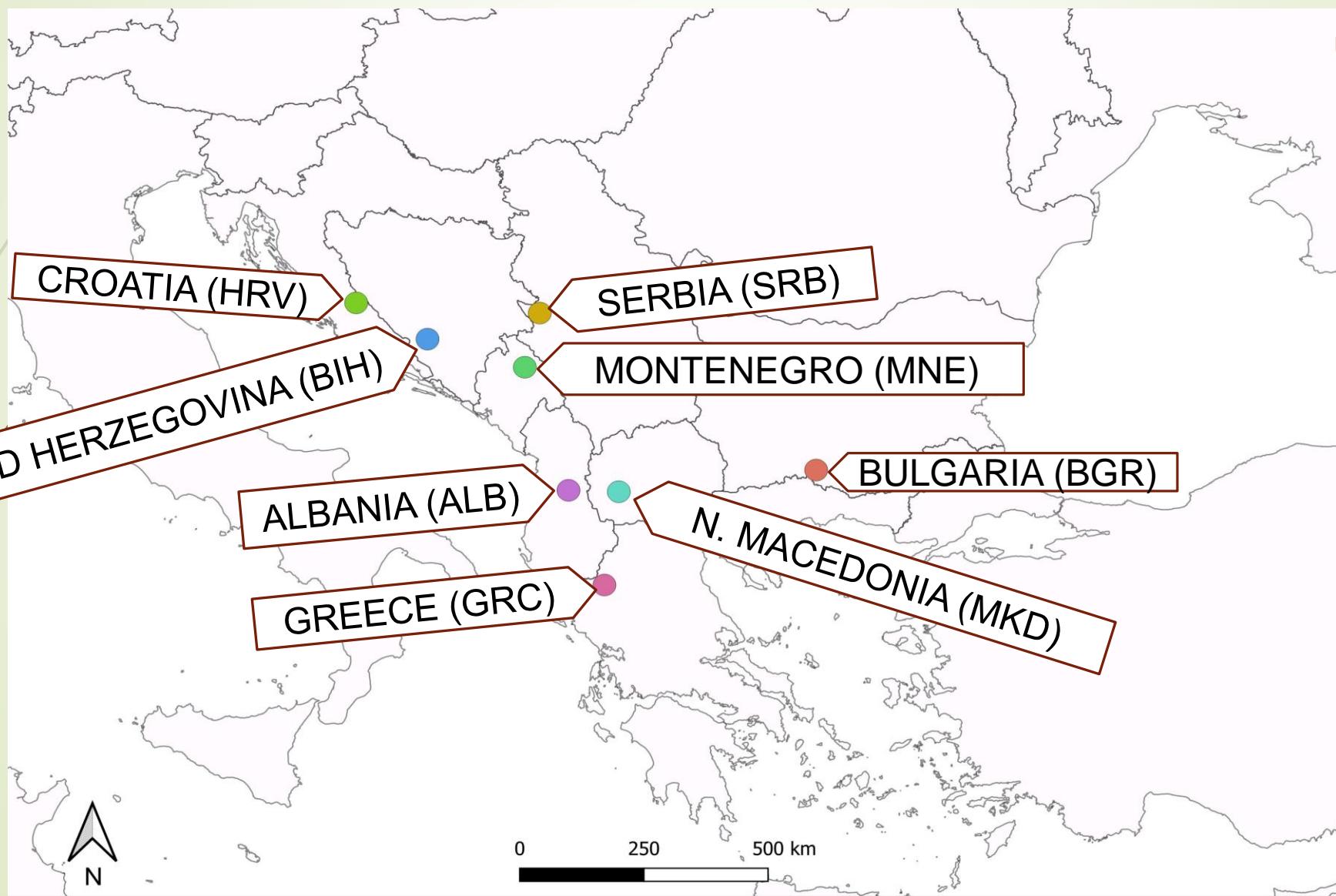
Haritakis Papaioannou² · Margarita Fernández¹ · Trinidad Pérez¹ · Ana Domínguez¹

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1. Sampling site

MATERIALS AND METHODS



→ 95 individual samples of the Balkan chamois from 8 countries



2. Genetic markers
and genotyping

MATERIALS AND METHODS

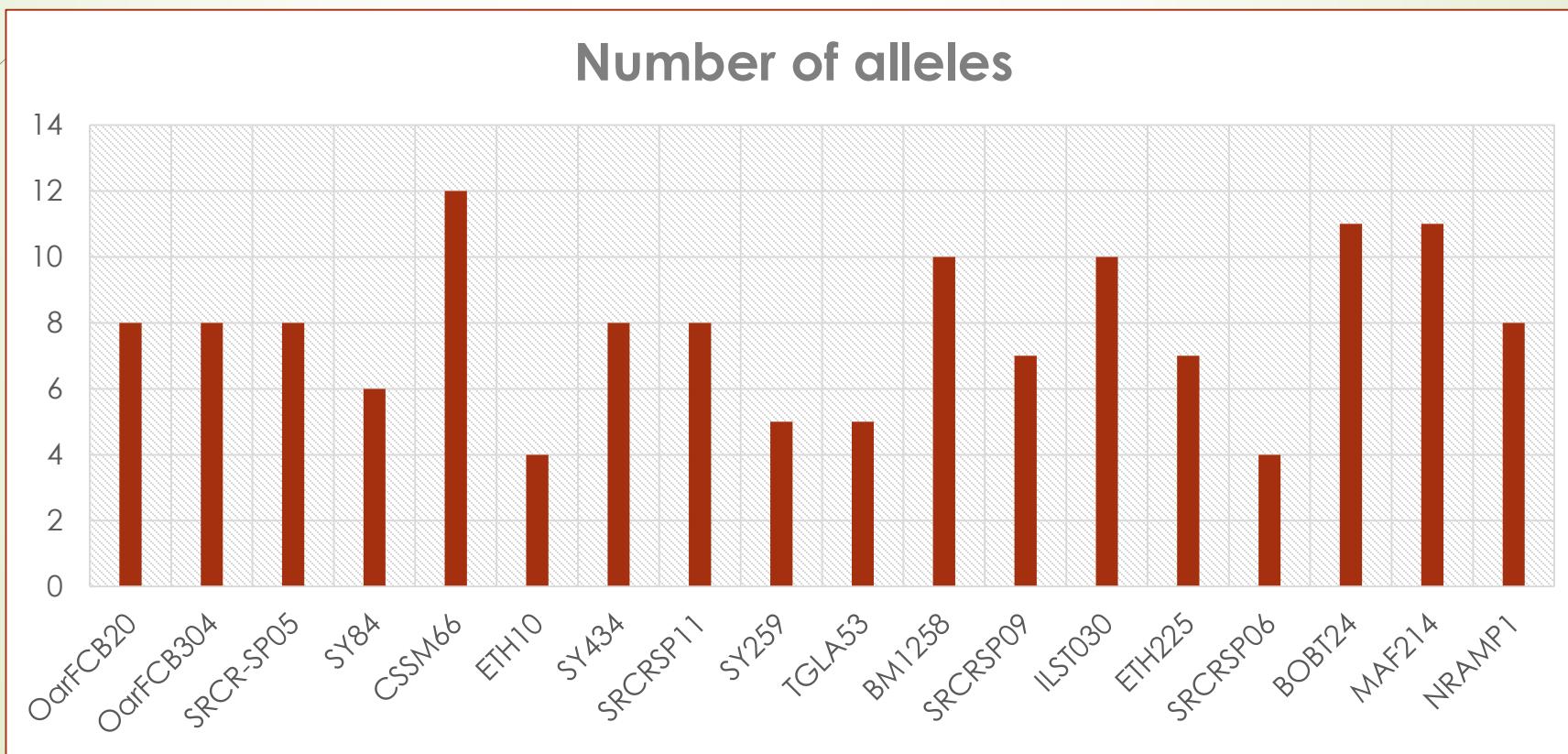
- ▶ PEQGOLD Tissue DNA Mini Kit (S-line; PEQLAB)
- ▶ 20 microsatellite loci in 3 multiplex sets (Zemanová et al. 2011)
- ▶ KAPA2G Fast Multiplex Mix protocol 
- ▶ Fragment analysis → ABI3130 Genetic Analyzer 
- ▶ Microsatellite genotypes → GeneMapper® Software



FreeNA
Genepop 4.7.2

RESULTS

- ▶ 18 loci out of 20
- ▶ SY58; INRA121loci were excluded
- ▶ 4-12 alleles



Genetix 4.05.2

RESULTS- genetic diversity

Population (n)	$H_e \pm SD$	$H_o \pm SD$	F_{IS}	A
ALB (4)	0.548±0.224	0.550±0.313	0.150	3.666
BIH (29)	0.616±0.169	0.554±0.271	0.118**	5.333
BGR (14)	0.497±0.206	0.482±0.236	0.067*	3.833
HRV (8)	0.661±0.134	0.599±0.210	0.167**	4.277
MKD (5)	0.530±0.196	0.465±0.340	0.245*	3.66
MNE (8)	0.597±0.202	0.571±0.254	0.108	4.111
SRB (24)	0.564±0.90	0.550±0.207	0.046*	3.944

**p<0.001

*p<0.05

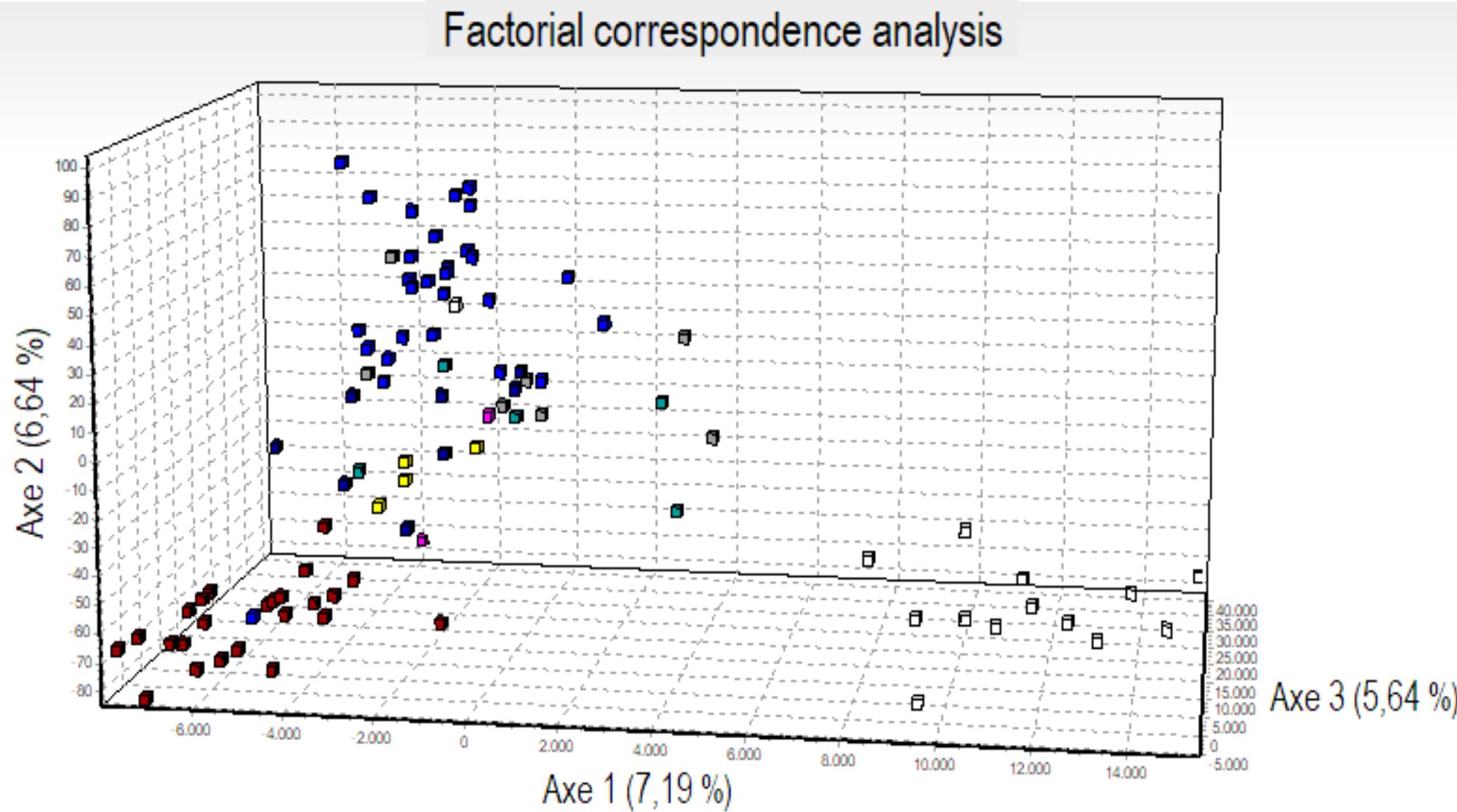
Genepop 4.7.2

RESULTS

Global F_{ST} **0.173** (Weir and Cockerham, 1984)

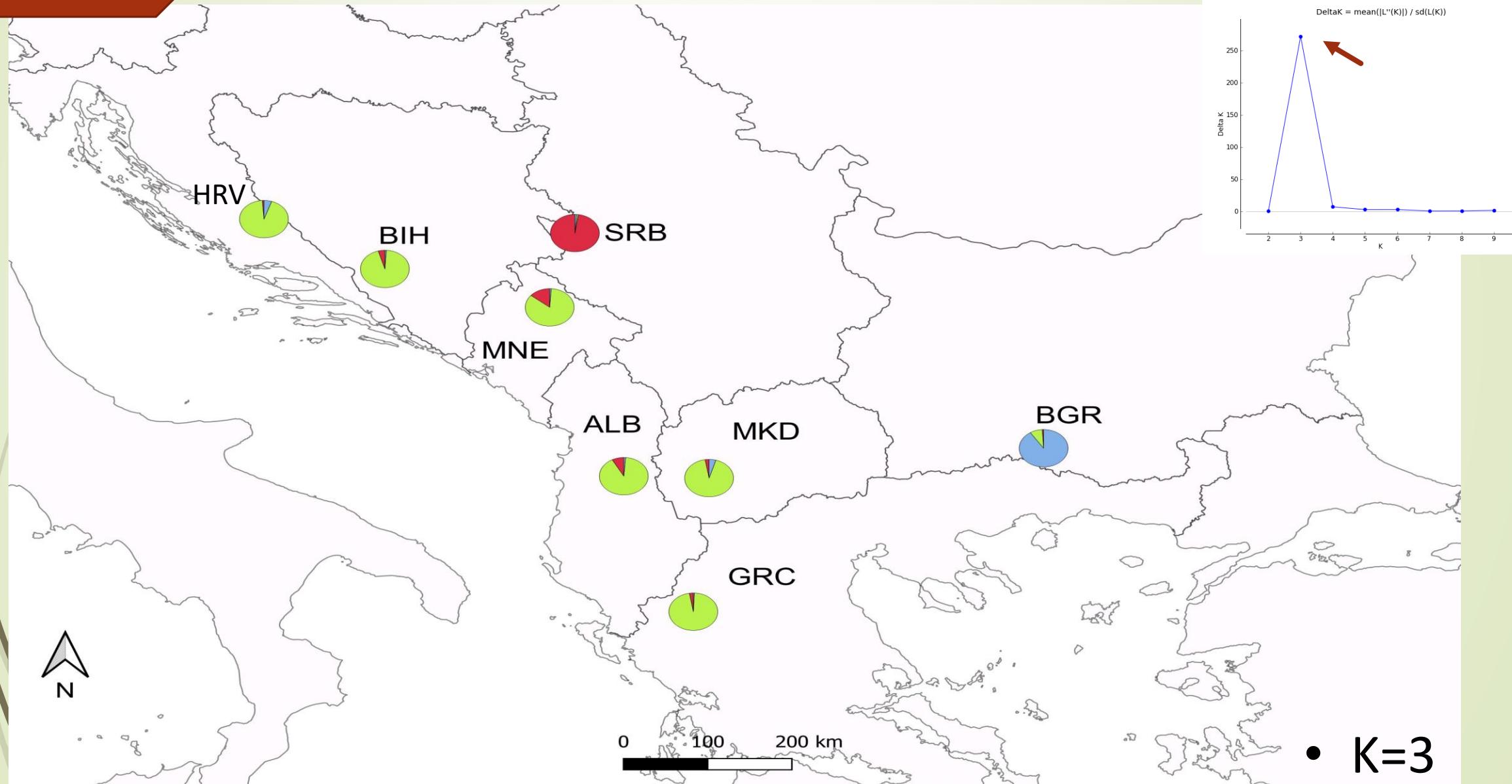
<u>Pop</u>	ALB	BIH	BGR	HRV	GRE	MKD	MNE
BIH	0.118						
BGR	0.2528	0.2236					
HRV	0.0940	0.0970	0.1927				
GRE	0.0151	0.1592	0.2514	0.0799			
MKD	0.0654	0.1697	0.2489	0.1034	0.0520		
MNE	0.0711	0.0932	0.2186	0.1075	0.1038	0.1438	
SRB	0.1353	0.1768	0.2827	0.1909	0.1755	0.1952	0.1270

RESULTS



STRUCTURE 2.3.4.

RESULTS Genetic structure of Balkan chamois



CONCLUSION

- ▶ New insight into the population genetic structure across the whole distribution range of Balkan chamois
- ▶ The management of Balkan chamois conservation status (action plans...)
- ▶ NATURA 2000 sites in Croatia!?...
- ▶ Potential reintroduction with particular attention to genetic origin
- ▶ Include the distribution of mtDNA haplotypes

**THANK YOU!!!
QUESTIONS
PLEASE???**



ACKNOWLEDGEMENTS
DNA as a evidence of
distribution and vitality of
endangered Balkan chamois –
BalkCham
IP-2016-06-5751

