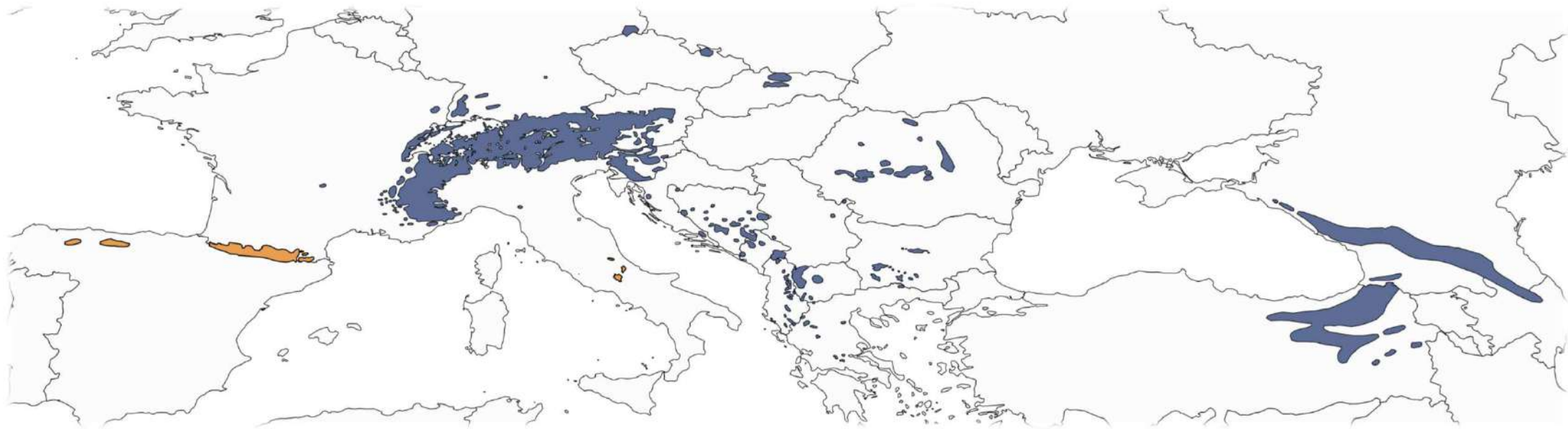


Diversity of the MHC class II *DRB* alleles in chamois populations

S. Stipoljev, E. Bužan, L. Iacolina, T. Safner, A. Rezić, S. Potušek, K. Križanović, A. Galov,
F. Bego, G. Markov, H. Papaioannou, A. Farkas, M. Scandura, D. Milošević, V. Maletić,
E. Babaev, D. Gačić, P. Lazar, M. Arnal, H. Ambarlı, N. Šprem



Chamois



Rupicapra pyrenaica

Rupicapra rupicapra

Chamois



R. pyrenaica

- ornata*
- pyrenaica*
- parva*

R. rupicapra

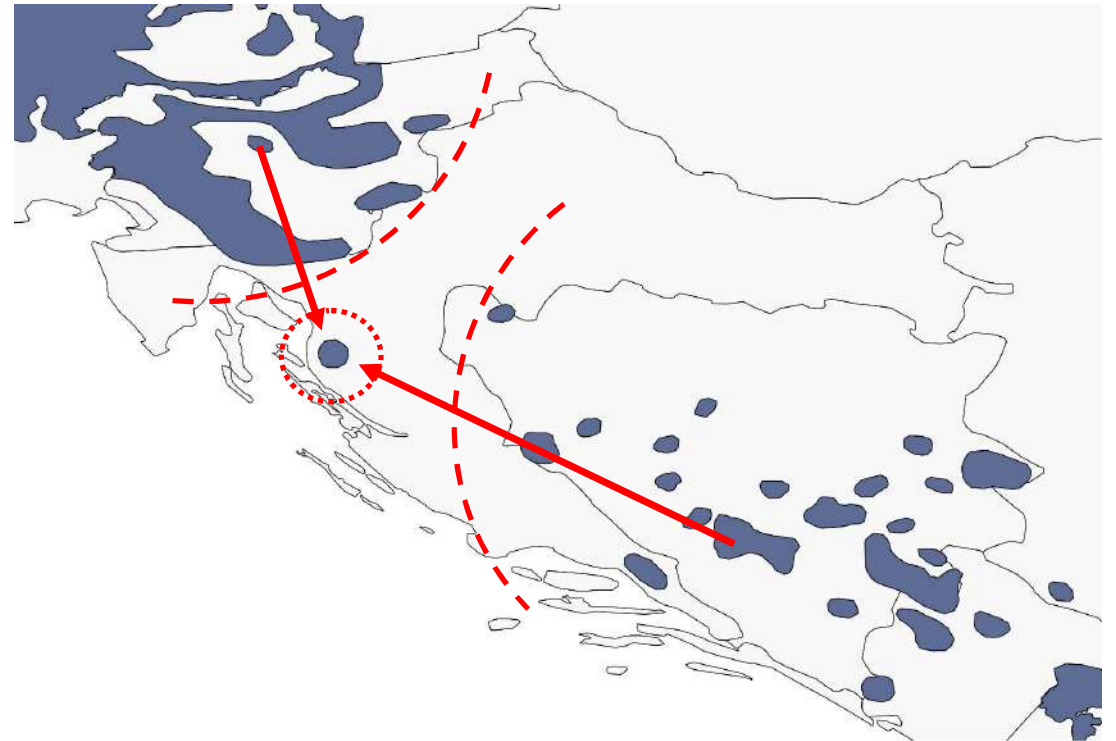
- balcanica*
- rupicapra*
- tatica*
- cartusiana*
- carpatica*
- asiatica*
- caucasica*

Chamois

- Alpine chamois (*R. r. rupicapra*)
- Balkan chamois (*R. r. balcanica*)
- Velebit Mtn - contact zone



Chamois on Biokovo Mtn (photo: Krešimir Kavčić).



NGS sequencing

PCR amplification



DNA sequencing



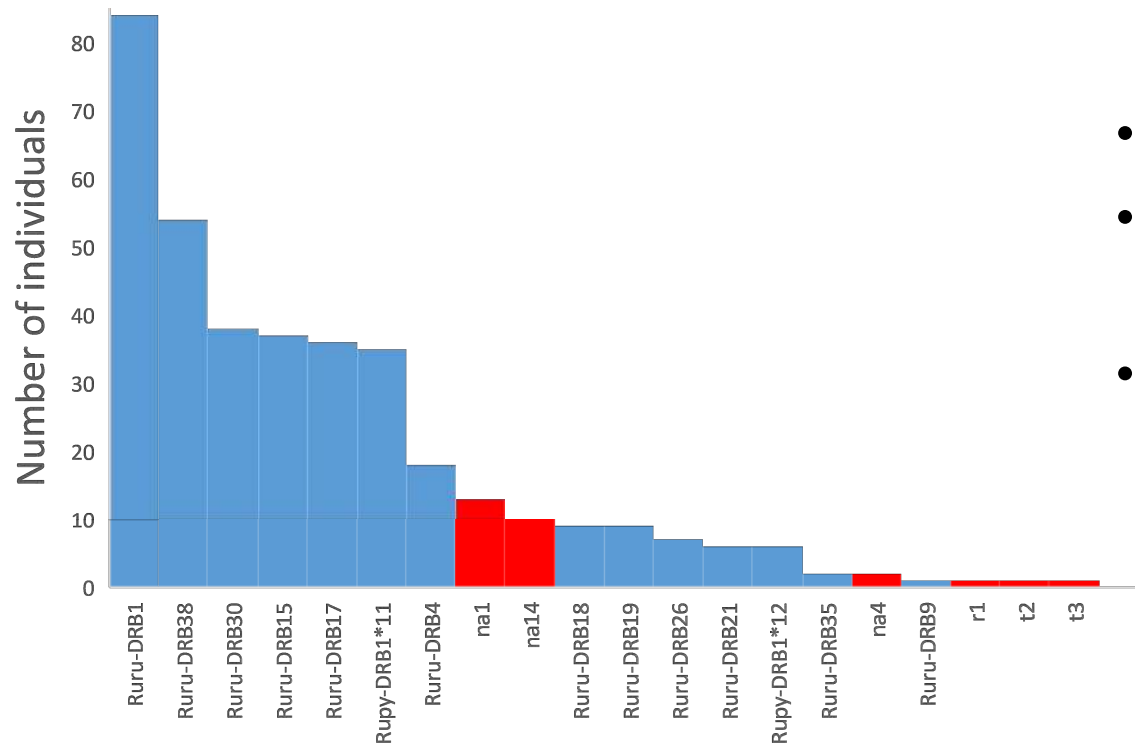
Sequence data analysis

```
5;6;5;:;B??2CCCCB;6;<<AAAA>?7C;;C1;7;A>;>;AAAA?@?CCCC@?CBAC1<<<7;6666;,,,,;CD1;,,,,;7;7;,>;B@;;;BB;
@015E3:00340:0024
TGAGCGGAACGATGATCCTCTCTCTGCGAGCATTTCCTGCTGTATGCTAAGAGCGAGTGTCATTTCCTCAACGGGACGCGAGCGGGTGGGTTCTCTGGACAGATACTTCTAT
+
<C????ACACCCCC><?>;CD??@;@B;;1;6;CBAC@A@FCCCCACCCDD?<<<6666,6666=6666,666;,,,CC;?>BB;/7;7;B7;CD>;>BB6;@C
@015E3:00340:00226
CGGAAGAACCTCGATATCTCTCTCTCTGCGAGCATTTCCTGGGATATCGTAAGAGCGAGTGTCATTTCCTCAACGGGACCGAGCGGGTGGGTTCTCTGGACAGATACTTCTC
+
??AEACD?>?CCCCCCCCACCCDDDDCCC?@?DDCC=CA??>?C??>?FFCACCCCCCCCC?>?CCC>CCACCADBE@CACCCCCC?CCCC@6;6;7?DDCCCCC<6;
@015E3:00340:00227
CTTCCATACAGATATCTCTCTCTCTGTAGCACATTTCCTGGAGTATCGTAAGAGCGAGTGTCATTTCCTCAACGGGACCGAGCGGGTGGGTTCTCTGGACAGATACTTCTAT
+
BC-A=B>?>CCCCBC@CDBCCCCCDD@?CD?C@CDBCCCCCCCCC?>CCCC>>6;;1>C@CDAACC?@=@@CCCC?CCCCAC6>;>6;CCCCCCCC6;6;@
@015E3:00340:00228
TGCAGCTCGATGATCCTCTCTCTGCGAGCATTTCCTGGGATATGCTAAGAGCGAGTGTCATTTCCTCAACGGGACGCGAGCGGGTGGGTTCTCTGGACAGATACTTCTAT
+
-----)-----<;<?>6CCC<@??;C;;1;?CCACC@?@CCCC=;B@;,,,,;6C;><DA7<6,666B;;@01;;>>ACACACCACC?>CCCCC???C
@015E3:00340:00230
TCTACATCTCGATATCTCTCTCTCTGCGAGCATTTCCTGGGATATCATAAGAGCGAGTGTCATTTCCTCAACGGGACCGAGC
```


Samples

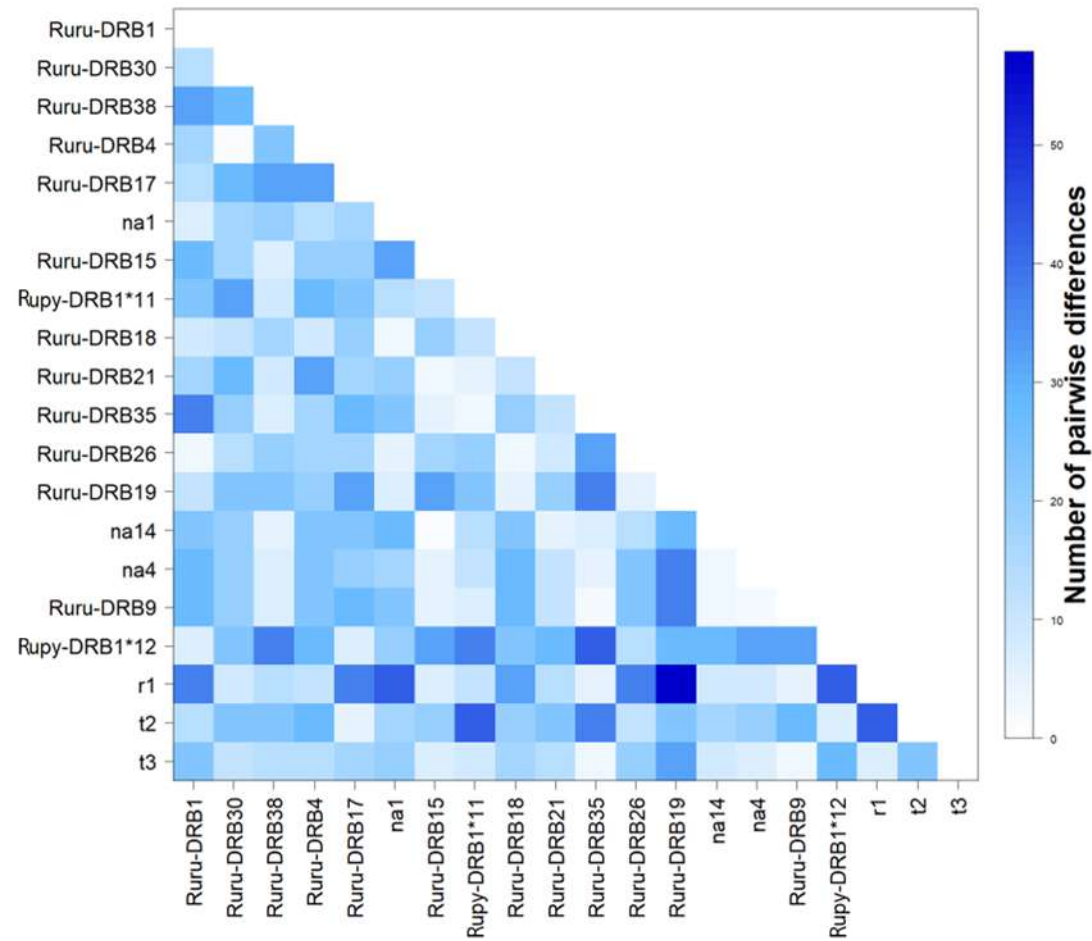


MHC alleles

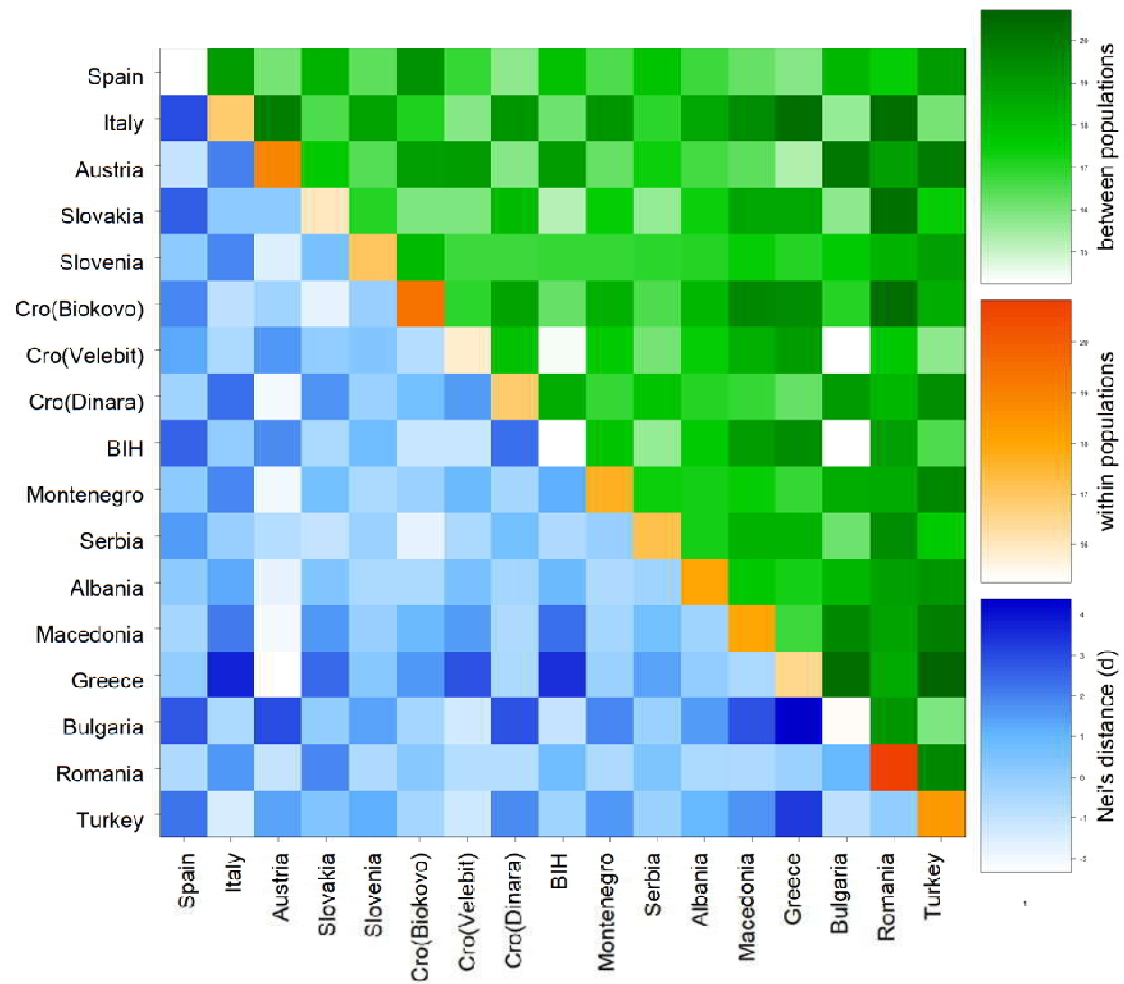


- 236 bp fragment of exon 2 of *DRB* gene
- number of alleles: 20
 - 6 novel
- number of unique proteins: 20

Haplotype distance matrix



Average number of pairwise differences

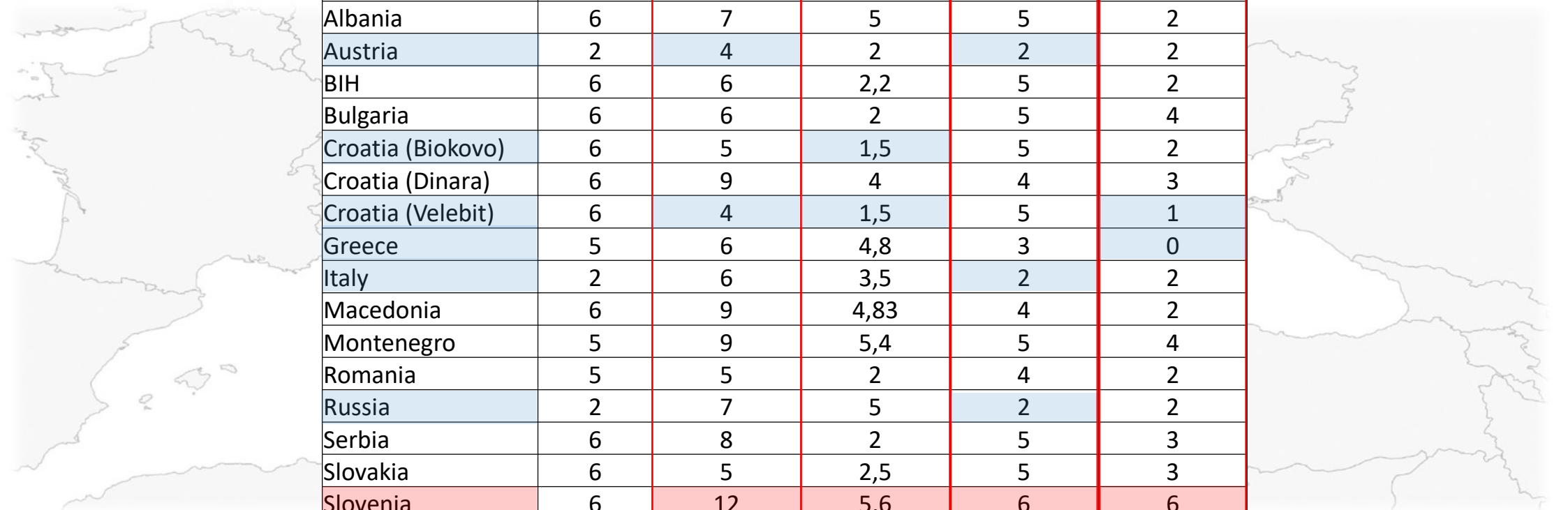


Peptide binding region (PBR)

[illegible]

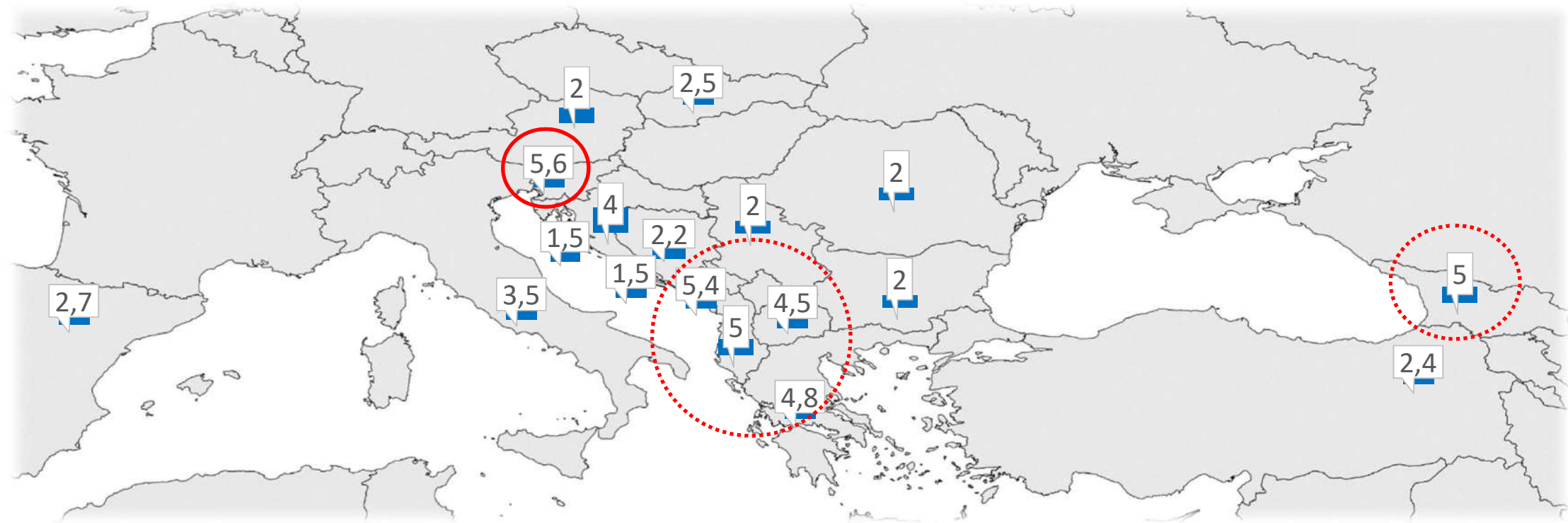
Region	No. codons	No. variable sites at nucleotide level	Nucleotide diversity (n)	Average number of nucleotide differences (k)
All	78	23	0,038	8,974
PBR	22	19	0,107	7,058

Estimates of genetic diversity for MHC

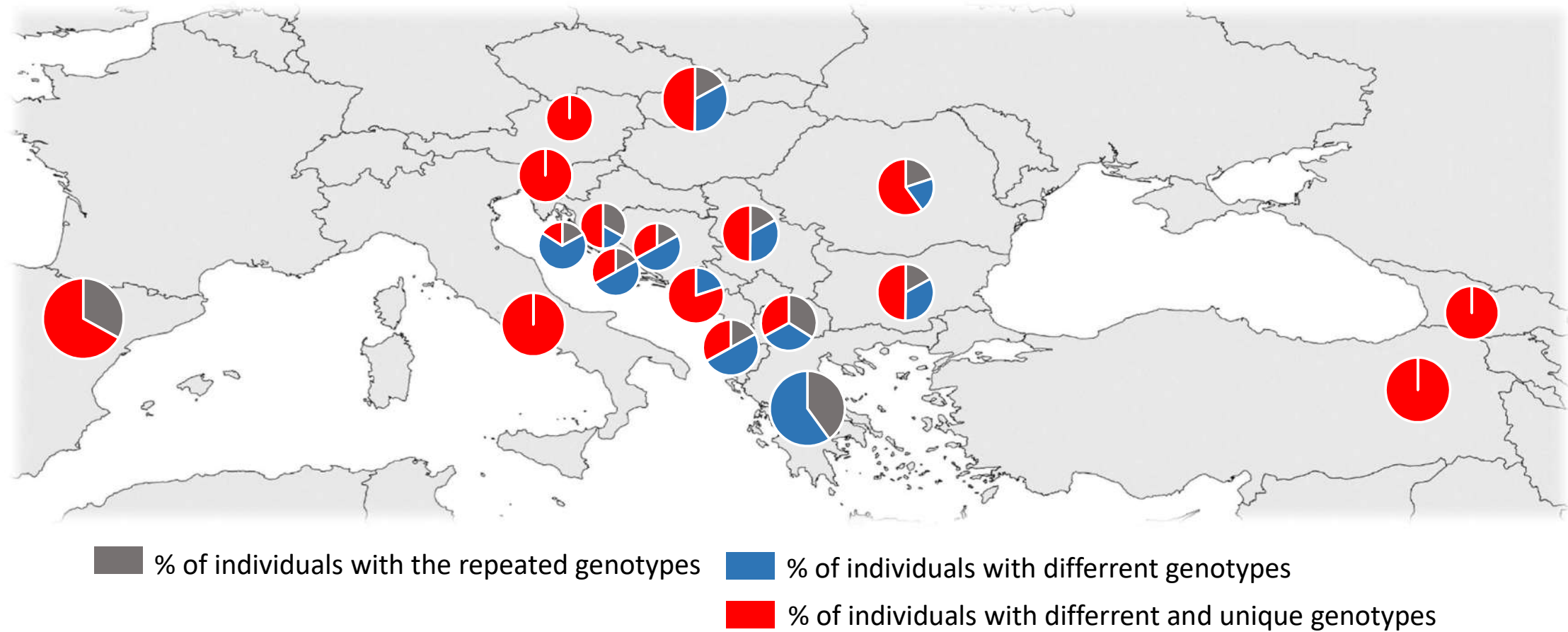


Region	N	MHC/pop	MHC/ind	No. genotypes	No. unique genotypes
Albania	6	7	5	5	2
Austria	2	4	2	2	2
BIH	6	6	2,2	5	2
Bulgaria	6	6	2	5	4
Croatia (Biokovo)	6	5	1,5	5	2
Croatia (Dinara)	6	9	4	4	3
Croatia (Velebit)	6	4	1,5	5	1
Greece	5	6	4,8	3	0
Italy	2	6	3,5	2	2
Macedonia	6	9	4,83	4	2
Montenegro	5	9	5,4	5	4
Romania	5	5	2	4	2
Russia	2	7	5	2	2
Serbia	6	8	2	5	3
Slovakia	6	5	2,5	5	3
Slovenia	6	12	5,6	6	6
Slovenia (Pohorje)	6	7	2	6	6
Spain	6	5	2,7	4	2
Turkey	5	8	2,4	5	5

Mean number of alleles per individual



Genotype diversity per region



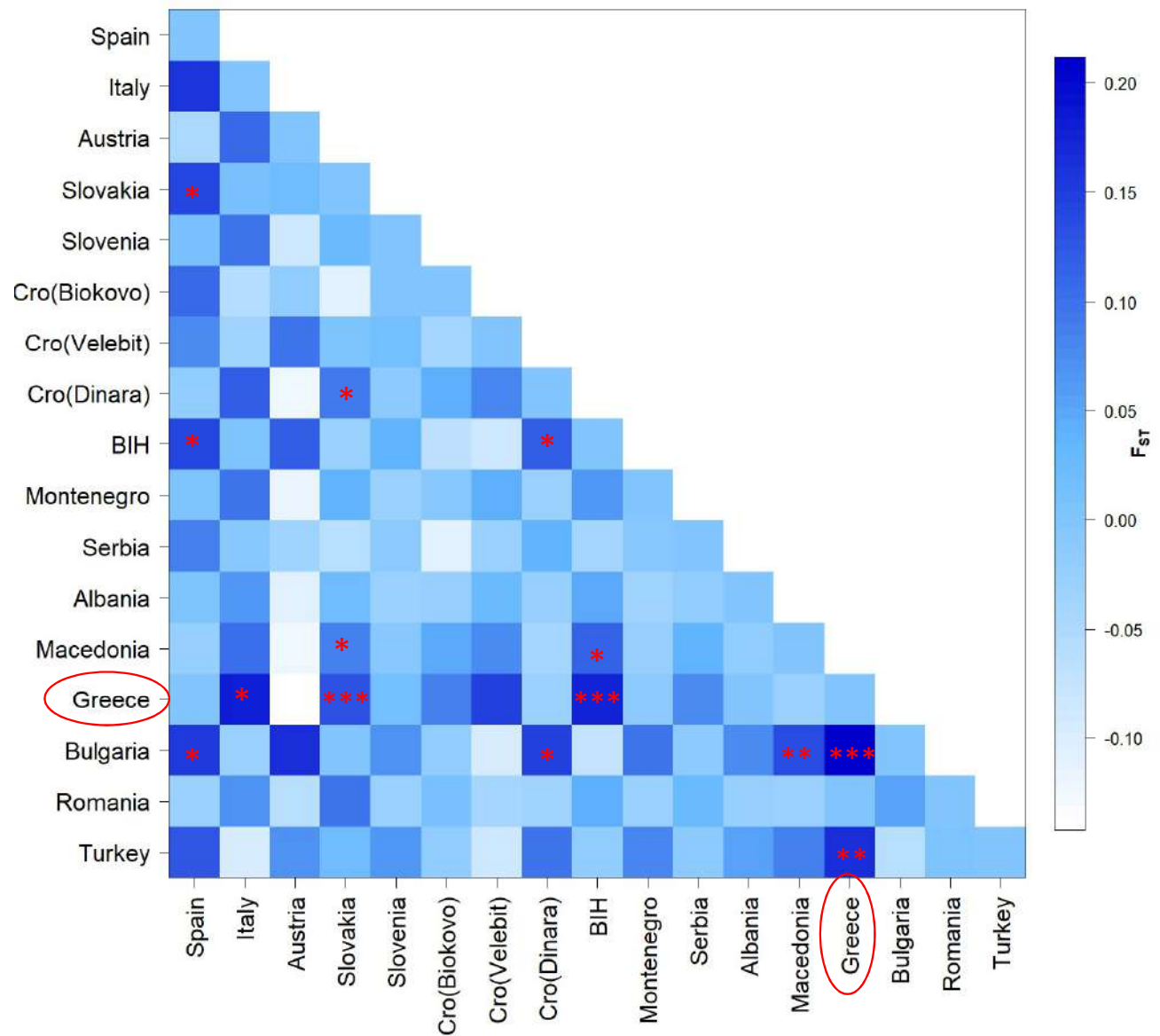
Matrix of pairwise F_{ST}

F_{ST} P values:

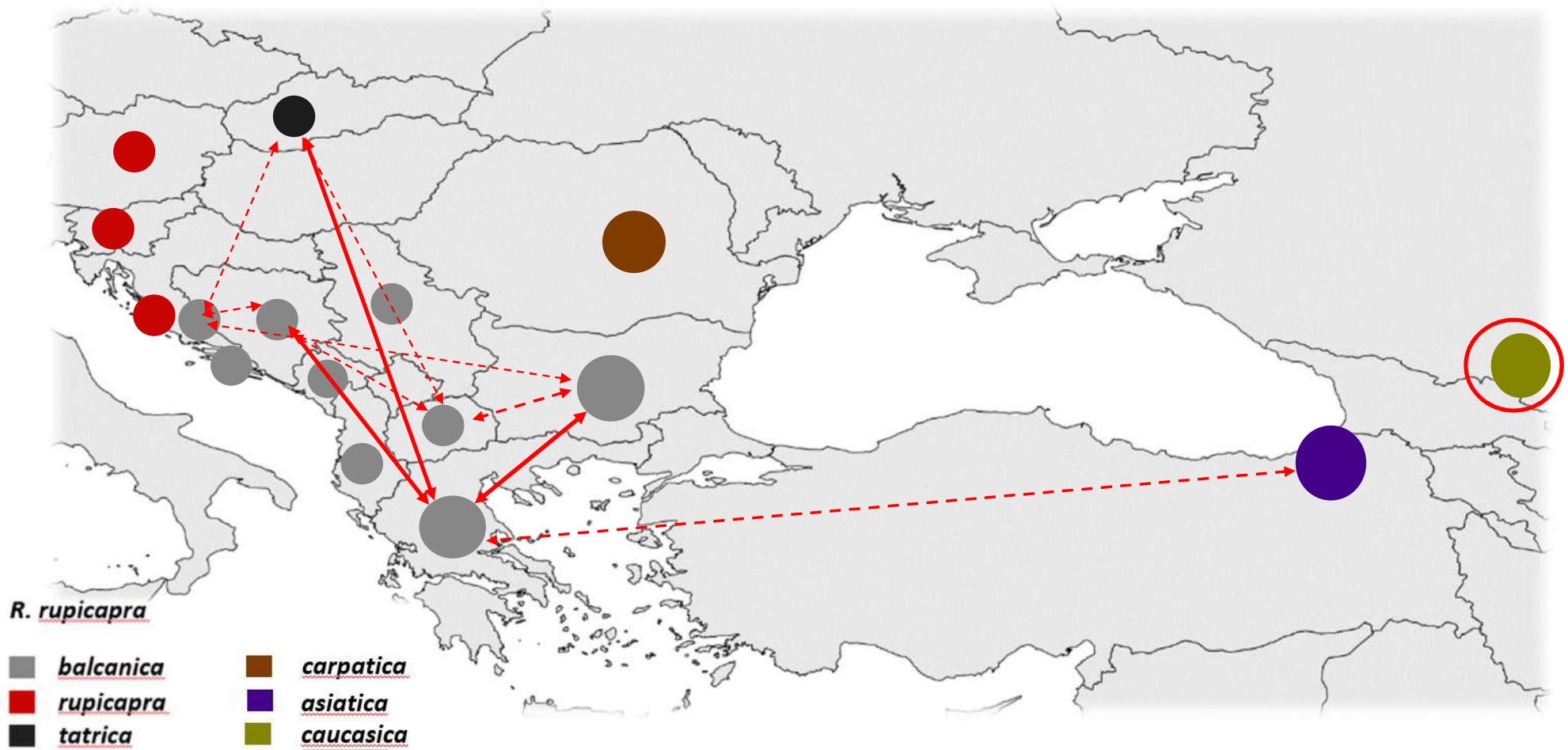
* $0,02 < P < 0,04$

** $0,01 < P < 0,02$

*** $P < 0,01$



Pairwise F_{ST}



Dear Colleagues,
Thank You for Your attention!



ACKNOWLEDGEMENTS

DNA as a evidence of distribution and vitality of endangered Balkan chamois –

BalkCham IP-2016-06-5751

