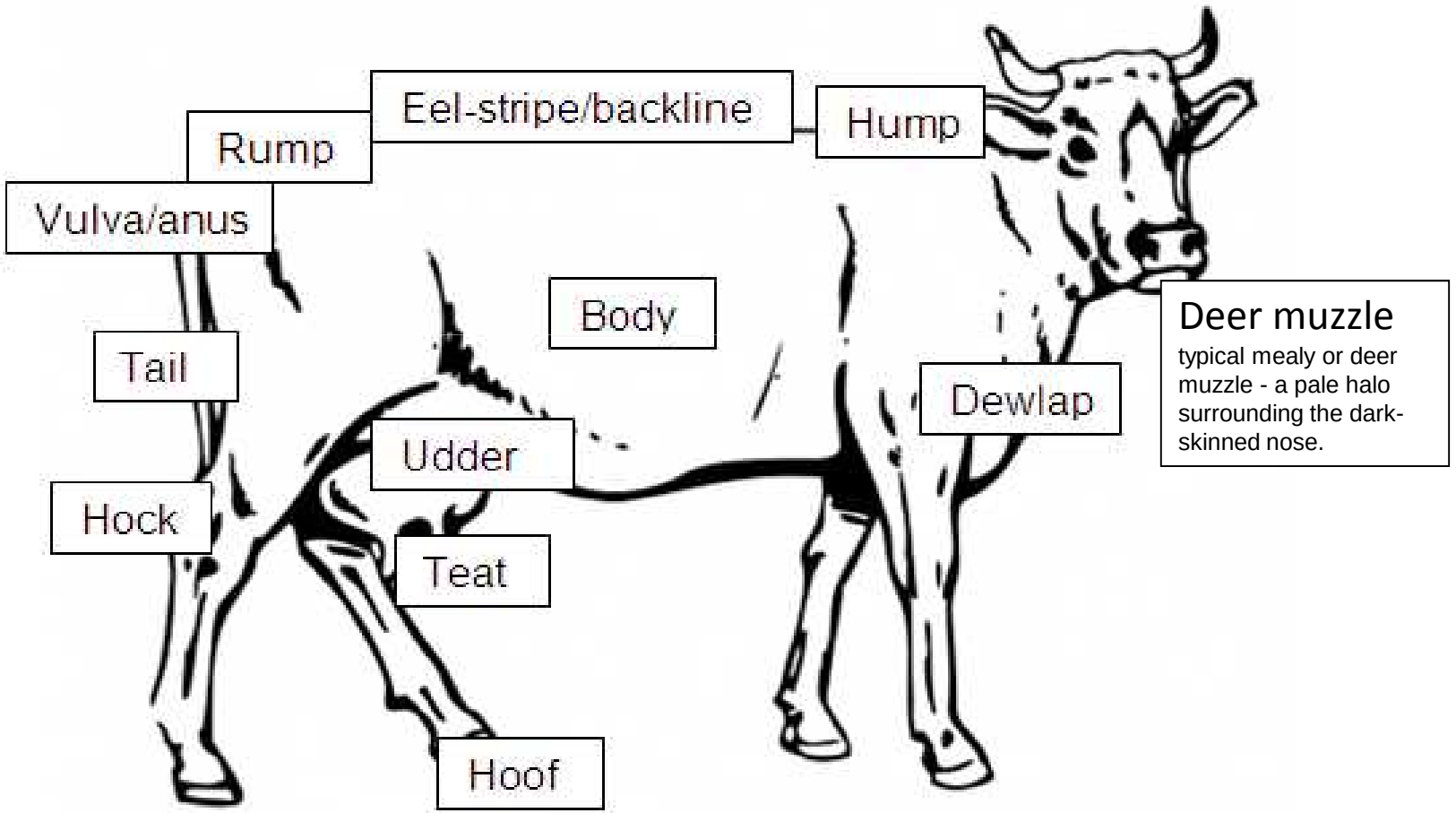
BushaLive

Determination of different types and strains
of Busha Cattle in the Balkans,
Sustainable use of Busha Cattle:
Comprehensive overview in the field, development
of an overall-crossborder conservation model

Waltraud Kugler

Pogradec, Albania September 2008: Shorthorn Cattle of the Balkan

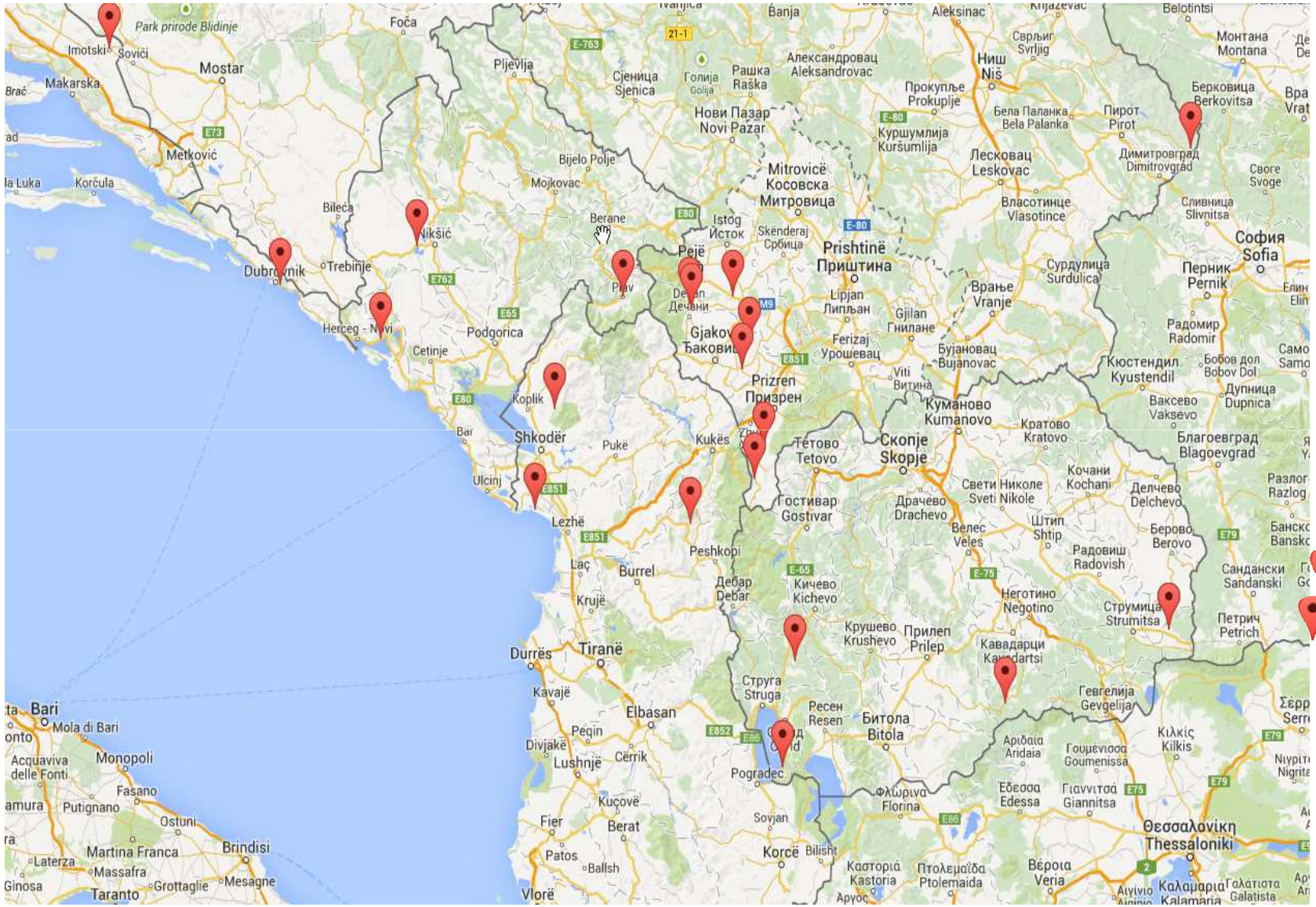
Determination of different types and strains of Busha Cattle in the Balkans



Information about the situation, production, conservation and market

Overall-crossborder conservation model

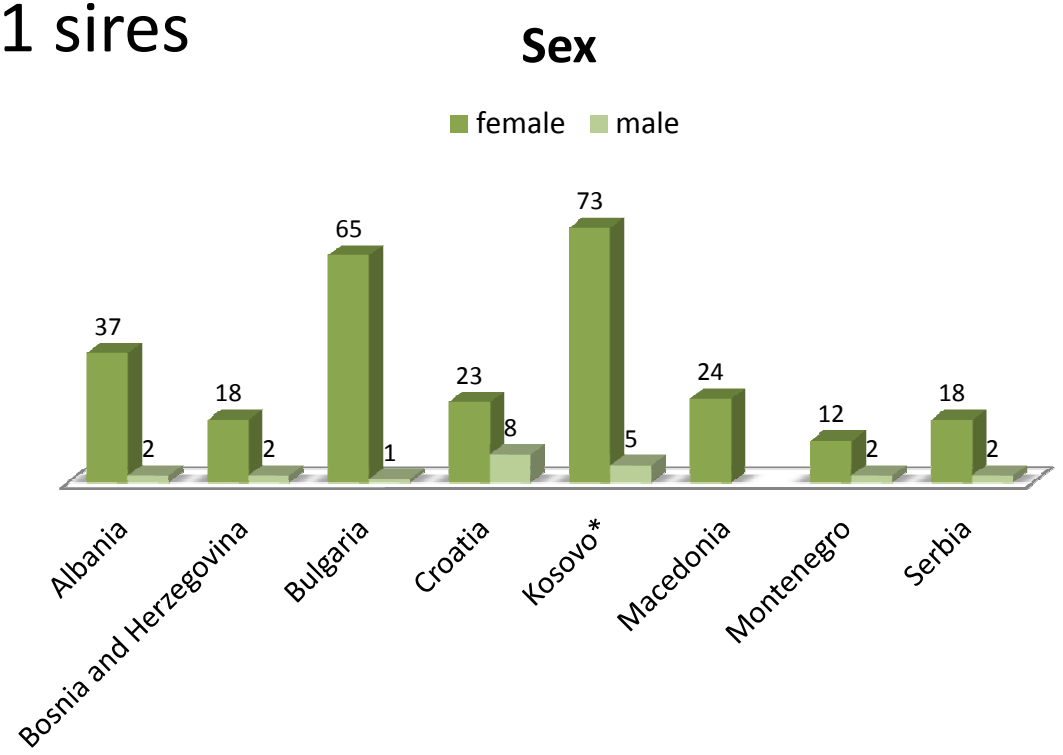
Locations of sampling



Analysis of the surveys

224 surveys from 7 countries (no from Bulgaria, 66 blood samples)

203 cows / 21 sires



* This designation is without prejudice to positions on status, and is in line with UNSCR 1244 and ICJ Advisory opinion on the Kosovo declaration of independence.

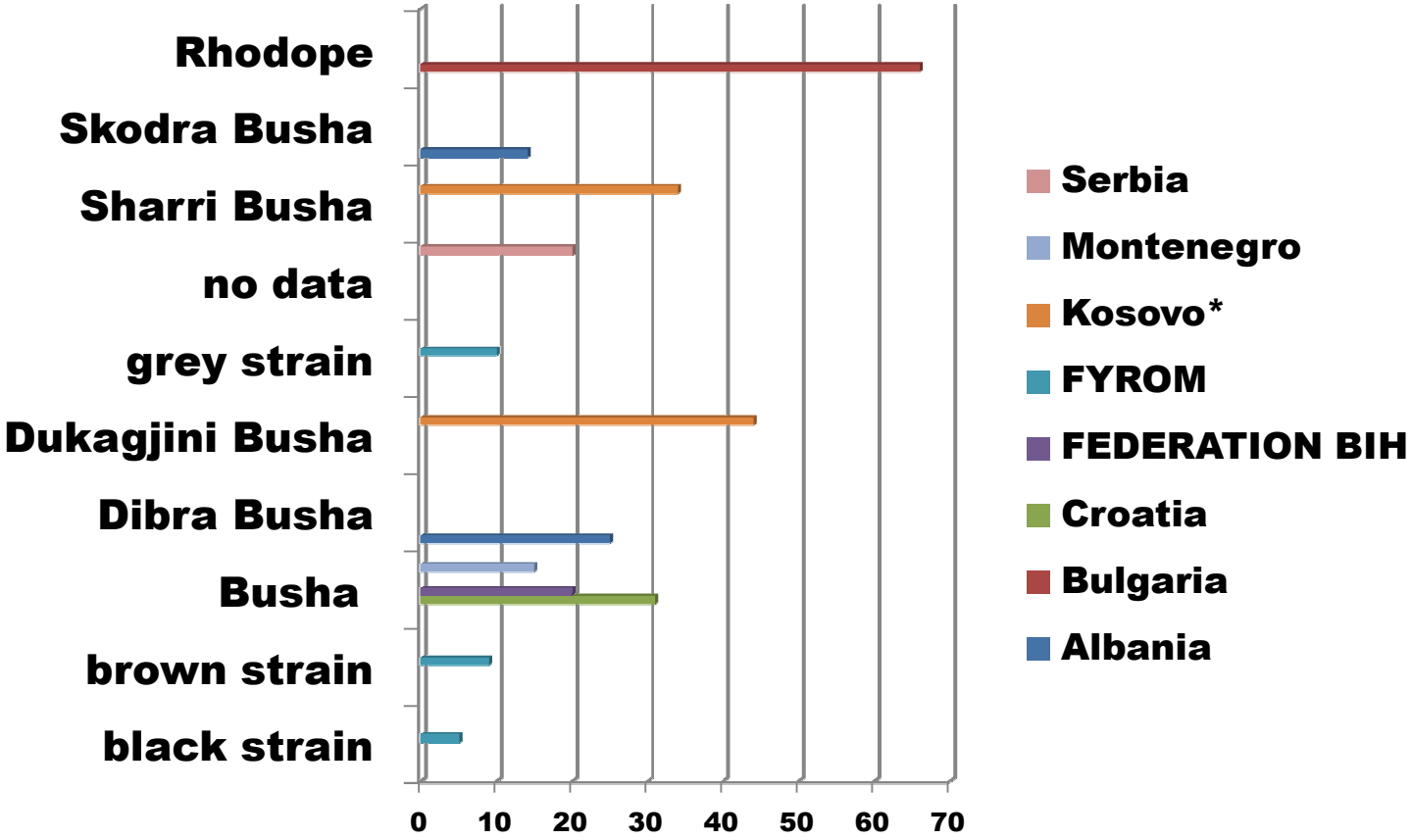
General Information
Population Trend

Country	Decreas	Increas	No data	Stable	Total
Albania			39		39
Croatia		16	15		31
BIH	20				20
FYROM	3			21	24
Kosovo*	33	36		9	78
Montenegro	9			6	15
Serbia	20				20
Total	85	52	54	36	227

Kosovo* = *This designation is without prejudice to positions on status, and is in line with UNSCR 1244 and ICJ Advisory opinion on the Kosovo declaration of independence.

General Information

Strains



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Busha Strains

Bulgaria










Croatia








Busha Strains

Kosovo*

BiH

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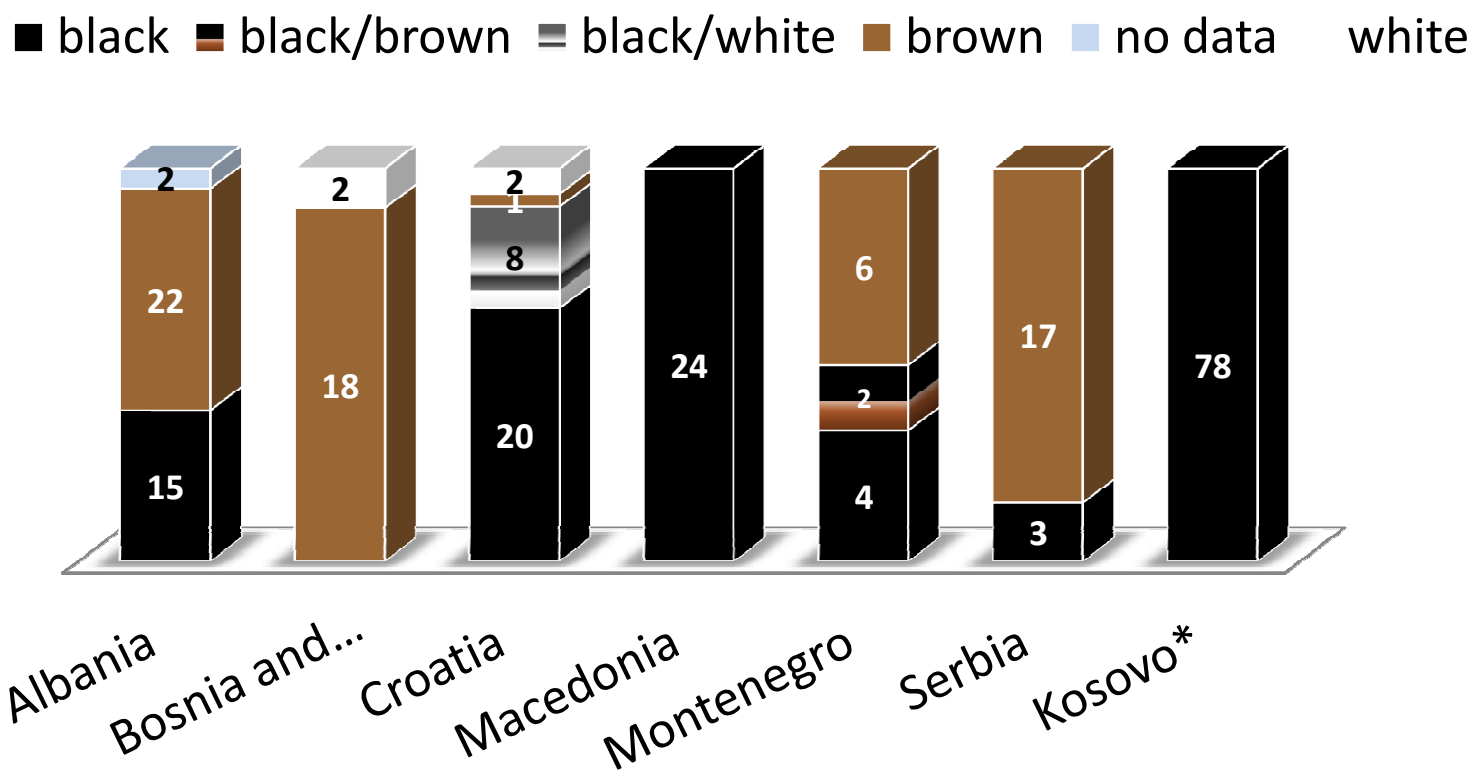
Physical Characteristics Body

Vulva / Anus



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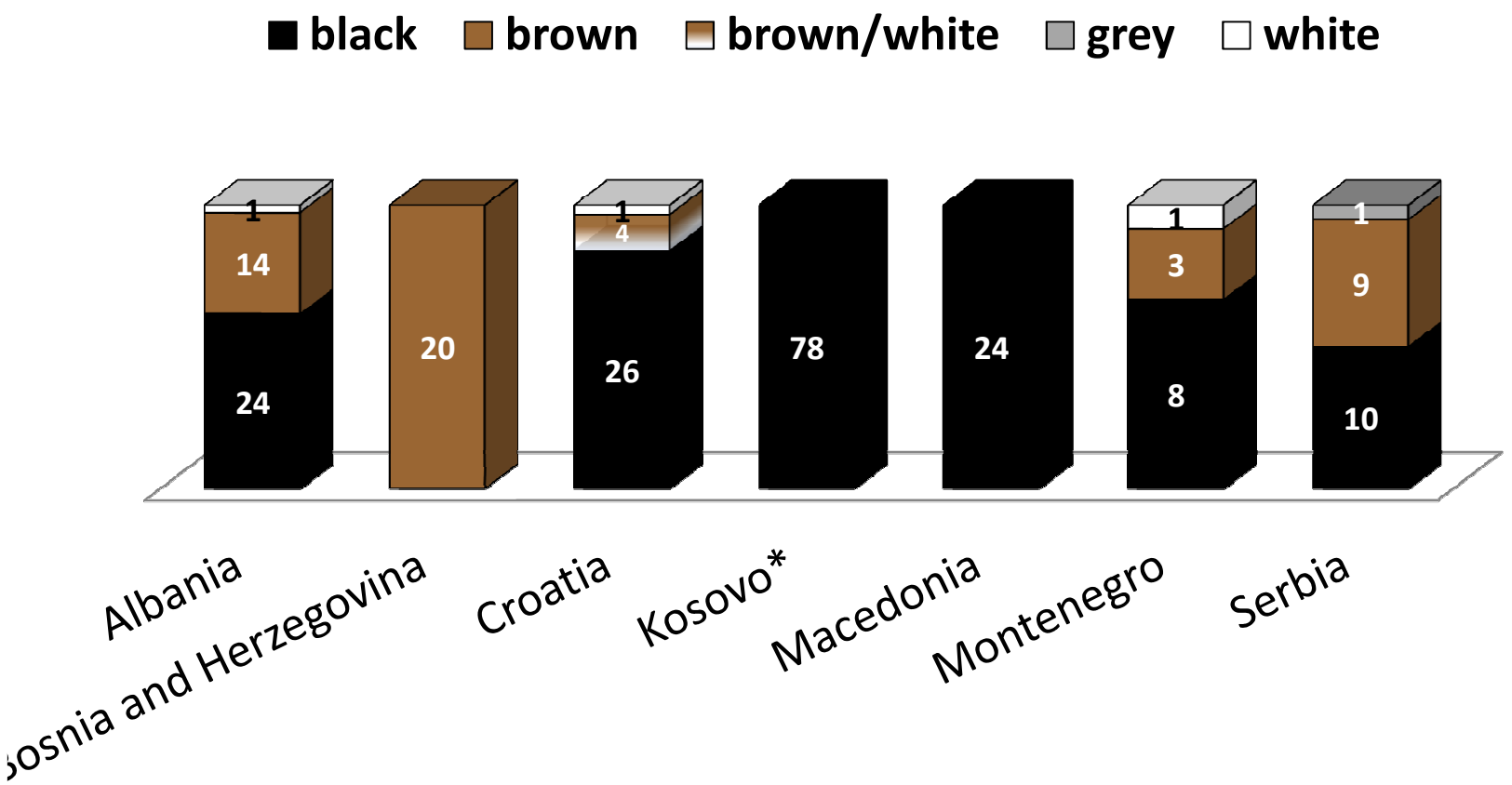
Physical Characteristics Body

Hoof colour



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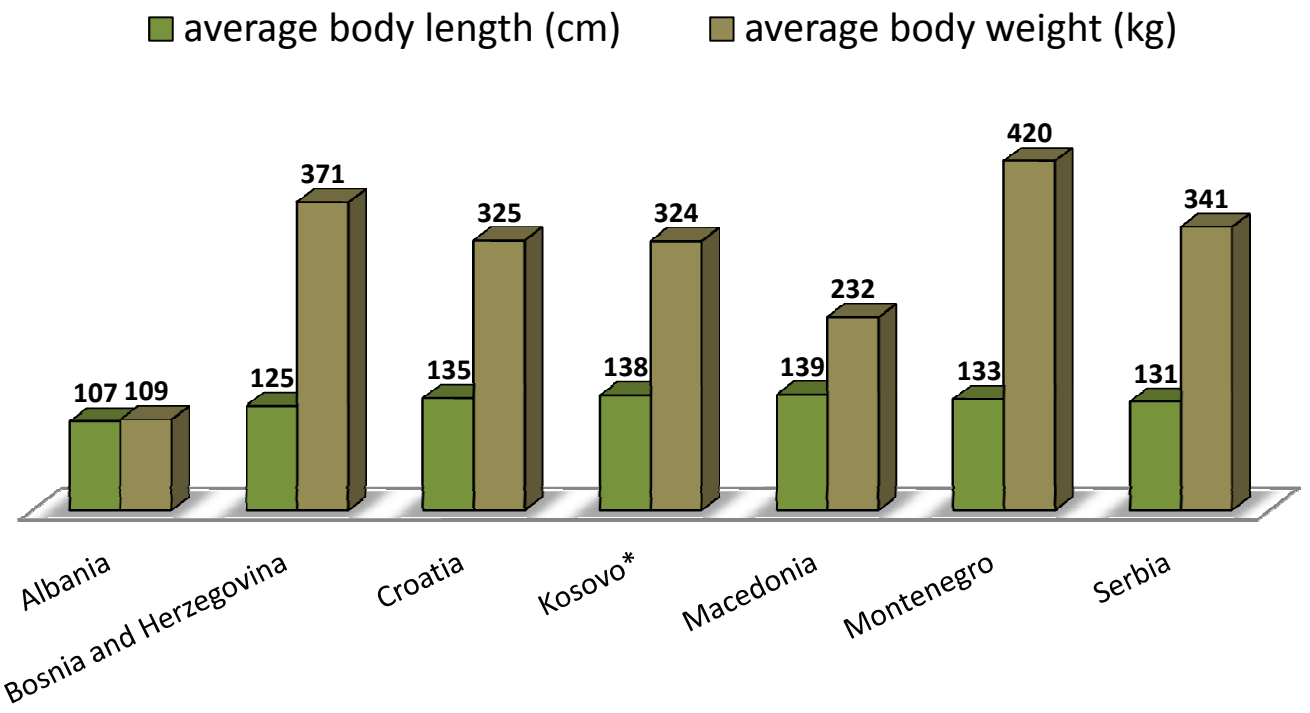
Physical Characteristics Body

Body length /weight



Tail length: mainly medium; FYROM: all lang

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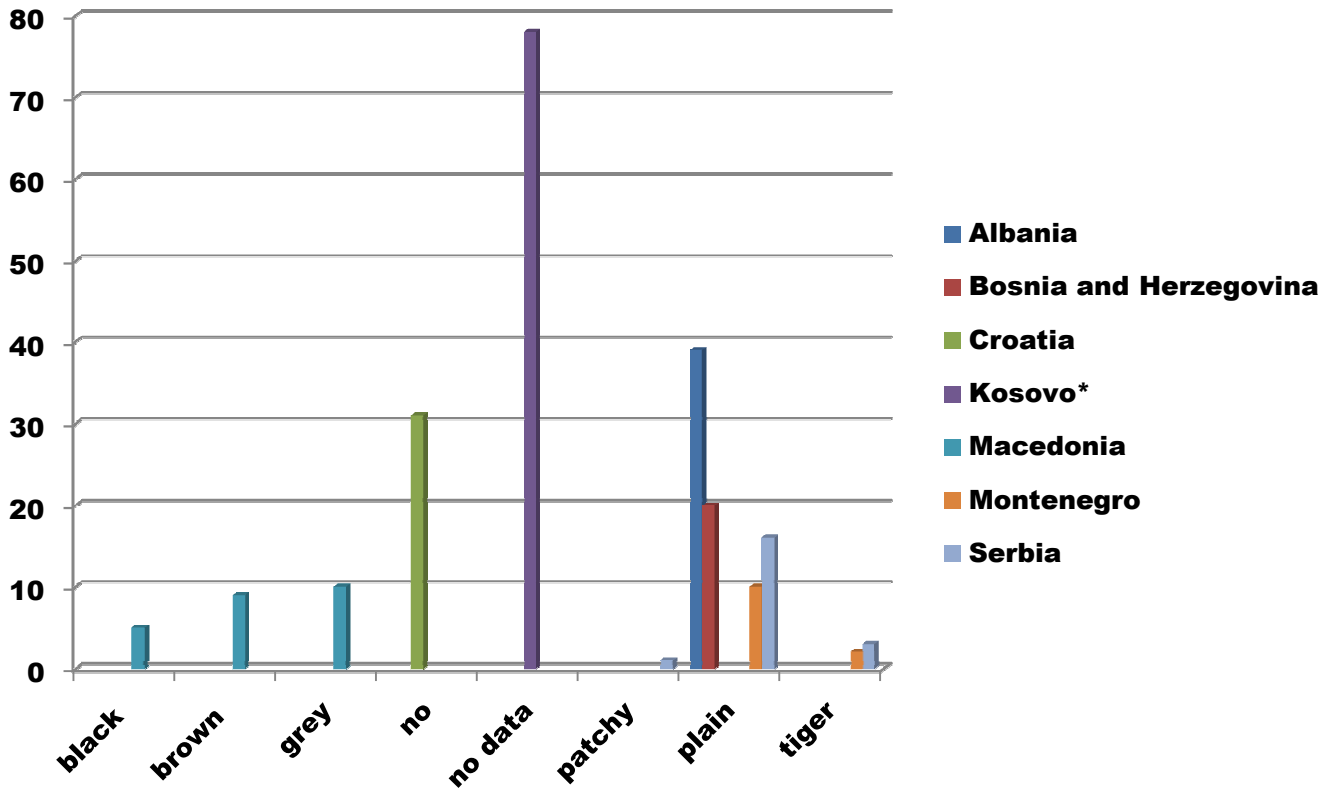
Physical Characteristics Body

Body hair colour



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Physical Characteristics Body

Eelstripe occurence

Country	Eelstripe
Albania	no
BiH	no
Croatia	Partwise farm 1 Šestanovac / Imotski
Kosovo*	no / no data
FYROM	no
Montenegro	no
Serbia	yes

Physical Characteristics Body

Hump/Dewlap

Country	Hump	Dewlap
Albania	absent except (SKB13/14)	absent
BiH	small	small
Croatia	absent-small	small-medium
Kosovo*	medium-small	absent
FYROM	absent-small	
Montenegro	small-medium	small-medium
Serbia	absent	small

Physical Characteristics Body

Backline profile / Rump profile

Country	Backline	Rump
Albania	straight (23)/slopes upwards (12)/slpoes down (4)	mainly sloping
BiH	straight	flat
Croatia	straight / slighty slopes (7)	slighty slopes / 6 flat
Kosovo*	straight / slpoes (4)	flat / sloping (8)
FYROM	straight & slope (8)	mainly flat
Montenegro	straight / slopes upward (2) / dipped (2)	sloping
Serbia	straight	sloping

Physical Characteristics Head

Country	Profile	Muzzle	Eyelid colour	ear shape	Ear orientat	Horns	Horntips	Horn Shape
Albania	straight / convcave (Dibra)	Deer / single not pigmen ted	Black /brown / yellow	Rounded	lateral	Brown / some hornless	black	curved
BiH	concave	Deer	black	Straight	lateral	brown	brown	curved
Croatia	straight	Deer	Black / 6 not	Rounded	Lateral / singel dropping	White / some brown	black	curved
Kosovo*	straight	Deer	black	Straight	Mainly lateral	Brown / white	black	curved
FYROM	straight	Deer	black			white	black	curved
Monteneg ro	straight	Deer	black	straight	lateral	white	White /black	Some straight
Serbia	straight	Deer	Black /2 d.grey	Rounded / straight edged	lateral	white	black	curved

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SAVE

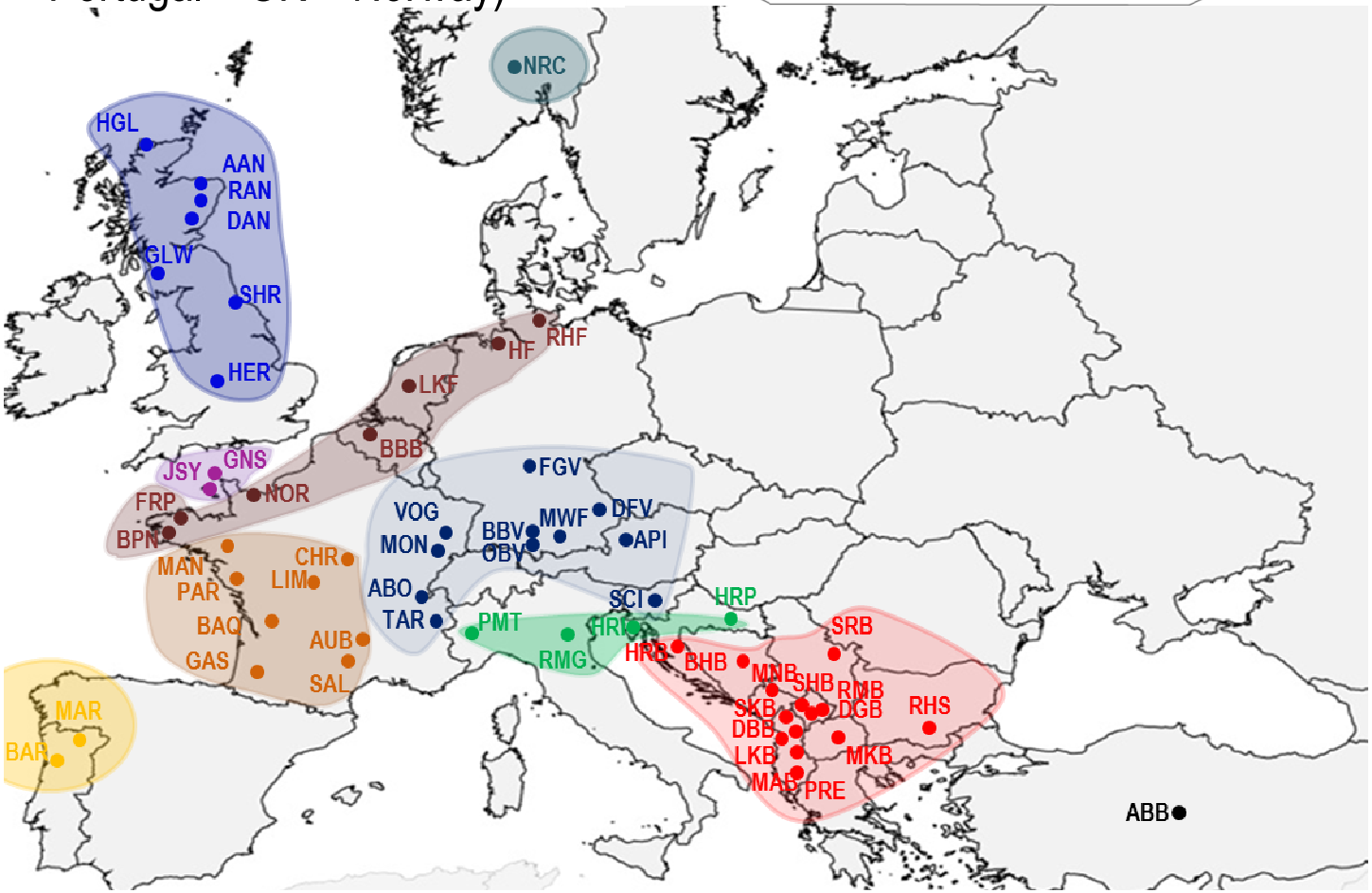
Short overview of genome-wide analysis of 14 Busha strains

Ramljak, J., Ivankovic, A., Brka, M., Stojanovic, S., Markovic, B., Bytyqi, H., Nikolov, V., Bunevski, G., Kume, K., Kugler, W., Broxham, E., Medugorac, I.,

Annual Meeting of the European SAVE network and 9th European Agrobiodiversity seminar
Lake Kerkini, Greece, 10-12 September 2015

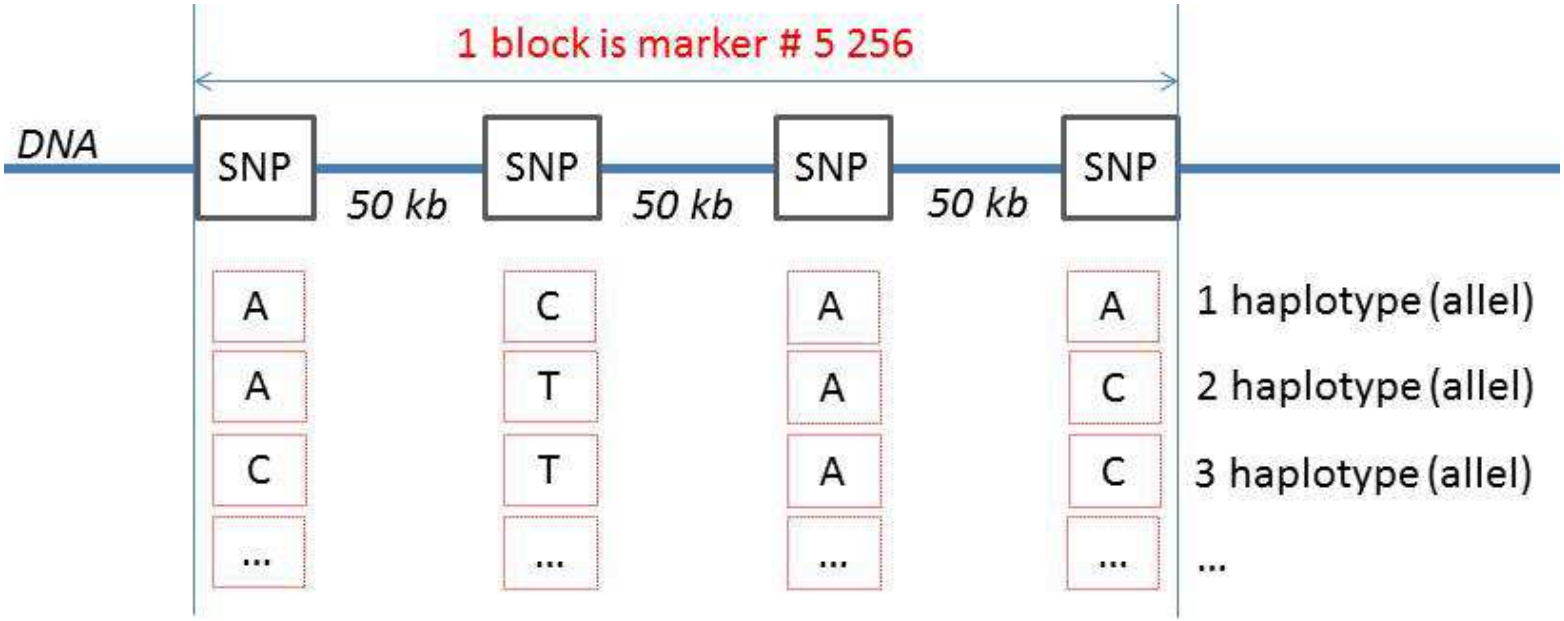
Results: geographic map

- **overall: 58 breeds**
  - 2 outliers (ZEB, NDA)
  - 14 Busha strains + 42 breeds from Europe
- distribution of 42 breeds cover large geographical area (Italy – France – Portugal – UK – Norway)



Results: Material and Methods

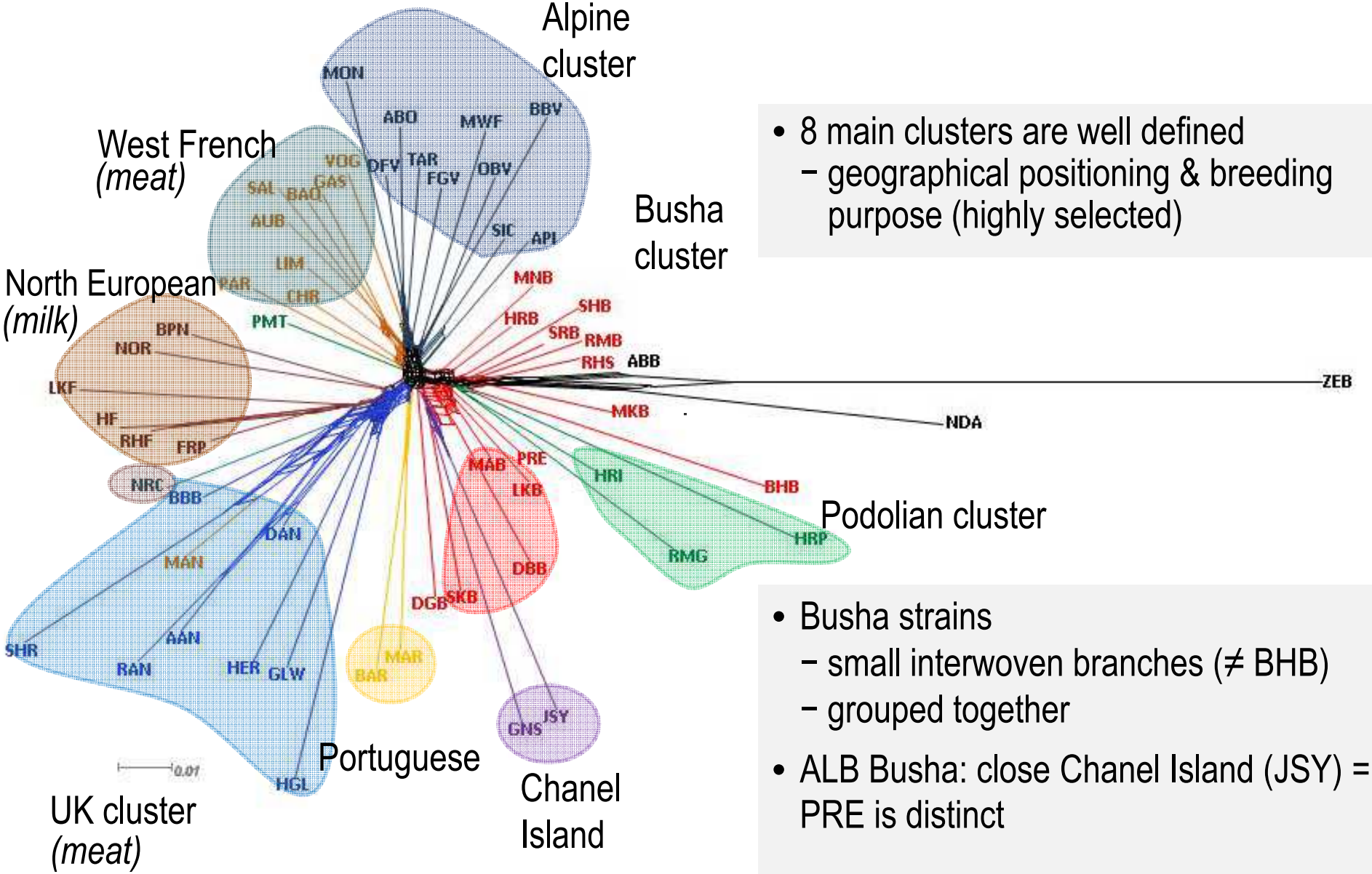
- in total genotyped 1.828 animals for ~54.000 SNPs
- to omit ascertainment bias we didn`t used SNP directly
- combination of 4-neighboring SNP with maximal distance of 50kb between neighbor SNPs
- these blocks of 4-SNP (N=5.256) were used as markers in all analyses
- haplotypes of these blocks (max 16 per marker) were used as alleles in all analyses



Results: Summary table of genetic diversity of cattle breeds excluding outliers

Population	*N*	*nA*	$\overline{nA}$	*mA*	$\overline{mA}$	H_E	$\overline{H_E}$	*npA*	$\overline{npA}$	*npA2*	$\overline{npA2}$
RHS (Bulgaria)	24	41194		7.84		0.741		175		212	
MKB (Macedonia)	24	39115		7.44		0.729		133		181	
PRE (Albania)	39	43441		8.27		0.736		170		215	
MAB (Albania)	**43**	**46135**		**8.78**		0.742		**235**		**272**	
LKB (Albnia)	27	40383		7.68		0.726		141		159	
DBB (Albania)	25	35484		6.75		0.703		85		100	
SKB (Albania)	**14**	32882	**39879**	6.26	**7.59**	0.708	**0.725**	**53**	**141**	81	**177**
DGB (Kosovo)	21	34321		6.53		0.702		56		98	
RMB (Kosovo)	26	42970		8.18		**0.743**		183		242	
SHB (Kosovo)	21	38293		7.29		0.726		140		159	
MNB (Montenegro)	20	38170		7.26		0.729		88		144	
SRB (Serbia)	20	39455		7.51		0.736		129		158	
BHB (Bos. & Herz.)	20	**29608**		**5.63**		**0.641**		56		**73**	
HRB (Croatia)	28	43127		8.21		0.742		159		200	
Podolian group	97	-	33696	-	6.41	-	0.681	-	75	-	105
Alpine group	411	-	34571	-	6.58	-	0.678	-	52	-	78
North European	232	-	34529	-	6.57	-	0.687	-	59	-	69
West Franch	222	-	36431	-	6.93	-	0.692	-	81	-	106
Portugese	28	-	29824	-	5.68	-	0.667	-	67	-	79
Chanal Island	68	-	**28904**	**-**	**5.50**	**-**	**0.619**	**-**	**35**	-	55
England	212	-	32850	-	6.25	-	0.664	-	62	-	71
Norway breed	32	-	34039	-	6.48	-	0.685	-	79	-	94
Total	**1654**	**-**	**-**	**-**	**-**	**0.681**	**0.681**	**-**	**651**	**-**	**833**

Results: phylogenetic tree – relationship



- 8 main clusters are well defined
  - geographical positioning & breeding purpose (highly selected)

- Busha strains
  - small interwoven branches (≠ BHB)
  - grouped together
- ALB Busha: close Chanel Island (JSY) = PRE is distinct

Results: Table of realised relationship IBD (**I**dentical **B**y **D**escent) – **W**ithin and **B**etween breeds

SAVE foundation

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Population	*Inbreeding*		*IBD (**W**)*		*Maximal IBD **(B)***	
	mean	*SD*	*mean*	*SD*	*IBD*	*(Pop)*
MKB (Macedonia)	**1.102**	0.077	0.004	0.183	0.057	RHS
PRE (Albania)	1.032	0.026	0.002	0.087	0.035	RHS
MAB (Albania)	1.044	0.059	0.001	0.057	**0.050**	**JSY**
LKB (Albania)	1.035	0.042	0.003	0.097	0.034	RHS
DBB (Albania)	1.062	0.066	0.002	0.200	**0.044**	**JSY**
SKB (Albania)	1.070	0.085	0.005	0.123	**0.032**	**JSY**
RMB (Kosovo)	1.035	0.028	0.002	0.056	0.048	MKB
SHB (Kosovo)	1.066	0.070	0.005	0.132	0.044	MKB
DGB (Kosovo)	1.053	0.069	0.006	0.181	0.021	RMB
RHS (Bulgaria)	1.080	0.053	0.003	0.105	0.057	MKB
SRB (Serbia)	**1.101**	0.086	0.001	0.118	0.053	MKB
MNB (Montenegro)	1.049	0.042	0.004	0.090	0.026	MKB
BHB (Bosnia&Herzegovina	**1.120**	0.081	**0.019**	**0.348**	0.037	MKB
HRB (Croatia)	1.031	0.031	0.002	0.042	0.029	RHS

Performance Lactation kg

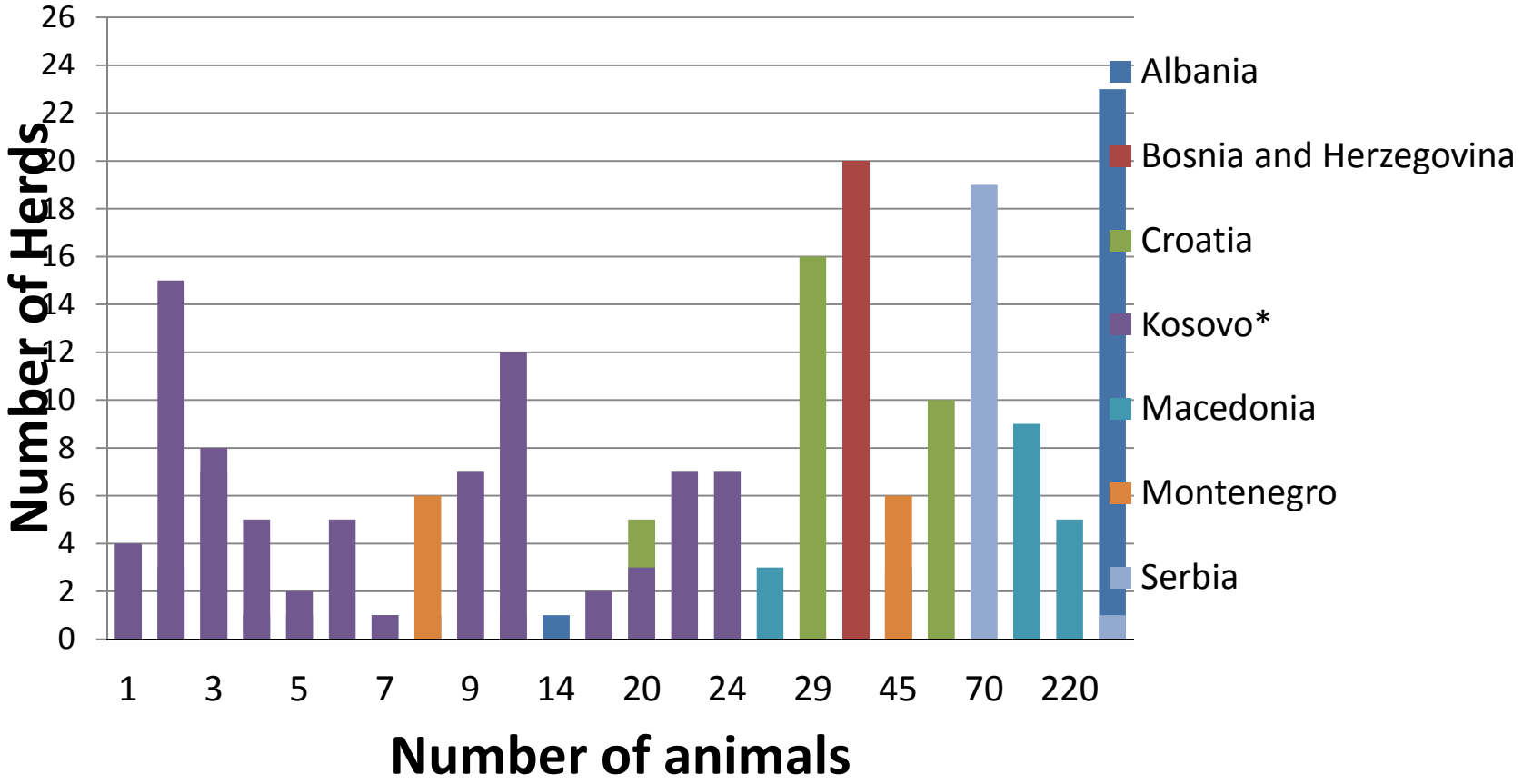
4 lactations: 6914 kg milk /lactation
Body weight 607 kg
6914 X 4 : 607 = 45.6 kg live performance

8 lactations: 1300 kg milk/lactation
Body weight:192 kg
1300 X 8 : 192 = 54.2 kg live performance

Performance - Lactation

Country	milk production /lactation	Lactation length (days)	Daily average milk (kg)k	Av. No of births	Body weight	av. milk production
Albania	1360 av.	284	4.9		109	
BiH					371	
Croatia	1250	250	5		325	
Kosovo*	1990 av.				324	
FYROM	1260	210	6	8	232	10800 /14616
Montenegro	1864	300	6.5	10	420	18640
Serbia	1080	180	6		341	

Farm Level Data – Herd size



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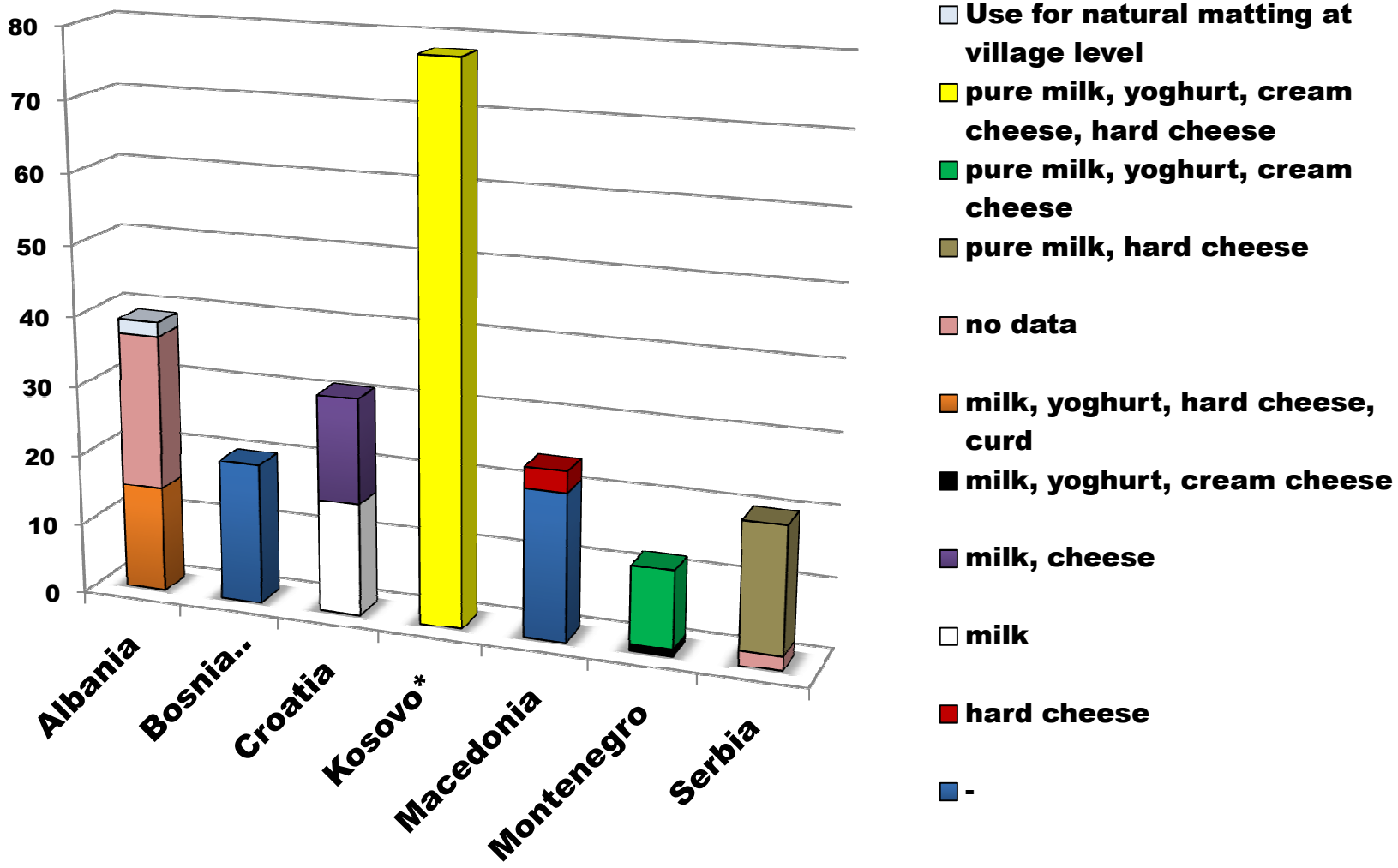
Products & Marketing



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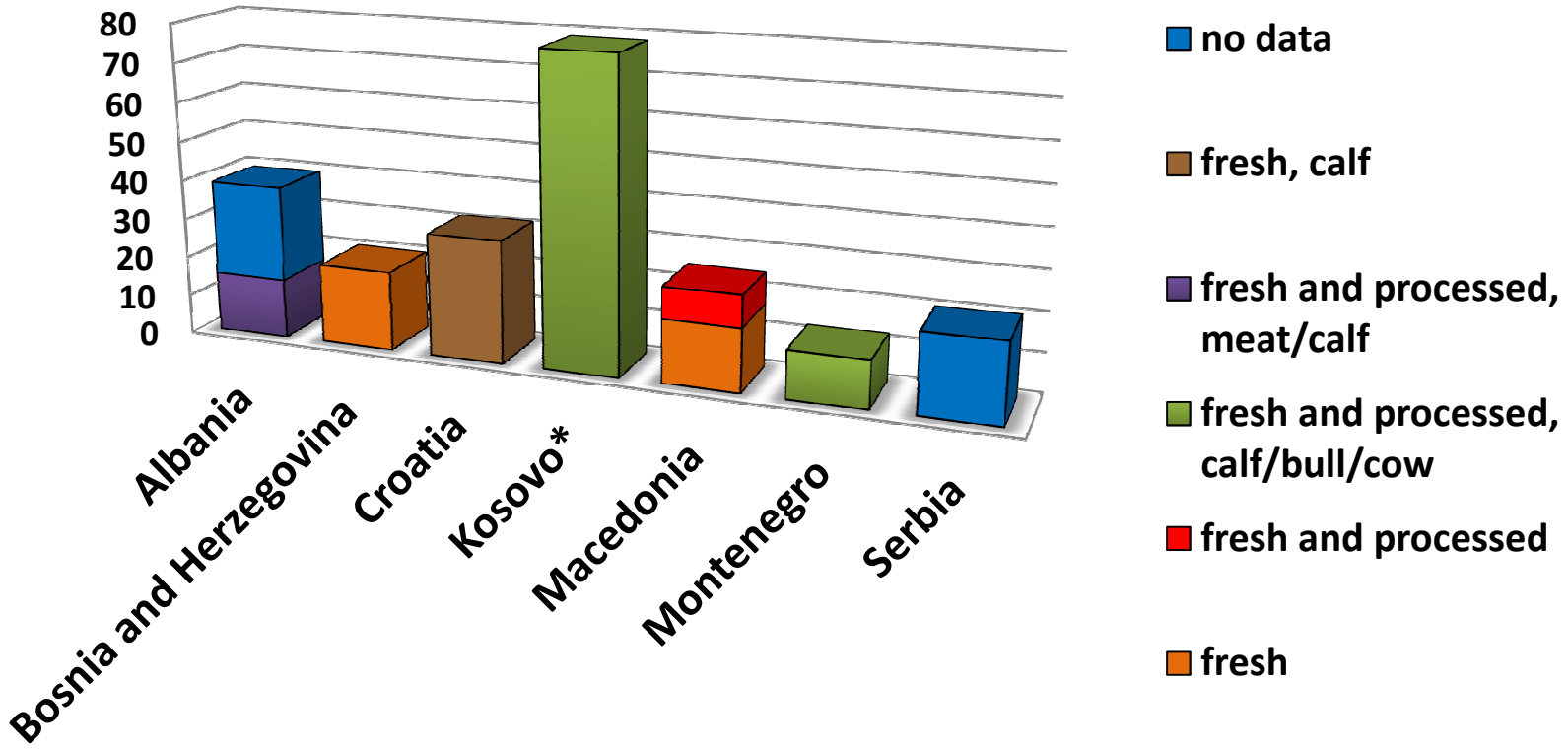
Meat production & market



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Recording System

Country	Recording System	Ear tag	Recording system	Association of Busha breeders
Albania	_	+	_	_
Montenegro	+	+	Agency for food and veterinary	-
Macedonia	+	+	Faculty of agricultural Sciences and Food Skopje	NGO Busha Skopje (2011)
Kosovo		+		_
Serbia	+	+	Institut for animal husbandry Faculty of Agriculture Novi Sad	Local and regional level
Bosnia and Herzegovina	-	+	Agency for identification in Banja Luka (no check-out ear tags)	+
Croatia	+	+	Croatian Agriculture Agency	Association of Busha breeders (2003)

Exchange of animals

- Between Busha Meta Population
- Collaboration with Countries
- Exchange of Experience
- Responsible Person
- Breeder
- Controlled exchange of semen
- Refreshing blood (with most similar breeds)

needs to stay in a low level


Conclusions

- **Do we need a common Breed Standard?**
- It is difficult to define a common standard as there is a large range within the Busha metapopulation.
- A standard can also be damaging to conservation as it restricts the diversity found within the population to one type of Busha and some valuable traits may be lost.
- The diversity and the range are important for conservation.
- It is better to speak of guidelines for common characteristics to conserve the crossborder breed in a meta-population with many strains.

- **A strategy for ongoing breeding management**
- Within each country it is important that the breeders are in contact with each other and that the recording of the strains takes place.
- This recording should also include the ISO codes to support the ongoing exchange of animals or material with a unique ID of the animals.
- The exchange, guided by the results of the genotyping, can be used to solve the problems of inbreeding and introgression within population groups