

Genetic diversity of Tibetan Terrier



Univerza v Ljubljani
Biotehniška fakulteta
Oddelek za zootehniko



Mateja Janeš^{1,2}, Minja Zorc², Vlatka Cubric-Curik¹, Ino Curik¹
and Peter Dovč²



EAAP

69th ANNUAL MEETING
Dubrovnik, Croatia
27th to 31st August 2018



Conventional and traditional livestock production systems – new challenges

Dogs in Tibet

- Do-Khyi
(Tibetan Mastiff)



- Tibetan Spaniel



- Khyi Apso
(Long haired
Tibetan Mastiff)



- Shih Tzu



- Lhasa Apso



- Sha-Khyi
(Tibetan
hunting dogs)



- Tibetan Terrier





Development of Lamleh lineage

- 1895: „neither more nor less than a rough terrier“
- 1922: India, Dr. A.R.H. Greig, **Bunty** and **Rajah**
- 1930: Lamleh Kennel
- 1937: the breed was recognized by the Kennel Club



Development of Luneville lineage

- 1953: John Downey,
found Dusky in Liverpool



- Dusky - declared by British judges to be Tibetan Terrier and registered by the EKC as **Trojan Kynos**
- **Trojan Kynos** + **Princess Aureus** = the basis of the **Luneville** Tibetan Terriers

Material and methods

- 68 buccal swabs
 - 25 native
 - 21 Lamleh
 - 4 Luneville
 - 8 F1 (native x lamleh)
 - 6 BC2 (F1 x lamleh)
 - 4 BC3 (BC2 x lamleh)
- Microsatellite genotyping (ISAG set of 18 markers)
- Sequencing of control region of mtDNA
- CanineHD Illumina BeadChip



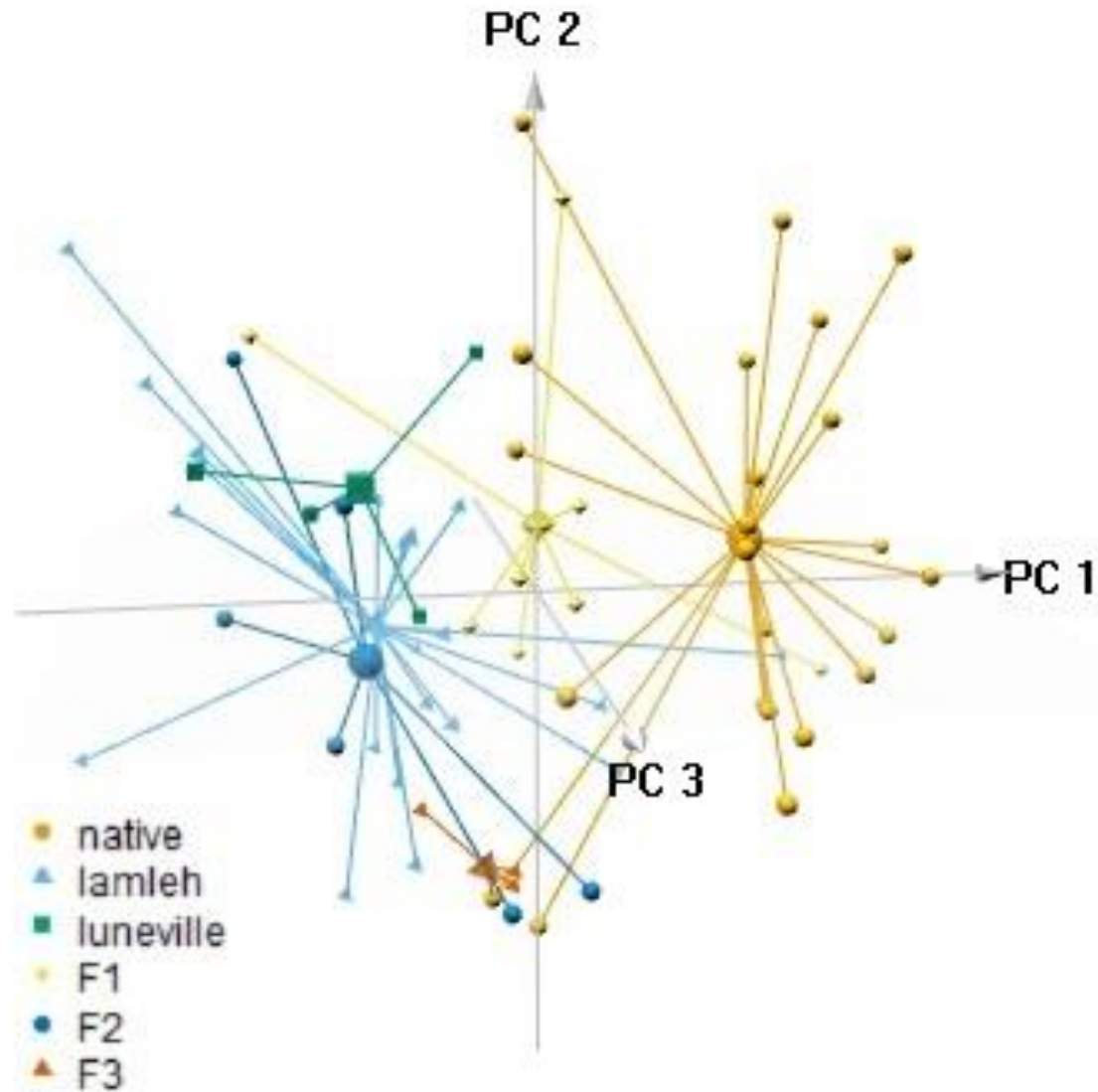
Results - Statistics

Locus	Na			Mean I	Ho	He	Fis	Fit	Fst
	native	lamleh	luneville						
AHTk211	7	6	5	1,05	1	0.76	-0,15	-0,08	0,07
CXX279	6	7	5	1,34	0.81	0.7	-0,16	-0,06	0,08
REN169O18	7	7	7	1,51	0.69	0.74	0,05	0,12	0,07
INU055	6	5	5	1,12	0.65	0.74	-0,05	0,01	0,06
REN54P11	6	5	4	1,22	0.75	0.7	0,01	0,15	0,15
INRA21	6	6	4	1,34	0.88	0.77	-0,15	-0,04	0,1
AHT137	6	6	5	1,77	0.88	0.73	-0,08	0,01	0,08
REN169D01	6	5	5	1,18	0.66	0.72	-0,16	-0,03	0,11
AHTh260	7	7	6	1,48	0.78	0.79	-0,12	-0,02	0,09
AHTk253	6	6	5	1,21	0.53	0.69	0,06	0,13	0,07
INU005	7	6	5	1,37	0.63	0.74	0,04	0,15	0,11
INU030	7	5	5	0,99	0.63	0.76	-0,14	0,03	0,15
FH2848	6	5	5	1,29	0.71	0.73	-0,11	-0,04	0,06
AHT121	7	6	5	1,66	0.94	0.78	-0,14	-0,04	0,09
FH2054	8	8	5	1,41	0.71	0.8	-0,02	0,08	0,1
REN162C04	7	7	5	1,52	0.71	0.74	-0,02	0,08	0,1
AHTh171	6	6	5	1,45	0.85	0.74	-0,09	-0,01	0,07
REN247M23	6	4	4	1,22	0.76	0.74	-0,14	0,01	0,12
	117	107	90						

Results - Statistics

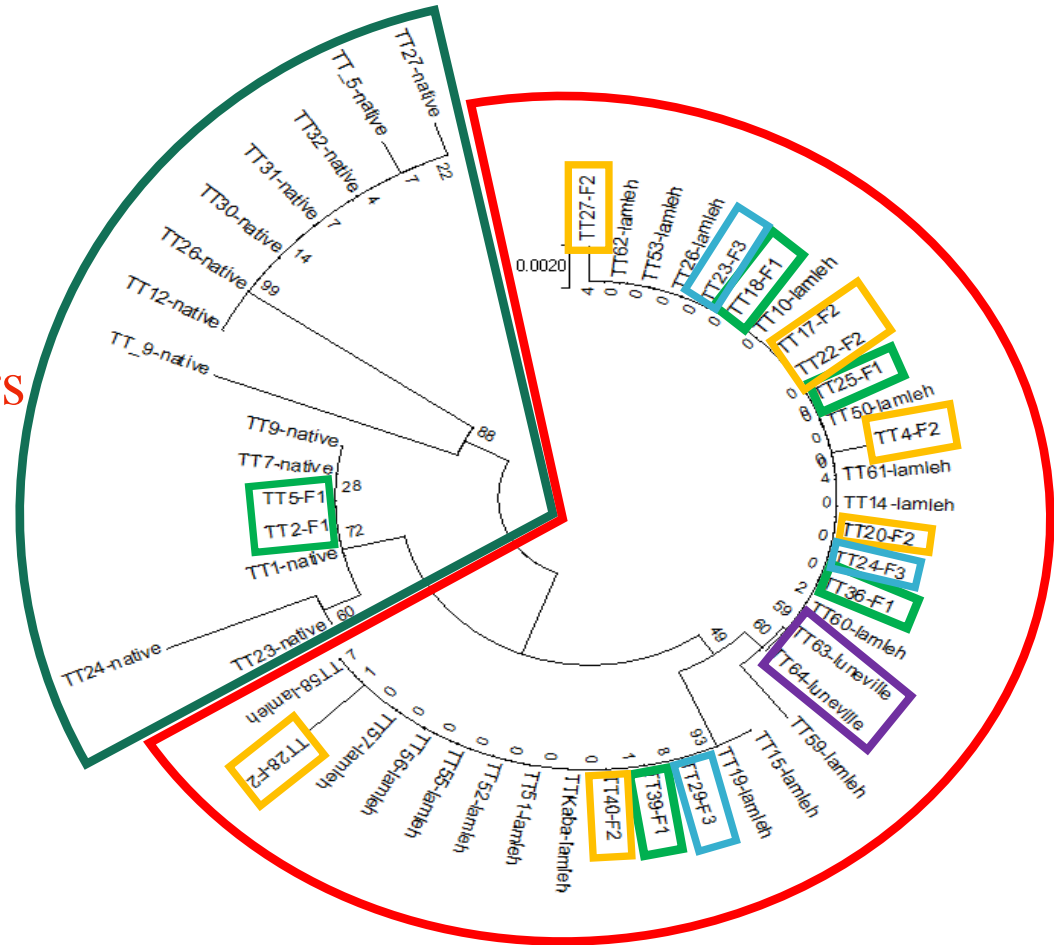
Locus	Na			Mean I	Ho	He	Fis	Fit	Fst
	native	lamleh	luneville						
AHTk211	7	6	5	1,05	1	0.76	-0,15	-0,08	0,07
CXX279	6	7	5	1,34	0.81	0.7	-0,16	-0,06	0,08
REN169O18	7	7	7	1,51	0.69	0.74	0,05	0,12	0,07
INU055	6	5	5	1,12	0.65	0.74	-0,05	0,01	0,06
REN54P11	6	5	4	1,22	0.75	0.7	0,01	0,15	0,15
INRA21	6	6	4	1,34	0.88	0.77	-0,15	-0,04	0,1
AHT137	6	6	5	1,77	0.88	0.73	-0,08	0,01	0,08
REN169D01	6	5	5	1,18	0.66	0.72	-0,16	-0,03	0,11
AHTh260	7	7	6	1,48	0.78	0.79	-0,12	-0,02	0,09
AHTk253	6	6	5	1,21	0.53	0.69	0,06	0,13	0,07
INU005	7	6	5	1,37	0.63	0.74	0,04	0,15	0,11
INU030	7	5	5	0,99	0.63	0.76	-0,14	0,03	0,15
FH2848	6	5	5	1,29	0.71	0.73	-0,11	-0,04	0,06
AHT121	7	6	5	1,66	0.94	0.78	-0,14	-0,04	0,09
FH2054	8	8	5	1,41	0.71	0.8	-0,02	0,08	0,1
REN162C04	7	7	5	1,52	0.71	0.74	-0,02	0,08	0,1
AHTh171	6	6	5	1,45	0.85	0.74	-0,09	-0,01	0,07
REN247M23	6	4	4	1,22	0.76	0.74	-0,14	0,01	0,12
	117	107	90						

Results - Microsatellites (PCA)



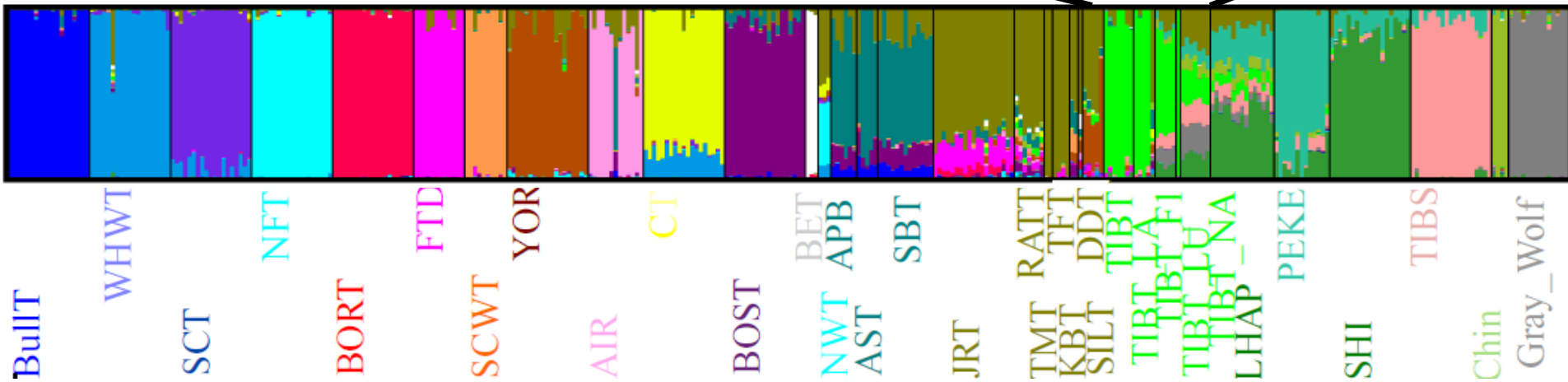
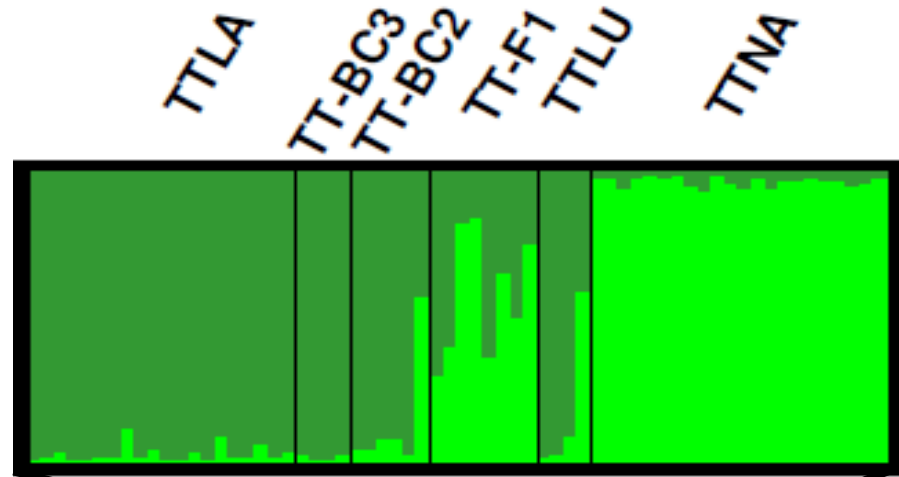
Results - Mt DNA sequencing

- Native Tibetan Terriers
- European Tibetan Terriers
- Luneville
- F1
- BC2
- BC3



Results - STRUCTURE

- Microsatellites
- SNP chip



Conclusions

- Six populations of Tibetan Terriers consist of two clusters – native Tibetan and European
- Genetic basis of native Tibetan Terriers is wider than of European Tibetan Terriers
- Genetic variability of native Tibetan Terriers is not reflected in their phenotype
- Tibetan Terriers are genetically closer to other Asian dog breeds than to other Terriers

Thank you for your attention!

