University of Ljubljana
Biotechnical Faculty

Estimation of dispersion parameters for test-day milk traits of the Bovec sheep in Slovenia

M. Simčič, M. Štepec, J. Krsnik & K. Potočnik

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Introduction

Jezersko-Solčava Sheep

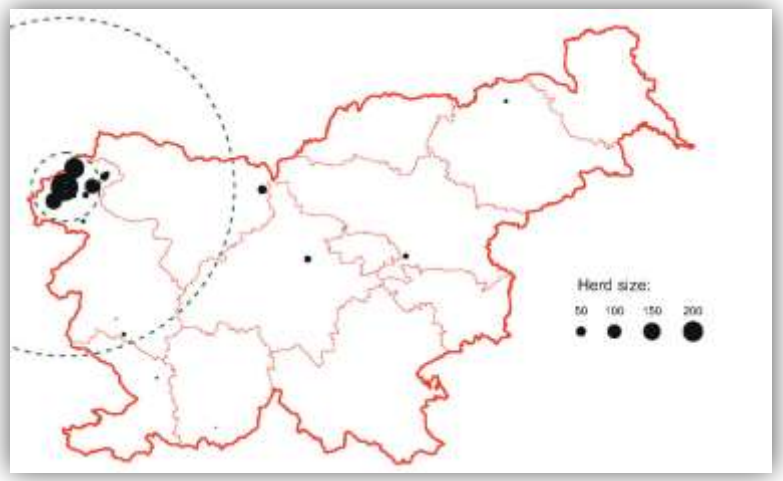
Istrian Pramenka

Bovec Sheep

Bela Krajina Pramenka

Bovec sheep

- Indigenous breed in Slovenia
  - Alpine region – extensive production
- Adapted on mountain grazing during summer time
- Population size = 3.300
- Breeding program since 2005



Bovec sheep

- Small body frame
- Different colour (white, black, black and white)
- Seasonal fertility
- Good milk production in poor environmental conditions

Bovec cheese

- Milk is processed into Bovec cheese
- Protected designation of origin

The objective

to estimate genetic and environmental dispersion parameters for

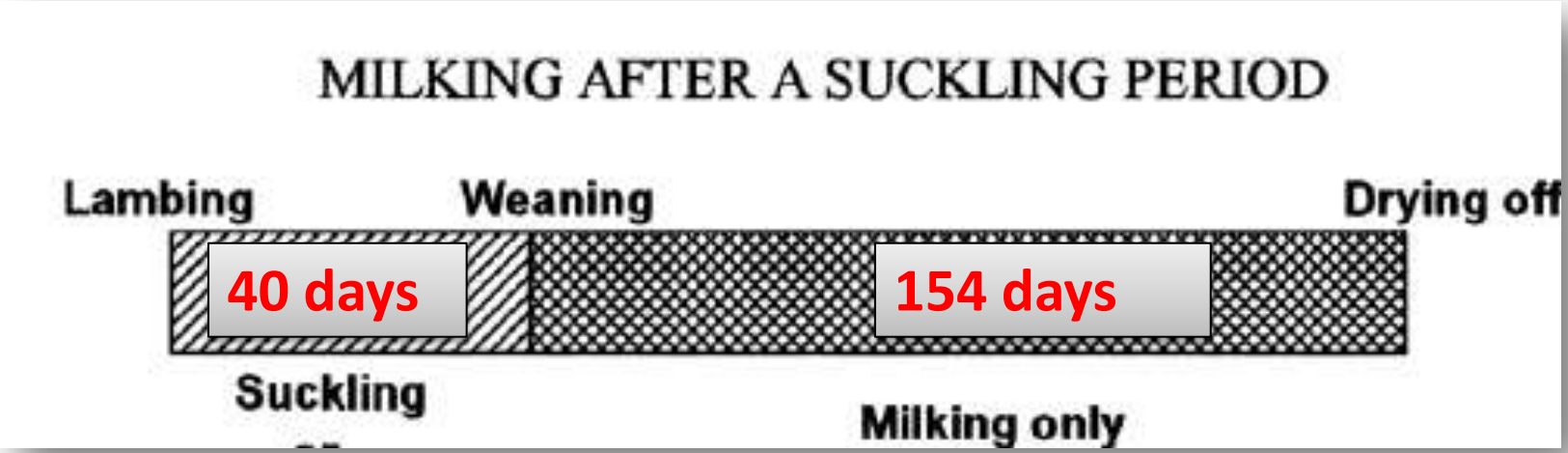
- Daily milk yield (DMY)
- Daily fat yield (DFY)
- Daily protein yield (DPY)

- Fat content (FC)
- Protein content (PC)
- Lactose content (LC)

using test-day records of the Bovec sheep ewes

Milk recording

- ICAR regulations
- AT4 method



Material

- Central Database for Small Ruminants in Slovenia
- 79,470 test-day records (AT4 method)
- 4,837 ewes
- 51 flocks
- From the years 2001 to 2016
- Pedigree information

Descriptive statistics

Trait	n	Average	SD
DMY (g)	79470	**1003**	603.0
DFY (g)	78890	**62.23**	33.62
DPY (g)	78918	**53.39**	29.08
FC (%)	78890	**6.64**	1.57
PC (%)	78918	**5.61**	0.99
LC (%)	78838	**4.50**	0.45

Pedigree structure

- 4,837 animals with records
  - 5 generations of progenitors known
- 6,078 animals in total in the pedigree file
- both parents were known for 73.5%

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Model

Single-trait repeatability test-day animal model

- DMY
- DFY
- DPY

Single-trait test-day animal model

- FC
- PC
- LC

Models

	FIXED EFFECTS				RANDOM EFFECTS		
	Stage of lactation	Parity	Litter size	Breed	Flock-year-season	Permanent environment	Additive genetic effect
DMY	√	√	√	√	√	√	√
DFY	√	√	√	√	√	√	√
DPY	√	√	√	√	√	√	√
FC	√	√	√	√	√		√
PC	√	√	√	√	√		√
LC	√	√	√	√	√		√

Methods

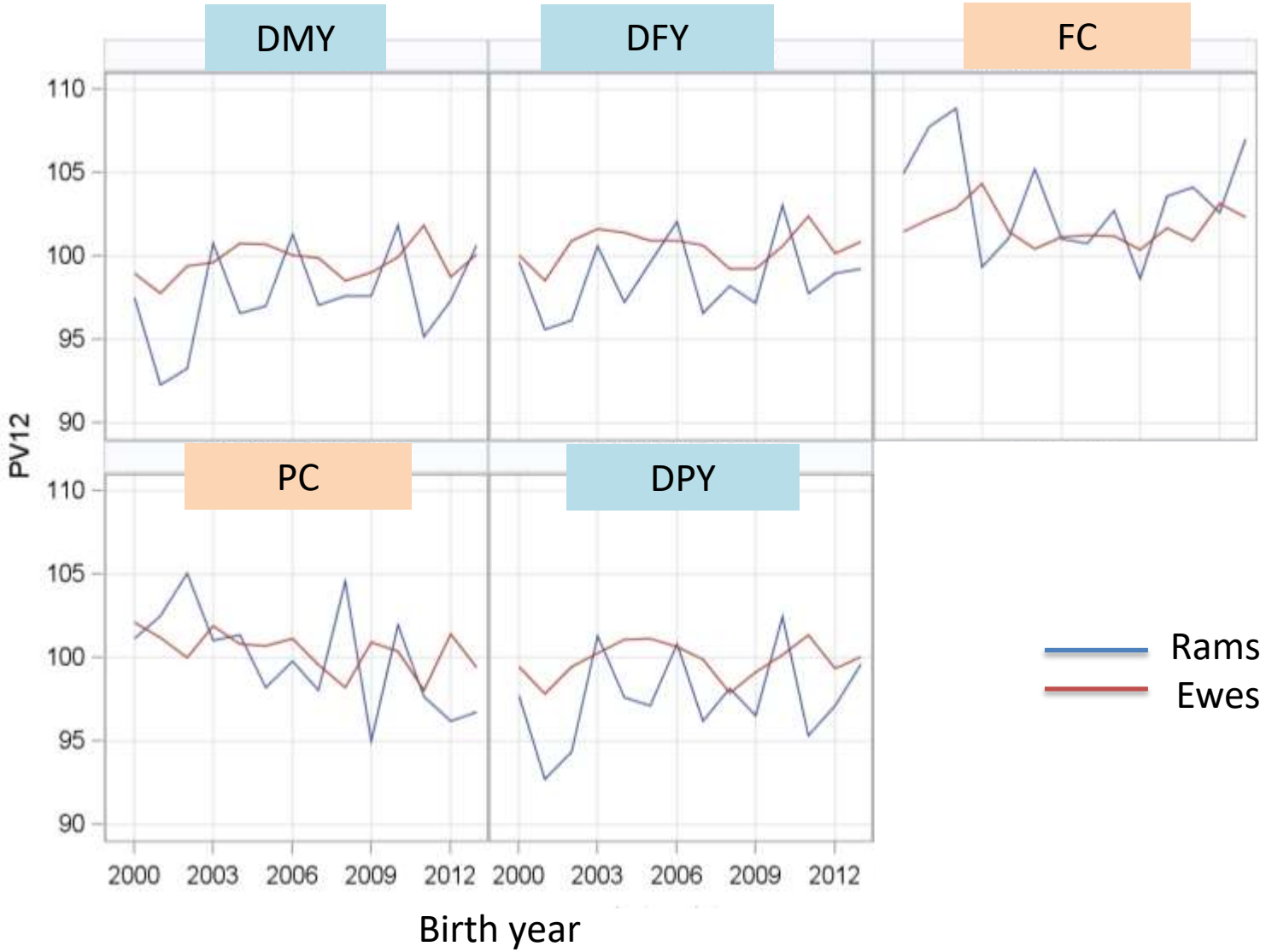
- Fixed effects
  - SAS/STAT – GLM procedure
- Variance components estimation
  - Residual Maximum Likelihood (REML) method
  - implemented in the VCE-6 program

Results

Dispersion parameters

Trait	Additive genetic effect (h^2)	Flock-year-season	Permanent environment	Residual
DMY	0.13	0.27	0.05	0.54
DFY	0.10	0.25	0.05	0.60
DPY	0.12	0.28	0.05	0.55
FC	0.17	0.09		0.74
PC	0.25	0.09		0.67
LC	0.23	0.10		0.66

Genetic trends



Conclusions

- Dispersion parameters are actually used in the breeding value prediction
- Breeding value prediction is applied for milk traits of the Bovec sheep for more than 10 years
- Heritabilities for milk traits were in expected range, similar than reported in the literature

Thank you for your attention!