66th EAAP ANNUAL MEETING

INNOVATION IN LIVESTOCK PRODUCTION: FROM IDEAS TO PRACTICE

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Mare's milk production with Lipizzan mares

Klemen POTOČNIK, Mojca SIMČIČ, Ana KAIĆ

University of Ljubljana Biotechnical Faculty

University of Zagreb Faculty of Agriculture

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Background

- Small, not competitive populations
- From 2004 the responsibility for horse breeding in the Faculty
- Reorganization of the EER centre
- Indigenous breed – Lipizzan horse
- All-round horse

The aim

- How to make breeding sustainable?

Possibilities

- Sport - just some horses
- Riding – driving school
- Leisure use
- Tourism
- EAAT
- Agriculture and forestry
- Meat production & processing
- Milk production & processing

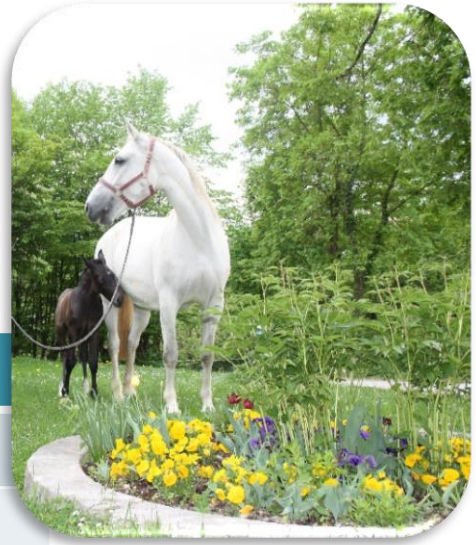
Use!

Equine Education & Research centre

- Unit of Biotechnical Faculty
- Only Lipizzan horses from 2009
- First foals in 2009
- First mare’s milk samples in 2010
- First routine milking in 2011

Lipizzan mares

- All three in 8th year of age
- 2nd foaling



Mare	WH	CG	Foaling Date	Foal sex
Bistrica IV	156	187	14th of March	female
Thais VII	159	186	27th of April	female
Famosa XI	160	198	10th of March	male

Routine milking

- Machine milking
- Starting in 9th week of lactation
  - From Monday to Friday
  - Weekend - resting
- Weaning at 7:30 AM
- Milking at 10:30 AM, 1:30 and 4:30 PM

Milking technology

- 5 weeks experiment:
  - from mid August to mid September
  - 4^{th} to 6^{th} month of lactation
- Each week on Thursday:
  - Collecting milk samples
    - Each milking (n = 3/day) of each mare (n = 3)
  - Milk yield recording (volume – mL)
  - Chest girth of mare‘s and foals recording

Experiment ≠ Routine!

- Even we train experiment work flow before
- After each mare milking
  - Measure the volume of the milk yield
  - Prepare the milk samples for lab
- Other people involved

Mare’s milk quality & quantity

- Milk yield (MY)
- Protein content (PC)
- Fat content (FC)
- Lactose content (LC)
- Somatic cell count (SCC)
- Total bacteria count (BC)
- Freezing point (FP)

Chest girth

- Measured each TD after weaning
  - Foals
  - Mares

Estimated Body Weight (kg) = G^3 x 90
G = chest girth in metres

- Daily gain = gain EBW/28 days

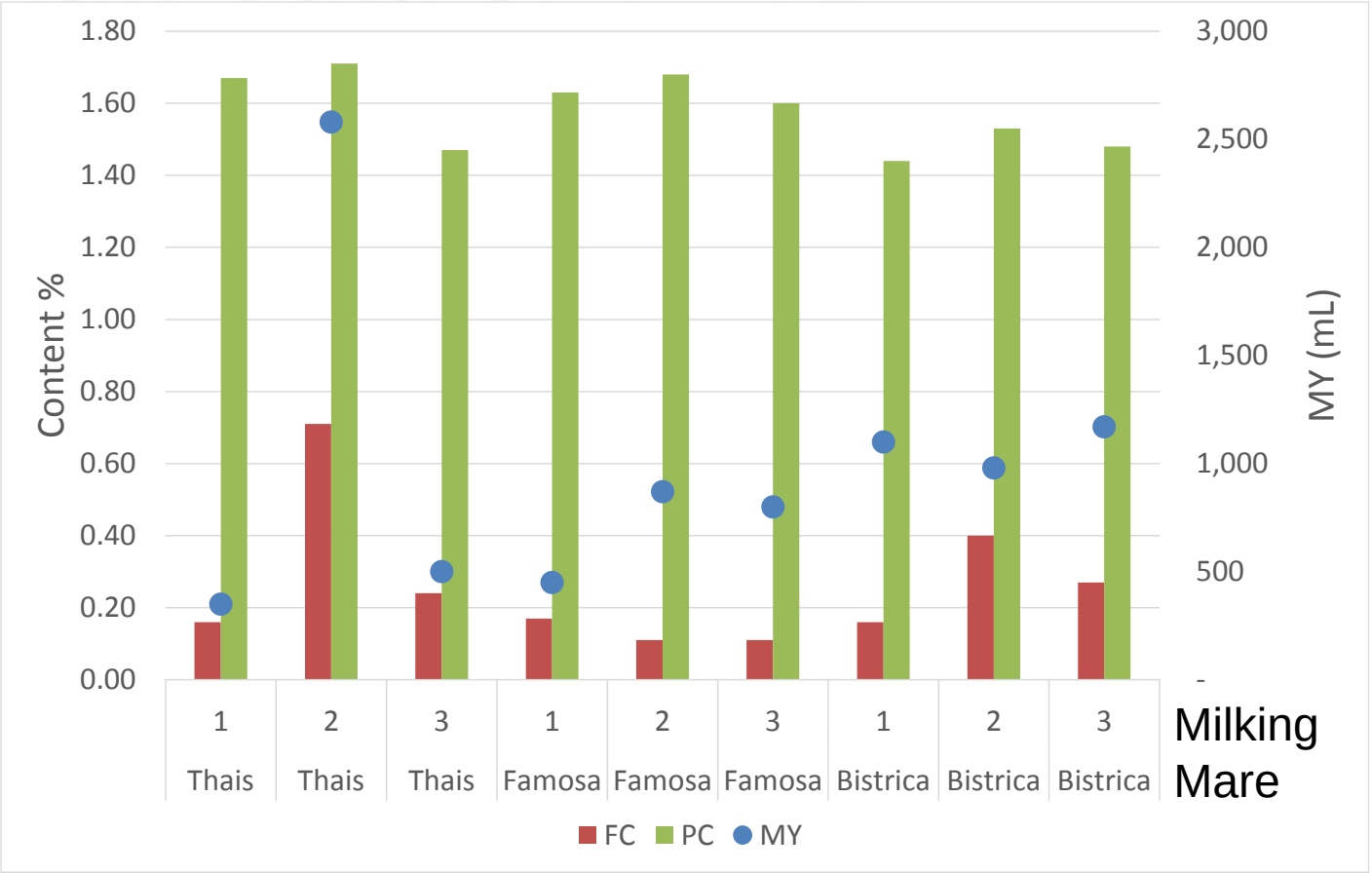
Data analyisis

- PCA – outliers detection
- Descriptive statistics
- Correlations
- Variance analysis
  - Effects mare, milking, TD, foal CG, mare CG, DIM, …

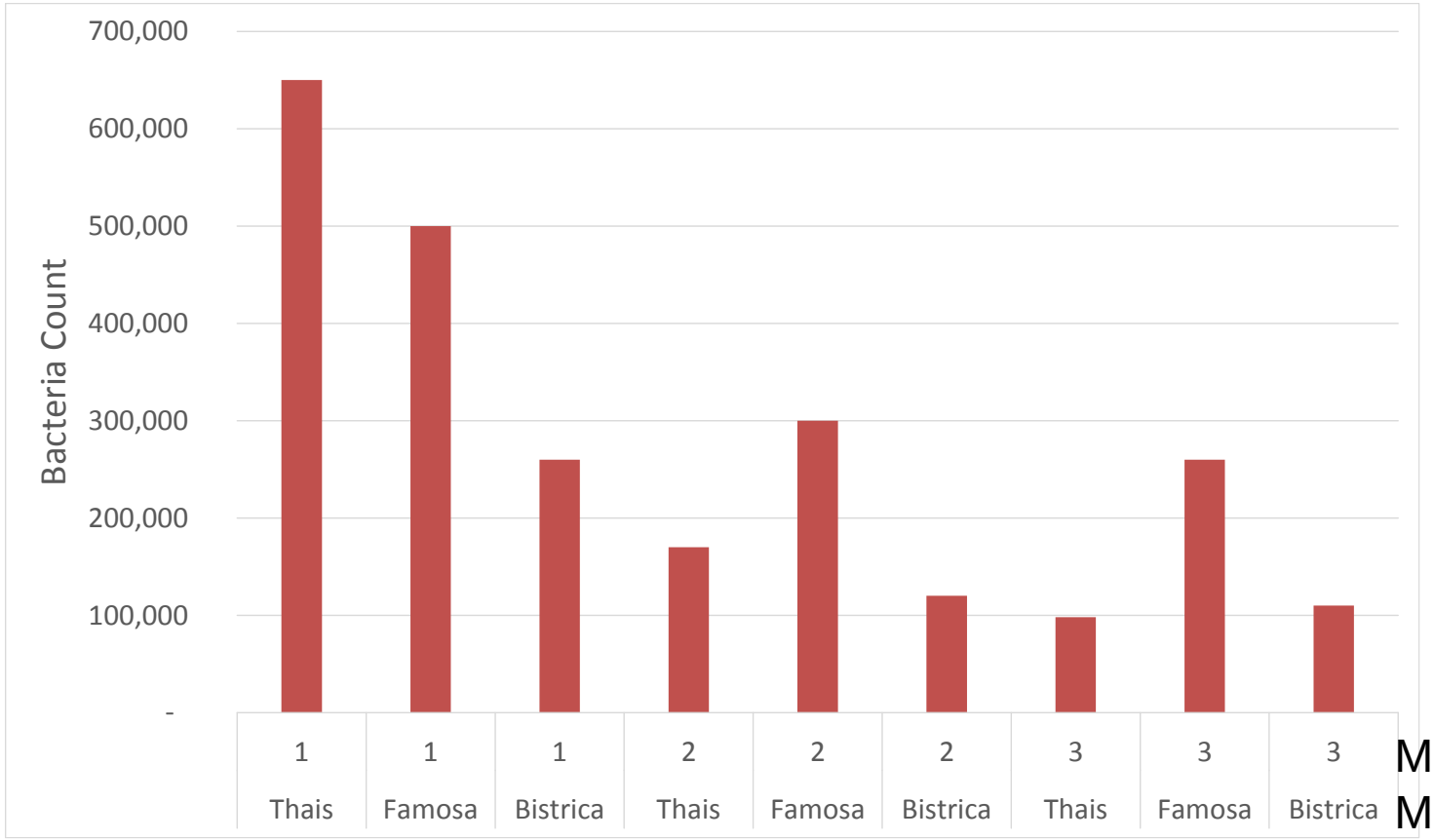
Descriptive statistics (N=45)

Trait	Mean	Std	CV	Min	Max
Milk yield (g)	1029.8	706.88	68.6	160	2680
Protein content	1.51	0.106	7.1	1.25	1.71
Fat content	0.40	0.296	73.4	0.03	1.28
Lactose content	6.32	0.214	3.4	5.76	6.61
Somatic cell count	6556	3194.9	48.7	2000	17000
lSCC (LOG2)	12.5	0.72	5.8	11.0	14.1
Total bacteria count	114,689	145,667	127.0	7,000	650,000
lBC (LOG10)	4.74	0.551	11.6	3.85	5.81
Freezing point	-0.505	0.020	4.0	-0.528	-0.443

Raw data of 1st TD



Raw data of 1st TD - BC



Correlations - significant

Trait	MY	PC	IBC	FP	ISCC
MY	-	NS	-0.48 (***)	-0.44 (**)	-0.37 (*)
PC		-	0.42 (**)	-0.41 (**)	+0.31 (*)
FC	+0.51 (***)	-0.33 (*)	-0.52 (***)	NS	NS
LC	+0.38 (*)	NS	NS	-0.92 (***)	-0.37 (*)
ISCC		+0.31 (*)	+0.39 (**)	NS	-

* p< 0.05; ** p < 0.01; *** p < 0.001; NS – non significant

Analysis of Variance

Trait	Traits		
	Mare	Milking	Foal chest width
Milk yield	NS	NS	NS
Protein content	NS	***	***
Fat content	NS	NS	*
Lactose content	NS	*	NS
logSCC	NS	NS	**
logBC	NS	***	***
Freezing point	***	**	***

* p< 0.05; ** p < 0.01; *** p < 0.001; NS – non significant

Foals

- Estimated body weight
  - Start of experiment 180 - 236 kg
  - Daily gain from 600 to 700 g
- The heaviest foal grown fastest
  - $r_{CGM:CGF}$=+0.83 (***)
- Growth is not related to mare‘s MY

Indirect effects on mares milking

- More work ☹
- More feed ☹
- More contact with foals & mares as usual
- Foals development
  - More developed than peers
  - Easy to handle – nice behaviour

Discussion & Conclusions

- Lippizan mare‘s
  - Sensitive
  - Need more time for adoption than draft mare‘s
  - Lactation yield > 500 kg
- Milk composition
  - Large variation (BC, FC, MY, SCC)
  - Quite stable (LA, PY)

Discussion & Conclusions

- Data analysis
  - Very high r between LC and FP
  - Low variation between mares (FP?)
  - Last milked mare & last daily milking
    - Lowest FP & BC → rest water in tube, …
  - Moderate and neg. r between BC and MY
    - Indicate hygiene problems
  - Moderate and neg. r between FC and MY
    - Indicate high FC in rest milk in udder

Preservation of breed & milking?

- It can be additional activity!
- Add value with
  - Milk processing → some possibilities will be shown on IE
  - Selling via on farm therapies, …
- Foals
  - Nice behaviour
  - Well developed
- Socio-economics
  - New jobs
  - Attractive for young people
  - Atraction for tourism, …

Future work

- Comparison of different type of milk sampling
  - Huge variation between published equine milk parameters
- Slovenian draft horse
  - Routine – comercial milking
  - Comparation between results from first jets & total milked milk yield

Thank you for your attention