

# Genetic parameters of chosen udder morphology and milkability traits and somatic cell score



Margetín<sup>1,2</sup>, D. Apolen<sup>2</sup>, M. Milerski<sup>3</sup>, O. Debreceni<sup>1</sup>, O. Bučko<sup>1</sup>, V. Tančin<sup>1,2</sup>, J. Margetínová<sup>2</sup>

<sup>1</sup> Slovak University of Agriculture Nitra, Tr. Andreja Hlinku 2, 949 76 Nitra, Slovak Republic

<sup>2</sup> Animal Production Research Centre Nitra, Hlohovecká 2, 954 41 Lužianky, Slovak Republic

<sup>3</sup> Institute of Animal Science, Přátelství 815, 104 00 Praha-Uhřetěves, Czech Republic

## Introduction

- Machine milking of sheep – prevailing method of milking in Slovakia in the last years.
- Selection in dairy sheep must be aimed also on better udder morphology and milkability.
- Udder morphology and teat position have significant effect on udder health status and machine milking productivity.
- Linear scoring of udder and some milkability traits – possible selection criteria for better milkability and udder health status in dairy ewes?

## Objectives



To estimate genetic parameters for chosen udder morphology and milkability traits and somatic cell score in ewes.

## Material and methods

### Evaluation of udder morphology

- Linear udder assessment (LS) according to De la Fuente et al. (1996) and Milerski et al. (2006) - **nine-point scale**; assessed following traits: udder depth (UD), teat position (TP), teat size (TS) and udder shape (US).

### Evaluation of milkability traits (MAT) and somatic cell count

- During milking period (May – August; years 2002-2008) linear assessment and milkability traits were taken in the same ewes and days.
- Milk yield and milk flow was recorded by standard milk meter or specialized milk jar. We analyzed:
  - Machine milked milk – MMM.
  - Portion of milk milked in 30 seconds to total milk yield – PM30s.
  - Portion of machine stripped milk to total milk yield – PMSM.
- Milk probes were collected from the same ewes for determination of somatic cell count.

### Number of analyzed ewes

- Genetic parameters were estimated using non-transformed data for LS traits and MAT and transformed data for SCC (Somatic cell score - SCS).
- Linear assessment - udders of **344 ewes were evaluated repeatedly** (within the lactation as well as between lactations) – totally were performed **1124 records**.
- Milkability traits and SCS were evaluated in the same ewes - **344 ewes; 1124 records**.

### Model used

- Multi trait animal models were used to estimate the genetic parameters (REMLF90, VCE).
  - Fixed effects:
    - control year (7 levels)
    - breed group (9 levels)
    - parity (3 levels)
    - lactation stage (4 levels)
  - Random additive genetic effect of animal
  - Permanent effect of ewe

## Results

Table 1 Basic statistics of linear udder assessment traits, milkability traits and somatic cell count.

Trait	n	$\bar{x}$	s	min.	max.
Udder depth (UD)	1124	5,03	1,587	1	9
Teat position (TP)	1124	5,21	1,769	1	9
Teat size (TS)	1124	4,43	1,427	1	9
Udder shape (US)	1124	5,32	1,543	2	9
Machine milked milk – MMM (ml) <sup>1</sup>	1124	<b>319,24</b>	167,45	20	1200
Portion of milk milked in 30 seconds to total milk yield – PM30s (%)	1124	54,02	18,24	0	100
Portion of machine stripped milk to total milk yield – PMSM (%)	1124	<b>27,39</b>	15,14	0	95
Somatic cell count (SCC)	1124	554839,1	1839178,8	5000	22683000
Somatic cell score (SCS)	1124	<b>2,44</b>	0,985	1,63	7,66

<sup>1</sup>milk milked during control measurement (only morning milk)

## Conclusion

Heritability coefficients for MMM, PMSM and PM30s were medium high (0,204, 0,134 and 0,147 respectively).

Heritability coefficients for SCS were low (0,058).

Genetic correlation between the UD and PMSM was 0.267; between UD and SCS 0.346.

It means that too deep and baggy udders are not suitable in terms of milkability and milk quality.

The important are also findings about positive genetic correlation between TP and MMM in ewes (0.544) and negative genetic correlations between TP and PMSM (-0.278), between MMM and PMSM (-0.792) and between MMM and SCS (-0.215).

Table 2. Heritability coefficients and genetic correlations between chosen traits of linear assessment of udder, milkability traits and somatic cell score in ewes milk.

Trait	UD	TP	TS	US	MMM	PM30s	PMSM	SCS
Udder depth (UD)	<b>0,063</b>	<b>0,549</b>	0,316	0,164	0,018	0,193	0,267	<b>0,346</b>
Teat position (TP)		<b>0,247</b>	<b>-0,311</b>	-0,189	<b>0,544</b>	-0,264	<b>-0,278</b>	0,087
Teat size (TS)			<b>0,273</b>	0,147	0,166	0,407	0,015	-0,200
Udder shape (US)				<b>0,093</b>	-0,029	0,011	-0,133	0,860
Machine milked milk – MMM (ml) <sup>1</sup>					<b>0,204</b>	-0,252	<b>-0,792</b>	<b>-0,215</b>
Portion of milk milked in 30 seconds to total milk yield – PM30s (%)						<b>0,147</b>	-0,122	-0,153
Portion of machine stripped milk to total milk yield – PMSM (%)							<b>0,134</b>	0,123
Somatic cell score (SCS)								<b>0,058</b>