



M. Margetin<sup>1,2</sup>, D. Apolen<sup>1</sup>, M. Milerski<sup>3</sup>, O. Debreceni<sup>2</sup>

<sup>1</sup> Animal Production Research Centre Nitra, Hlohovecká 2, 954 41 Lužianky, Slovak Republic

<sup>2</sup> Slovak University of Agriculture in Nitra, Slovak Republic

<sup>3</sup> Institute for Agricultural Engineering and Animal Husbandry, Germany

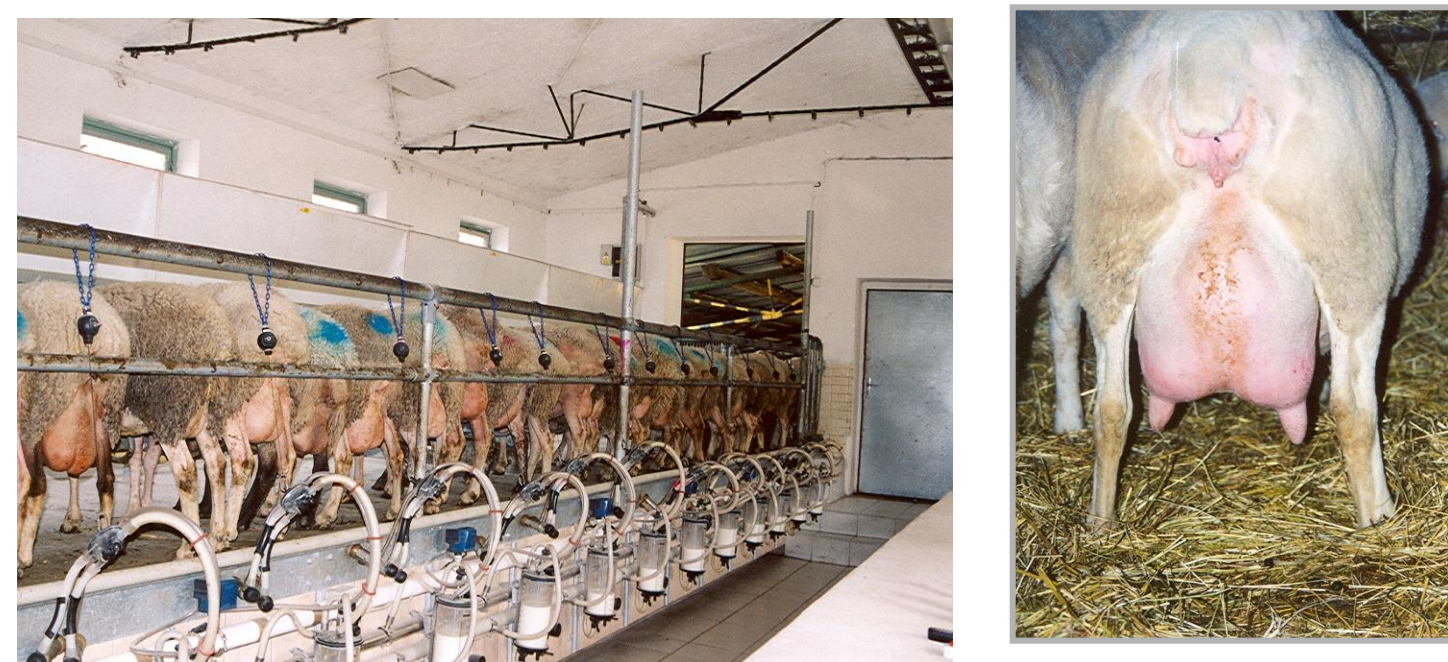
margetin@cvzv.sk

## Introduction

- Machine milking of sheep – prevailing method of milking in Slovakia in the last years.
- Selection in dairy sheep must be directed also on milkability parameters.
- Udder cistern size diagnosed by ultrasonography correlates with milk production and better milkability (according to our previous results - phenotype correlations).
- Udder cistern size – possible selection trait for better milkability in dairy ewes?

## Objectives

To estimate genetic parameters for chosen measurements of ewe's udder detected by using ultrasonography.



## Results

Table 1 Basic statistics of udder cistern measurements

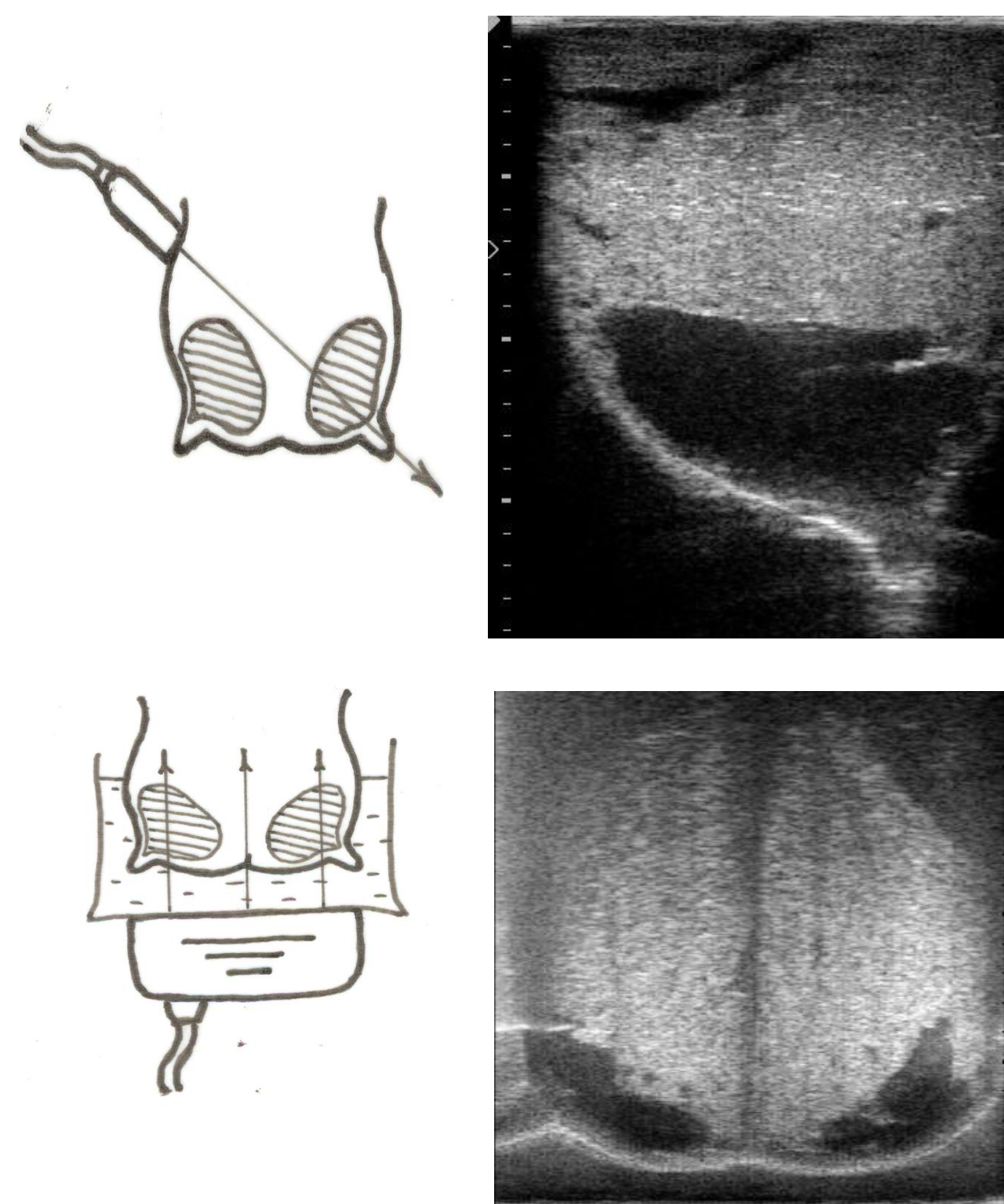
Trait	n	$\bar{x}$	s	min.	max.
Length of left cistern (LLC1) – mm (1)	1023	69.1	16.31	17	133
Width of left cistern (WLC1) – mm	1023	36.4	11.19	5	104
<b>Size of left cistern (SLC1) – mm<sup>2</sup></b>	<b>1198</b>	<b>1933.4</b>	<b>929.15</b>	<b>133</b>	<b>7560</b>
Length of right cistern (LRC1) – mm	1023	69.9	15.86	20	118
Width of right cistern (WRC1) – mm	1023	37.7	10.74	10	84
<b>Size of right cistern (SRC1) – mm<sup>2</sup></b>	<b>1198</b>	<b>1973.1</b>	<b>927.95</b>	<b>10</b>	<b>5799</b>
<b>Total size of both cisterns (TSBC1) – mm<sup>2</sup></b>	<b>1198</b>	<b>3904.8</b>	<b>1748.46</b>	<b>390</b>	<b>12900</b>
Length of left cistern (LLC2) – mm (2)	753	78.6	15.17	25	132
Width of left cistern (WLC2) – mm	753	35.5	9.78	7	77
<b>Size of left cistern (SLC2) – mm<sup>2</sup></b>	<b>753</b>	<b>2137.7</b>	<b>919.56</b>	<b>166</b>	<b>6731</b>
Length of right cistern (LRC2) – mm	753	78.0	15.13	19	131
Width of right cistern (WRC2) – mm	753	35.9	10.16	7	134
<b>Size of right cistern (SRC2) – mm<sup>2</sup></b>	<b>753</b>	<b>2171.1</b>	<b>940.10</b>	<b>178</b>	<b>7832</b>
<b>Total size of both cisterns (TSBC2) – mm<sup>2</sup></b>	<b>753</b>	<b>4308.8</b>	<b>1741.25</b>	<b>650</b>	<b>12646</b>

(1) – method of scanning „from side“; (2) – method of scanning „from bottom“

## Material and methods

### Udder cistern diagnostics

- Two methods of scanning – „from side“ and „from bottom“ according Nudda et al. (2000) and Bruckmaier et al. (1997).
- Used apparatus: Aloka 250 (3.5 MHz linear probe) and SonoVet 2000 (L2-5/170 CD linear probe).
- Both cisterns were scanned approximately 12 hours after the machine milking.



### Number of analyzed ewes

- By using of the method „from side“ **378 ewes were diagnosed repeatedly** (within the lactation as well as between lactations) – totally were performed **1198 measurements**.
- By using of the method „from side“ **265 ewes were diagnosed repeatedly** (within the lactation as well as between lactations) – totally were performed **753 measurements**.

### Model used

- **Multi trait animal models** were used to estimate the genetic parameters (REMLF90, VCE).
  - **Fixed effects:**
    - control year (7 or 5 levels)
    - breed group (9 levels)
    - parity (3 levels)
    - lactation stage (4 levels)
  - **Random additive genetic effect of animal**
  - **Permanent effect of ewe**

## Conclusion

Heritability coefficients for size of left and right cistern detected by the method „from side“ were 0.069 and 0.168 and by using method „from bottom“ 0.182 and 0.155, respectively.

Genetic correlations between size of left and right cistern were high ( $r_g = 0.726$  or  $0.910$  according to used method).

Genetic correlations between the size of left and/or right cistern and total size of both cisterns were also high with both ways of scanning ( $r_g = 0.896$  to  $0.982$ ).

Size of udder cistern diagnosed by ultrasonography – suitable selection trait for better milkability.

Table 2. Heritability coefficients and genetic correlations between udder cistern measurements (method from side)

Trait	LLC1	WLC1	SLC1	LRC1	WRC1	SRC1	TSBC1
Length of left cistern (LLC1)	<b>0.024</b>	-0.006	0.487	<b>0.840</b>	0.002	0.457	<b>0.503</b>
Width of left cistern (WLC1)		<b>0.019</b>	0.844	-0.076	<b>0.453</b>	0.435	<b>0.641</b>
Size of left cistern (SLC1)			<b>0.069</b>	0.442	0.467	<b>0.726</b>	<b>0.896</b>
Length of right cistern (LRC1)				<b>0.074</b>	0.361	0.769	<b>0.686</b>
Width of right cistern (WRC1)					<b>0.043</b>	0.825	<b>0.933</b>
Size of right cistern (SRC1)						<b>0.168</b>	<b>0.973</b>
Total size of both cisterns (TSBC1)							<b>0.123</b>

Table 3. Heritability coefficients and genetic correlations between udder cistern measurements (method from bottom)

Trait	LLC2	WLC2	SLC2	LRC2	WRC2	SRC2	TSBC2
Length of left cistern (LLC2)	<b>0.222</b>	0.701	0.890	<b>0.944</b>	0.661	0.718	<b>0.833</b>
Width of left cistern (WLC2)		<b>0.121</b>	0.890	0.554	<b>0.672</b>	0.713	<b>0.831</b>
Size of left cistern (SLC2)			<b>0.182</b>	0.851	0.852	<b>0.910</b>	<b>0.982</b>
Length of right cistern (LRC2)				<b>0.187</b>	0.766	0.809	<b>0.851</b>
Width of right cistern (WRC2)					<b>0.031</b>	0.969	<b>0.924</b>
Size of right cistern (SRC2)						<b>0.115</b>	<b>0.971</b>
Total size of both cisterns (TSBC2)							<b>0.173</b>