

## **THE BREEDING OF TSIGAI SHEEP AS A POSSIBILITY TOWARDS THE PROFITABILITY I. MILKING PERFORMANCE, PRODUCTION INDEXES**

*J. Csanádi, J. Fenyvessy, I. Bajúsz*  
University of Szeged, Faculty of Engineering

### **ABSTRACT**

Authors present the results of their two-year study related Tsigai sheep breeding. Investigated Tsigai ewes gave much more milk than Hungarian Worsted Merino even in extensive condition as well. The results verified that the half of Tsigai ewes could be milked in average for 131 days after the separation of the lambs (day 30.). The ewes were capable to produce during the lactation period 102 litres which correspond to daily 0.78 litres.

The average milk composition relative to the milking period was supposed around the following values: fat content 6.97%; protein content 5.44%; lactose content 4.80%; ash content 0.95%; non-fat solids 11.19% and the total solids 18.16%.

Finally the Authors proposed the milking of Tsigai ewes in 5-6 month lactation, furthermore the cross-breeding with the Merino or other genotypes towards for increasing the income of the sheep breeding.

### **1. INTRODUCTION**

Nowadays, the income-expansion of sheep breeding is very important and shepherds can achieve it by increasing of the quantity and by development of the quality of sheep milk at the same time. The enhancement of milk yield certainly has an effect on the quality, quantity and market position of sheep milk products which can cause a positive feed-back.

The goal of our work is to help the Hungarian sheep-farming and to give useful information following fields:

- Increasing the profitability of sheep-breeding by enhancement of milk production and ewe milk yield due using Tsigai genotype.
- Investigating the components of milk.
- Emphasizing the nutritional effects of Tsigai ewe milk and products from Tsigai ewe milk.

We would like to inform you of our results related milk yield, composition of milk and some production indexes in this paper.

### **2. PRELIMINARY RESEARCH WORKS**

At the same time the products made of sheep milk are very popular all over the world and in our Country as well. The data derived from the trade prove that the domestic market is capable to take sufficiently more product made of sheep milk. Besides this the domestic data prove that the significant part – about 30% - of the incomes originated from the sheep farming can be represented by the milk (KUKOVICS and NAGY, 1999.). The generous works made through several decades concerning the cow milk

quality certify that the conditions of the good milk quality are the high production and hygienic levels which can produce an income being capable to cover the necessary investments.

The logical direction is to develop the milk production but it can bring the optimal results with the improvement of the realization of the meat as well. In opposite case the incomes derived from the sales of milk have to compensate the possibly wastes coming out from the meat production too.

On the base of the investigations concerning the domestic milked sheep varieties (KUKOVICS et al. 1992, JÁVOR 1994, JÁVOR et al. 1998, JÁVOR 1998, KOMLÓSI 1998, GULYÁS and KOVÁCS 1998, KUKOVICS and NAGY 1999, GULYÁS 2002), it can be said that to increase the milk production by the cross-breeding of the Merino with milking varieties may be necessary. The autochthonous Tsigai as the possible variety of the milking sheep-farms became the object of the intensively tested varieties. At the end of the nineties in order to develop the milking sheep-farms – besides other varieties - the milk production of the Tsigai was investigated during the thirties, for example PÓCZOS (1934), in the forties FEJÉR (1942) and among the newer research works the activity of KÓSA (1998) must be mentioned.

During the last decades numerous Hungarian and foreign authors reported about the composition and properties of the sheep's milk. We can consider the earlier reports of domestic authors as basic works like CSISZÁR (1928), SCHANDL (1937), BALATONI (1963), which provide valuable information about the milk composition of the Hungarian Combed Merino sheep.

The data originated from high sampling-rated experiments were published about the composition of the milk of Combed Merino sheep as FENYVESSY (1992), and furthermore about the composition of the milk of the Merino and the cross-breeding genotypes as JÁVOR (1994).

The milk composition changes during the lactation period were followed (for example by CSAPÓ, 1992; FENYVESSY, 1992; MUCSI, 1997; BEDŐ et al. 1999). One of components were especially investigated by numerous authors. DÖRNERNÉ (1954), CSAPÓ (1992) dealt with the vitamin content and CSAPÓ (1992) investigated the content of the minerals in the sheep's milk.

### **3. MATERIALS AND METHODS**

#### **Farming, feeding, sampling**

We took the individual samples from a Tsigai sheep herd on Hungarian Grand Plane (village Makó-Rákos) during the years 2000 and 2001. The feeding was based on the grazing and was characteristically extensive type. Depending on the weather and the available pasture in most necessary cases we gave additional fodder (0.2-0.3 kg/ewe). The herd was held in free and they spent the night in the sheep-pen only.

In order to ensure the undisturbed growth of the lambs, sampling took place first only after the 30<sup>th</sup> day of lactation. The duration of the lactation was 165 days. The ewes were milked twice a day. The milking was done manually, following the thorough cleaning of the udder and the foremilk was done separately. The samples were examined within 3 hours following milking subsequently.

The milking was made by hand the mixed milk samples represented the daily production (morning + evening milking). For the individual investigations we selected ewes having average ability. For the individual investigations we selected 12 ewes having average ability. By this way we wanted to avoid the overestimation of this variety. Due to the problems during the lactation and the earlier drying-off we could use the results of 5 ewes only.

#### **Investigation of the raw milk**

The raw milk samples were collected on the spot according to the EN ISO 707:2000 European Union Standard. We tested the quantities of the main components of milk as protein, fat, lactose, ash, solids and the non-fat solids according to the IDF Standard 141B:1996. For the investigation of the raw milk samples we used instrument (Milco-Scan) accredited for the raw milk qualification.

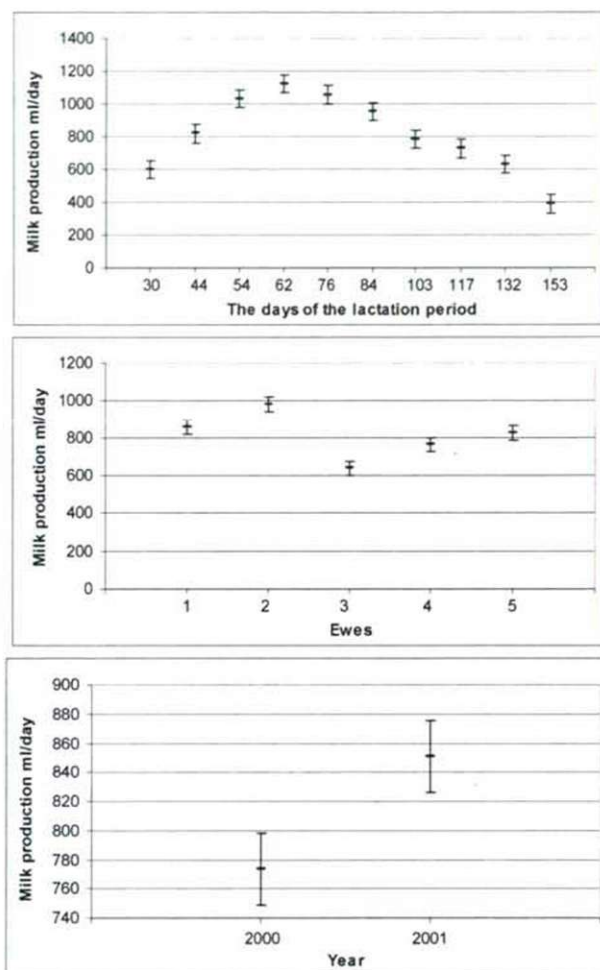
#### **Mathematical and statistical methods**

We used the MS Excel and Statgraf programs to process the data files of the substance values. To prove the connections between individual parameters we prepared a correlation matrix. We investigated the effects of the ewes, the year and runoff of the lactation period on the milk production by three-way Analysis of Variance, while the effect of the ewes and the lactation on the produced milk components was made by two-way Analysis of Variance. For the estimating of the milk performance parameters (production of milk, fat, protein, etc.) during the lactation period the Trapezoid Method were used. The graphic illustration was made also using the MS Excel and Statgraf software with the appropriate conversation.

## **4. RESULTS**

The results of the investigated Tsigai ewes milk production was behind the values of publications available in the bibliography concerning the milking sheep genotypes. But the Tsigai is able to produce much more milk than Merino even in extensive condition as well.

Our results from the investigation of the milk performance are shown in Figure 1.



Effect of	SQ	DF	MQ	F	Significance level
Lactation	4906725,9	9	545191,7	36,178	0,0000
Ewe	1280355,4	4	320088,8	21,241	0,0000
Year	148918,8	1	148918,8	9,882	0,0023
Residue	1280909,3	85	15069,5		
Total	7616909,4	99			

**Figure 1. Milk performance of Tsigai ewes in the two-year study**

The lactation performance showed similar trend as in the literature. The peak of the milk production was in May (1170 ml/day/ewe approximately).

Significant difference was in the milk production in the case of individual ewes. This result suggests that the selection is very important for reaching higher production.

The daily milk production of investigated ewes differed significantly in the same breeding condition. It's reasons are multifactorial and we didn't investigate the exact reasons, but we can find similar data in the literature. The difference was about 10%.

We found sufficient differences between the compositions of milk from individual ewes during the milking period. Taking into consideration the composition of milk (%) on the same sampling day we can expect the highest deviation figures as: protein content 0.89%; fat content 2.19%; lactose content 0.33%; non-fat solids 1.29%. while in the total solids 3.48%. The figures of the Coefficient of Variance (Cv%) deviation prove that in case of the highest deviation can be expected in fat content while the lowest deviation can be appeared for the lactose content.

Our results verified that the half of Tsigais could be milked in average for 131 days after the separation of the lambs (day 30.). The ewes are capable to produce during the lactation period 102 litres which correspond to daily 0.78 litres. On our opinion we have proved that with the farming of Tsigai population the produced milk quantity could create the possibility of the profitable sheep farming.

We found sufficient differences between the compositions of milk from the individual ewes during the milking period. Taking into consideration the content (%) of milk component in ewes' milk on the same sampling day we can expect the highest deviation figures as: protein content 0.89%; fat content 2.19%; lactose content 0.33%; non-fat solids 1.29%, while in the total solids 3.48%. The figures of the Coefficient of Variance (cv%) prove that in case of the highest deviation can be expected in fat content while the lowest deviation can be appeared for the lactose content. The trend in the milk composition was in conformity with the expectation during the milking period and in accordance with the relevant literature.

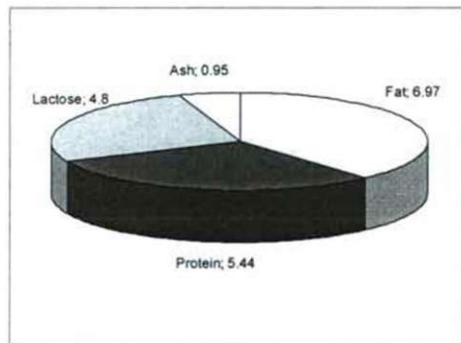


Figure 2. Average milk composition of Tsigai ewe's milk

On the base of our results, our valid conclusions regarding Tsigai ewes held on the Hungarian Great Plain are as following. Sufficient differences can be expected concerning the milk composition and between the ewes during the milking period. At the end of the lactation the following values can be expected: the highest protein content 6.35%; the fat content 9.37%; the lactose content 4.98%; while the non-fat solids 12.19% and the total solids would be about 21.56%.

The average milk composition relating to the milking period was supposed around the following values: fat content 6.97%; protein content 5.44%; lactose content 4.80%; ash content 0.95%; non-fat solids 11.19% and the total solids 18.16%. (Figure 2.)

According to our results the daily average production rate during the milking period was 51.1 g of fat; 40.7 g of protein; 36.6 g of lactose; 84.3 g of non-fat solids and 135.4 g of total solids.

**Table 1. Daily production data of Tsigai ewes (Average; g/ewe/day)**

	Fat	Protein	Lactose	Nfs	Ts
2000 (n=50)					
Daily average (g)	52,5	41,9	37,0	86,3	138,8
Deviation	11,2	10,9	10,5	23,1	33,9
Cv%	21,3	26,0	28,4	26,8	24,4
Max	64,6	55,1	50,4	114,8	179,4
Min	29,7	19,4	15,8	38,7	68,4
Whole production (g)	6572	5177	4537	10631	17203
2001 (n=14)					
Daily average (g)	49,6	39,5	35,9	82,3	131,9
Deviation	14,4	13,4	13,7	29,7	43,8
Cv%	29,1	33,9	38,0	36,0	33,2
Max	66,9	60,0	55,8	126,9	193,1
Min	19,7	15,0	11,5	28,8	48,5
Whole production (g)	7174	5732	5201	11935	19109

Nfs: Non-fat solids; Ts: Total solids

It follows from our results coming out from the summarized average productions that ewe of middling ability during one milking period – with extensive conditions is capable to produce totally 6.873 kg of fat, 5.455 kg of protein, 4.869 kg of lactose, 11.283 kg of non-fat solids and 18.156 kg of total solids. Result of the different years is presented in Table 1.

## 5. CONCLUSIONS

Investigated Tsigai ewes are able to produce much more milk than Hungarian Worsted Merino even in extensive condition as well. Our results verified that the half of the Tsigai ewes could be milked in average for 131 days after the separation of the lambs (day 30.).

Ewes are capable to produce during the lactation period 102 litres which correspond to daily 0.78 litres in average.

Sufficient differences can be expected concerning the milk composition and between the ewes during the milking period in accordance with the literature. At the end of the lactation the following values can be expected: the highest protein content 6.35%; the fat content 9.37%; the lactose content 4.98%; while the non-fat solids 12.19% and the total solids would be about 21.56%.

The average milk composition relating to the milking period was supposed around the following values: fat content 6.97%; protein content 5.44%; lactose content 4.80%; ash content 0.95%; non-fat solids 11.19% and the total solids 18.16%.

In our experiments the produced results of Tsigai ewes do not reach the values of the milking varieties published in the scientific literature but their values are sufficiently higher than the merinos' ones being predominant in Hungary.

Our result suggests that the income of sheep breeding can rise remarkable with the intensive milking of Tsigai ewes in a 5-6 month lactation, furthermore Tsigai genotype can be proposed for the cross-breeding with the Merino or other genotypes.

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