

## MILK PRODUCTIVITY INDICATORS OF GOATS OF ZAAZEN BREED BROUGHT FROM ABROAD ACCORDING TO CONSTITUTIONAL TYPE IN THE CONDITIONS OF KARAKALPAKSTAN

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### Abstract

In this article, the indicators of milk productivity in the first lactation of imported Zaanen goats bred in the conditions of Karakalpakstan were studied for the first time.

**Keywords.** Zaanen goat breed, milk yield, chemical composition.

### Actuality of the topic

Milk is a nutritious liquid secreted by the mammary glands of female mammals. The period from the birth of female animals to weaning is called the lactation period. The biological importance of milk secreted during lactation is to feed its offspring in the early postembryonic period. Because the young organism that came into the world cannot yet digest other nutrients in nature, including humans. Today, milk is an important indispensable product of human nutrition, and its production has grown to a large industrialized level.

Even the Food and Agriculture Organization of the United Nations (FAO) has declared 1<sup>st</sup> June as International Milk Day to recognize the importance of milk as a global food. World Milk Day has been celebrated since June 1, 2001. This day is designed to create an opportunity to draw attention to milk-related activities [5].

Milk is a multi-component polydisperse system in which all components are finely dispersed. This condition ensures that the milk has a liquid consistency. Many scientists have found that dairy products contain more than a hundred of the most valuable components for the body. These components include substances necessary for vital activity: proteins, fats, carbohydrates, mineral salts, vitamins.



These substances are well balanced in milk, so they are easily and completely absorbed. In addition, milk is a valuable source of many biologically active compounds. It is widely used in the treatment of various metabolic diseases, functional disorders, diseases of the gastrointestinal tract, heart and kidneys [1].

Humans have domesticated many mammals specifically to use their milk as food. In domestication, animals that are easy to milk and have a relatively long lactation period have been trained. Cattle produce relatively more milk, so these animals are more domesticated. In some regions, sheep and goats were used [4].

Goats are an animal with very high milk productivity according to their biological potential. Goats with high milk productivity have 13-15 kg of milk per kilogram of live weight. Under standard feeding and storage conditions, lactation can last 300-310 days and 600-1700 kg of milk with a fat content of 4-5 percent can be milked [2].

It is necessary to take it into account in order to evaluate milk productivity during lactation. In the assessment of milk productivity, daily or control milking is carried out. Graphic representation of daily or monthly milk yield during lactation is called lactation slope in animal husbandry. According to the structure of the lactation slope graph, it has three different forms: 1) rising at the beginning and then slowly decreasing; 2) unstable vocal; 3) is in the form of a sharp decrease.

Production and secretion of milk in the udder is a complex biological process controlled by the higher nervous system and relevant hormones. Several physiological factors affect the amount of milk. Milk yield increases for a certain period at the beginning of the lactation period, and then decreases based on certain dynamics. This also affects the physical and chemical changes in the composition of milk. In particular, at the beginning of the lactation period, the percentage of protein and fat in milk is low, and at the end of the period, the percentage of these substances increases. The same trend applies to dry matter in milk. Because the main part of the dry matter corresponds to fat and proteins.

### **Source and method of the research**

Studies on milk productivity indicators of goats of Zaanen breed of different constitutional types during the first lactation period were conducted at the farm "PANAEV FARMS" located in the Karaozak district of the Republic of Karakalpakstan. 300 female goats and 10 male goats aged 7-8 months were brought



to this farm from Austria in May 2017. These goats were divided into dense, thin and strong constitution type groups based on the generally accepted method of determining constitution type in zootechnics. Each group consisted of ten goats (n-10), which were maintained under the same feeding and storage conditions.

Milk productivity was calculated using the mobile milking machine "Double Goat Portable Milker" and the amount of milk produced was calculated by determining the weight change of the milking machine on the electronic scale "Super AOTE" Electronic platform scale. The technical capacity of the scale is from min-400 g to max-200 kg. Lactation was taken into account for 7 months. Three times in each month of lactation, control milking was performed on the 5th, 15th and 25th days. The milking process was carried out twice a day: in the morning and in the evening. Based on multiplying the obtained results by 10, the monthly total amount of milk was calculated.

According to the obtained numerical data [3], mathematical statistical analysis was performed using the Microsoft Excel 2007 computer program, and the average arithmetic value of the characters ( $\bar{X}$ ), the average arithmetic error  $S_x$ , the coefficient of variation ( $C_v\%$ ), the degree of reliability according to the Student's criterion ( $t_D$ ) was determined. The analyzed numerical data were presented in the form of tables and graphs.

### The obtained results and their analysis

Table 1 shows the numerical data obtained during the research on milk yield during the lactation period of goats of different constitution types determined during the seven-month period.

Table 1 Milk yield of goats by months of lactation, kg

Months of lactation	Constitution type					
	Strong		Dense		Thin	
	$\bar{X} \pm S_x$	$C_v \%$	$\bar{X} \pm S_x$	$C_v \%$	$\bar{X} \pm S_x$	$C_v \%$
1	53,6 $\pm$ 1,42	8,40	54,9 $\pm$ 1,49	8,61	53,9 $\pm$ 1,39	8,18
2	64,2 $\pm$ 1,69	8,30	66,9 $\pm$ 1,81	8,56	68,9 $\pm$ 1,80	8,28
3	107,4 $\pm$ 2,67	7,87	121,6 $\pm$ 2,97*	7,72	114,6 $\pm$ 2,96	8,16
4	129,5 $\pm$ 2,56*	6,25	125,5 $\pm$ 2,81	7,09	119,6 $\pm$ 2,72	7,19
5	100,8 $\pm$ 2,48	7,78	108,6 $\pm$ 2,55	7,43	106,4 $\pm$ 2,67	7,94
6	77,9 $\pm$ 2,00	8,13	86,8 $\pm$ 2,17**	7,91	83,4 $\pm$ 2,03	7,71
7	69,3 $\pm$ 1,87	8,52	73,5 $\pm$ 2,01	8,66	61,2 $\pm$ 1,40	7,26
Total	602,7		637,8		608,0	



Note: \*- $P < 0.05$ ; \*\* - $P < 0.01$

According to the data in this table, in the first month of the lactation period, goats with a strong constitution type produced an average of 53.6 kg of milk, and their peers with a dense and thin constitution type had 54.9 kg and 53.9 kg, respectively, 1.3 kg or 2.43% and 1.0 kg or 1.86% ( $P > 0.05$ ) more milk was found.

In the second month of the lactation period, it was observed that the amount of milk in all three groups of goats increased, compared to the first month of lactation, in the strong, dense and thin constitution types, it was 10.6; increased by 12.0 and 15.0 kg ( $P < 0.01$ ), 64.2; 66.9 and 68.9 kg indicators were recorded. In the second month of lactation, a relatively high indicator was observed in the thin constitution type, and it was 4.7 and 2.0 kg ( $P > 0.05$ ) more than the strong and dense type peers.

In the third month of the lactation period, an increase in milk volume was observed in the group of goats, 43.2 in the corresponding sequence in the types of strong, dense and thin constitution compared to the second month of lactation; 54.7 and 45.7 kg ( $P < 0.001$ ) more milk was obtained. In the third month of lactation, a relatively high rate was observed in goats of dense constitution type.

In the fourth month of lactation, goats in all three groups had the highest milk content. 129.5 in the corresponding sequence in constitutional types; It was 125.5 and 122.4 kg. In the fourth month of lactation, superiority in milk volume was observed in the group of goats of strong constitution type, which was superior to their peers of dense and thin constitution type by 4.0 and 7.1 kg ( $P > 0.05$ ) kg, respectively.

In the fifth month of the lactation period, a decrease in the volume of milk produced was observed. In particular, compared to the fourth month, 28.7 in terms of strong, dense and thin constitution types; 19.6 and 16.0 ( $P < 0.01$ ) kg less milk was milked. Relatively high performance of the groups was 108.6 kg in the dense constitution type, which prevailed by 7.73 and 2.07 percent ( $P > 0.05$ ) over the peers of the strong and thin constitution type, respectively.

In the sixth month of the lactation period, the volume of milk was even lower, and compared to the fifth month, it was 22.9, respectively, according to the types of strong, dense and thin constitution it was found that it decreased by 21.8 and 23.0 ( $P < 0.001$ ) kg. In this month, a relatively high figure by groups was observed in the type of dense constitution, which amounted to 86.8 kg. Compared to peers of strong



and thin constitution type, it prevailed by 8.9 ( $P<0.01$ ) and 3.4 ( $P>0.05$ ) kg, respectively.

In the seventh month of the lactation period, the volume of milk compared to the sixth month is 8.6 in a suitable sequence according to the types of strong, dense and thin constitution; 13.3 and 22.2 ( $P<0.01$ ) kg less milk was obtained. In this month, the advantage in terms of milk volume was observed in the group of goats of the dense constitution type, which was superior by 4.2 ( $P>0.05$ ) and 12.3 ( $P<0.01$ ) kg, respectively, than their peers of the strong and thin constitution type.

Table 2 shows the calculated indicators of the dynamics of the average daily amount of milk during the period of lactation.

The analysis of the data in this table shows that the daily amount of milk is similar to the dynamics of monthly milk, and the highest rate was recorded in the fourth month of lactation. Average daily milk yield for this month was 4.32 kg for strong constitution type, 4.18 kg for dense constitution type and 3.99 kg for thin constitution type. During the next 5-7 months of lactation, a decrease in the amount of daily milk was observed. In goats of dense constitution type, the daily milk yield was characterized by a steady decrease compared to goats of strong and thin constitution type.

Table 2 Dynamics of average daily milk yield of goats during the lactation period, kg

Months of lactation	Constitution type					
	Strong		Dense		Thin	
	$\bar{X} \pm S_x$	$C_v \%$	$\bar{X} \pm S_x$	$C_v \%$	$\bar{X} \pm S_x$	$C_v \%$
1	1,79 $\pm$ 0,05	8,31	1,83 $\pm$ 0,05	8,89	1,80 $\pm$ 0,05	8,78
2	2,14 $\pm$ 0,05	7,89	2,23 $\pm$ 0,06	8,49	2,30 $\pm$ 0,06	8,30
3	3,58 $\pm$ 0,09	7,84	4,05 $\pm$ 0,10*	7,70	3,82 $\pm$ 0,10	8,20
4	4,32 $\pm$ 0,09*	6,23	4,18 $\pm$ 0,09	7,05	3,99 $\pm$ 0,09	7,17
5	3,36 $\pm$ 0,08	7,81	3,62 $\pm$ 0,09	7,44	3,55 $\pm$ 0,09	7,93
6	2,60 $\pm$ 0,07	8,13	2,89 $\pm$ 0,07*	8,06	2,78 $\pm$ 0,07	7,75
7	2,31 $\pm$ 0,06	8,57	2,45 $\pm$ 0,07**	9,17	2,04 $\pm$ 0,05	7,25

Note: \*- $P<0.05$ ; \*\* - $P<0.01$

In particular, in the sixth month of lactation, the daily milk yield of dense constitution was 2.89 kg, it was more by 0.29 kg ( $P<0.05$ ) compared to goats with a





strong constitution and 0.11 kg ( $P>0.05$ ) of goats with a thin constitution. The same advantage was found in the seventh month of lactation. In this month, the milk yield of goats of dense constitution type is 2.45 kg, of strong type is 2.31 kg, and of thin type is 2.04 kg, and goats of dense constitution type was prevailed by 0.14 kg ( $P>0.05$ ) and 0.41 kg ( $P<0.01$ ) than the goats of strong and thin constitution types. The lactation curve, which is a graphical representation of the amount of milk produced during the months of lactation, is presented in Figure 1 below.

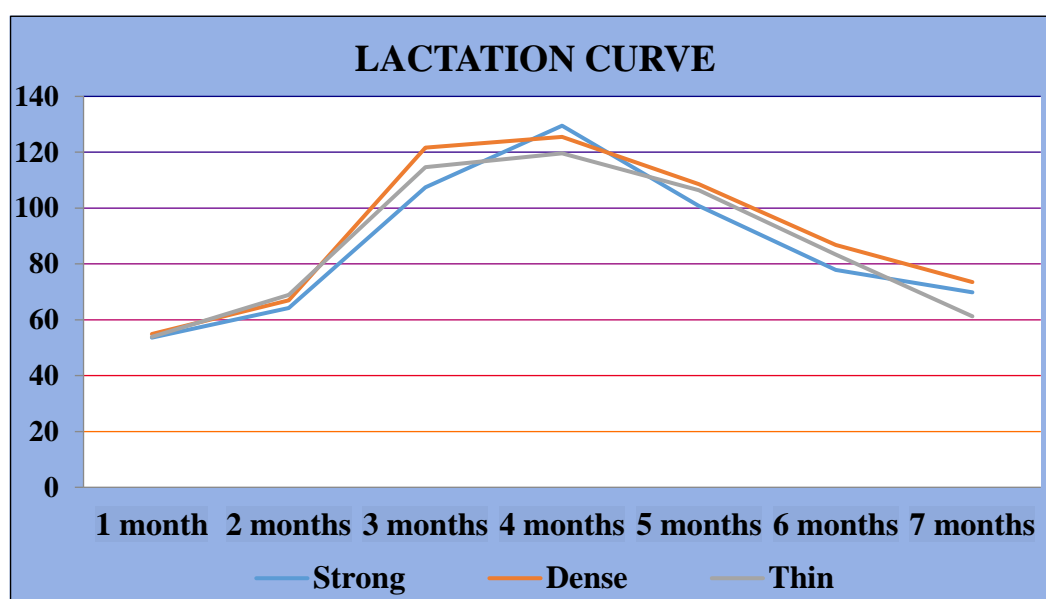


Figure 1. Lactation curve of zaanen goats of different constitutional types

From the lactation curve, it can be seen that the amount of milk increases slowly during the transition from the first month to the second month, and it can be seen that it rises sharply between the second and third month. The peak of the lactation curve corresponds to the fourth month, and the highest peak among all types can be seen in the lactation curve of goats of the strong type (in blue in Figure 1). From the fourth month of lactation to the last seventh month of lactation, the curve showed a downward trend in all constitution types. In goats of strong type, the decline was relatively unstable. In dense type goats (in red color in Figure 1), the lactation curve is at a higher limit than in strong and thin type goats, indicating that the lactation curve is relatively stable. The lactation curve of thin constitution type goats (in green in Figure 1) is located in the intermediate position of the lactation curve of goats of strong and dense constitution type, with a sharp decrease in the seventh month.

## **Conclusion**

Studies have shown that all three types of goats have a high rate of milk production. However, higher daily and monthly lactation rates were observed in strong type goats, which were more by 0.14 and 4.0 kg ( $P>0.05$ ) in dense type, and 0.33 and 9.9 kg ( $P<0.05$ ) in thin type. According to the maximum milk yield during lactation, it was found that dense type goats give more milk by 35.1 and 29.8 kg, respectively, compared to strong and thin type goats.

## **List of Used Literature**

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