

RELATIONSHIP BETWEEN THE NUMBER OF LACTATION AND MILK YIELD ON SAANEN GOAT FARMS

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ABSTRACT

The authors examined the milk production, on five Saanen-goat farms at the time of the monthly milk-recordings. In their present study they endeavoured to examine the connection between lactation number and milk production. They tried to find out how the increase in the lactation number of the mother goats affect the milk yield; in which lactation these values are the highest and until which lactation it is worth keeping the mothers in production. There were 37 ewes on farm No. 1, 17 on farm No. 2, 45 on farm No. 3, 17 on farm No. 4 and 80-90 on farm No. 5. On farm No 1-4 the daily milk yield was measured five times a month from May to September. On farm No. 5 the examinations were continued for three years. The data were processed by Microsoft Excel 5.1 and analysed by SPSS for Windows 15.0 programmes. To determine the relationship between the data univariate variance analysis and Pearson' correlations were applied. The highest milk yield was observed in lactation 3 and 4. The most milk was produced by the does on farm 5 in lactation 4 (2.75 milk kg/day/doe; $r = 0.31$; $P < 0.01$), while the least yield was given by the ewes on farm 4 (lactation 7; 0.52 milk kg/day/doe). Based on the evaluation in the end the peak of the mild yield was in lactation 4. (2.46 milk kg/day/doe; $r = 0.16$; $P < 0.01$), and in lactation 7 the milk yield of the ewes was the same as that of the ewes in lactation 1. Based on these findings it was concluded that the mothers could be kept in production until their 7th - 8th lactation. When considering milk yield a value of $h^2 = 0.22$ ($P < 0.05$) was found in the given stock, which means the heritability of this parameter indicated a poor heritability, according to their results. The farm effect proved to be significant in case of the milk yield.

Keywords: Saanen goat, milk yield, lactation number

INTRODUCTION

The main benefits of goat milk production. The influence of the quantity of milk nutrition, and age significantly affected. The Hungarian domestic varieties give an average of around 300 liters, while foreign dairy breeds from 6000 to 1200 liters of milk. The good dairy goats produced milk 15 to 20 times their body weight during a lactation (SCHANDL, 1971). KUKOVICS-NÉMETH (2008) found that the goat's body weight compared to a maximum of 9.31 times the capability of producing a lactation, when the mother's average weight is 50-60kg goat, the amount of milk they produce can be 500-600kg.

According to SCHANDL (1971) the best age for the animals to start breeding is 7-8 months however in case of the less-developed animals he suggests the 1 1/2 years of age. The animals are at top capacity at the age of 3-5, but he notes that in some cases, even at the age of 12-16 they can be satisfactory for milk yield. The 1-2 year old mothers give less than 100 to 200 liters per year less than the older goats. The 5 to 7 year-old goats produce the most milk, then there is a decrease in their milk yield.

The 1-2 year old mothers give 20-30% less milk than the 3-5 years old, who are in their prime breeding. The goats are usually taken out of milk production at the age of 7 to 9 years, but sometimes 12 to 16-year-old animals can produce at an acceptable level (VÁRKONYI-ÁTS, 1982).

MOLNÁR - MOLNÁR (2000) found that the goats are at the top of their milk production during their fourth lactation period. In comparison, their production is 95%, in the third lactation 90% in the second one, while in the first one it is only 70%. The mothers reach their peak performance from 4 to 8 years old. According to NÉMETH ET AL. (2010), milking should be started as soon as possible after calving, while they suggest the end of the milking, the so-called dry period, should start from 200th day of lactation. From this point on there is a greatly reduced milk yield, although studies have shown that milk fat and milk protein content might increase.

CREPALDI ET AL. (1998) Alpine goats were tested and found to affect on milk yield the calving period ($R^2 = 0.4$), number of calving ($R^2 = 0.03$) and litter size. Most of the calving was wintertime (60%) and 40% in spring. There are several authors demonstrating the positive effect of winter calving on the milk yield: STEINEN, 1975; ALDERSON AND POLLAK, 1980; MONTALDO ET AL., 1981; BOULOC, 1992; MUORAD, 1992; VECEROVA AND KRIZ, 1993; NIZNIKOWSKI ET AL., 1994.

The one-year milk production will be best if the mother calves in winter (SCHANDL, 1947), so it will give a lot of milk in spring again, due to the green fodder, while mothers calving in summer dry up soon (their milk production stops).

An increase in the milk production of mothers more than 5-year-old is rare, but it might happen. VECEROVA - KRIZEK (1993) examined 809 goats, Czech, white short-haired goats, which were in the 10th lactation and in case of 248 animals they found an increasing production. However FINLEY ET AL (1984) think, the maximum milk yield can be achieved between 24 and 50 months of age; Alpine, Saanen and Toggenburg goats were examined. RAATS ET AL. (1983) carried out experiment with, Boer goats and found that the milk production increases from the second lactation to the fifth one.

In this study authors endeavoured to examine the connection between lactation number and milk production. They tried to find out how the increase in the lactation number of the mother goats affect the milk yield; in which lactation these values are the highest and until which lactation it is worth keeping the ewes in production.

MATERIAL AND METHODS

The examinations were performed on five Saanen goat farms. Grazing was the basis for nutrition, which was supplemented with feed mix (corn, wheat, barley, and triticale) at the milking in the morning and in the evening. But the quality and quantity of the grasslands and feed mix were different. The animals could graze on burned out, sparse-grass field except in May, the rainy month, on Farm 2 and Farm 4. We examined 56 mother goats on Farm 1, 17 mothers were on Farm 2, 45 animals on Farm 3 and 17 on Farm 4. The examinations were carried out on Farms 1, 2, 3 and 4 from the beginning of May until the end of September, 2008, for five months, monthly. On Farm 5, where there were 80-90 mother goats, the examinations were continued for three years (2005-2007). The quantity of goat milk was measured with Berango type ewe-milk measuring equipment in the morning and in the evening- monthly. Based on the daily (morning and evening) measured milk production data I calculated the daily milk yield of each lactating goat and the average values of lactating goats were made up from these data. The mother goats were grouped according to lactation number on each farm and then the average daily lactation milk yield values were lactation for each group. The data were analysed with a single-factor analysis of variance method. The relationship between the variables was examined with correlation analysis (Pearson's phenotypic correlation coefficient). The results were illustrated in table or in chart. The examinations were carried out from the combined data of the five farms altogether.

The figures were uploaded and systematized on computer with Microsoft Excel 5.1 programme. For data processing SPSS for Windows 15.0 programme was used.

RESULTS

The assessment of individual farms

On Farm 1 mothers in third lactation reached the highest milk yield (2.67 kg/ mother/day), while there was no significant difference between the average milk yield from second to sixth lactation only a minor fluctuations were observed. The milk yield was significantly less, compared to the peak production in the 8th lactation but almost the same as in the first one.

On Farm 2 the milk yields were little in every lactation; the higher values were due to three calvings. However, the milk production fluctuated - e.g. second lactating mothers produced less than the first. The animals could not produce more milk due to poor nutrition.

On Farm 3 the fourth lactation mother goats produced most milk (2.45 kg/mother/day), although this value is not significantly different between the neighboring third and fifth lactation values. However, the milk production at 6th lactation mother goats has been significantly reduced. Mothers were at their peak power of 3-5 lactation.

On Farm 4 lactation milk yield was very low in each group. The animals were in very poor condition due to incomplete nutrition. The 5-lactating mothers produced the most milk, but the average lactation milk yield was 1.70 kg milk/day/mother, which is the lowest of all farms.

On Farm 5 the production significantly increased until the fourth lactation (2.75 milk kg / mother / day). In this period, the animals produced the most milk on this farm.

Is noteworthy that milk production was high (2.37 kg) even in the sixth lactation, it was significantly more than the 2nd lactation mother goats and did not differ significantly from the production of the 3.-4.- 5. lactation mothers (*Table 1*).

Table 1. The relationship of the average daily lactation milk yield and the number of lactation by farms (milk kg/mother goat/year)

| Lactation No | Farm 1 | | Farm 2 | | Farm 3 | | Farm 4 | | Farm 5 | |
|--------------|-------------------|----|------------------|----|-------------------|-----|------------------|----|-------------------|-----|
| | $\bar{x} \pm s$ | n | $\bar{x} \pm s$ | n | $\bar{x} \pm s$ | n | $\bar{x} \pm s$ | n | $\bar{x} \pm s$ | n |
| 1 | 2.06±0.62a | 50 | 1.93±0.86 | 30 | - | - | - | - | 1.67±0.47c | 140 |
| 2 | 2.53±0.66b | 65 | 1.85±0.89 | 15 | - | - | - | - | 2.00±0.66b | 175 |
| 3 | 2.67±0.69b | 35 | 2.20±0.93 | 20 | 2.20±0.50a | 105 | 0.86±0.48 | 10 | 2.15±0.85b | 205 |
| 4 | 2.54±0.71b | 10 | 1.60±0.87 | 10 | 2.45±0.54a | 65 | 0.76±0.42 | 25 | 2.75±0.56a | 205 |
| 5 | 2.29±0.89b | 40 | 2.56±1.15 | 5 | 2.07±0.48a | 25 | 1.70±0.62 | 30 | 2.20±0.68b | 100 |
| 6 | 2.45±0.38b | 15 | - | - | 1.39±0.78b | 15 | - | - | 2.37±0.44a | 20 |
| 7 | - | - | 2.65±1.12 | 10 | 1.18±0.16b | 5 | 0.52±0.35 | 5 | - | - |
| 8 | 2.15±0.96a | 10 | 1.30±0.54 | 5 | 3.16±0.61c | 5 | 0.69±0.36 | 15 | - | - |
| 9 | - | - | - | - | 1.63±0.10b | 5 | - | - | - | - |
| Average | 2.35 | - | 1.91 | - | 2.20 | - | 0.86 | - | 2.19 | - |

n = number of measurements

The means with the different letters are significantly different, within farms ($P < 0.05$)

The combined evaluation of farms

The total assessment of the data of all five farms covers the individual differences of the farms. The milk production tendency in the successive lactations was performed as expected (*Figure 1.*). The milk production increased until the fourth lactation (2.46 kg milk/day/mother goat) and then a decrease followed. MOLNÁR - MOLNÁR (2000) concluded the same results.

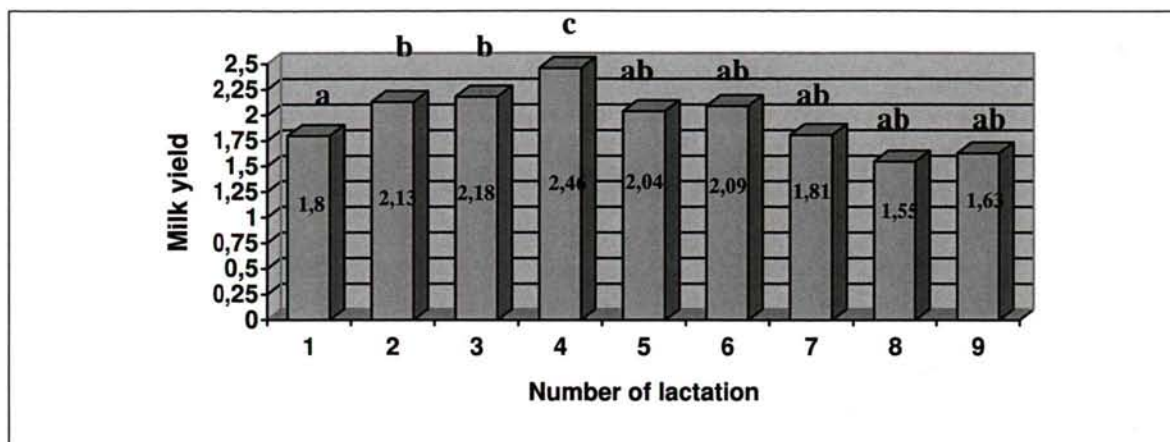


Figure 1. The relationship of the average daily milk yield and the lactation number on all five farms (milk kg/day/mother goat)

The values marked with various letters are significantly different ($P < 0.05$)

The peak production was significantly higher than the neighbouring values. Milk production decreased from the fifth lactation without significant differences. The milk production of mother goats in their seventh lactation was the same as that of the first-lactation mothers. The milk yield produced by mothers in their ninth lactation was hardly less than that of the first-lactation mother goats. Based on that we can conclude that it is worth keeping the 7.-8.-9.-lactation mother goats in production when they perform these values. It must be noted though, that the rate of such animals was not high. Because of their high life-expectancy I suggest keeping their offspring in production as well. The correlation examination of the milk yield and the lactation number indicated a weakly intermediate, positive relationship from the first to the fourth lactation. ($r = 0.26$; $P < 0.01$), while the milk yield was growing. Later, together with the increase of the lactation number, the milk yield decreased and the relationship became negative ($r = -0.16$; $P < 0.01$).

CONCLUSIONS

The milk yield increased in all examined farms with lactation number, but there were significant differences in values. The highest amount of milk was produced in the third, fourth and fifth lactation of the goats, then their production fell back. The goats on Farm 3 had the highest milk yield (2.75 kg milk/mother/day; $r = 0.31$, $P < 0.01$) in fourth lactation. The least milk was produced on Farm 4, during their peak production, in the fifth lactation period: 1.70 kg milk/mother/day. The production of the animals due to poor nutrition fell back to far behind that of the animals with well-fed and the production was unbalanced. They were not able to fulfil the production that can be expected from them because of their genetic endowments and the lactation number (Farm 4: the peak production of the fifth lactation was only 1.70 kg milk/day/mother goat).

When looking at the analysis carried out by the combined results of the five farms it can be observed that the animals produced the largest quantity milk in the fourth lactation period (2.46 kg milk/mother/day). This result is the same as MOLNÁR-MOLNÁR (2000) found. In comparison, the mothers in fifth lactation produced significantly less milk (2.04 kg/day). The milk yield of mothers in the seventh lactation did not differ significantly from that of the mothers in their second lactation.

According to the results found that the influence of the number of lactation milk yield.

The animals should be kept in production for seventh and eighth lactation as well, if they achieve results like mothers on Farm 1 and 3.

The animals are capable of high production for many years, if their nutrition is adequate (Farm 1: From lactation No.2- to No.6).

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