UDK 636.23.237.23

Original scientific paper
Izvorni znanstveni članak

GENETICAL AND ADAPTATION ISSUES DURING THE FIRST LACTATION OF SIMMENTAL COWS

Y. Biçoku, E. Sallaku, A. Hoda

Summary

The study was conduct to investigate the interrelation between milk production during the first lactation with the age of calving and the length of pregnancy past in Albania, as well as the relation of milk production with feeding system. There are studied 27 cows imported from Austria during the year 2005, and managed in Nikel-Kruje. The study shows that the heifers aging 32-34 months have produced more milk than heifers ageing 28-31 months. In addition, the heifers that past more months of their pregnancy in Albania have produced less milk, which is related with the diffrence of feed ration from country of origine. However, for both indicators there is not a statistically significant relationship at the 95.0% or higher confidence level. For each kilogram milk produced is spent 1,15 Milk Unit out of 0,85- 0,90 Milk Unit advised from the literature. The lack of good feeding during the entire lactation has influenced the milk production. So, the production of studied cows is 3735 kg milkin their first lactation while theeir mothers production in the first lactation is 5499 kg. Comparisons were done for the results obtained in our country and the country of origin. However, the results taken by the studied herd compare with the heifers imported in 1972 and from the literature, are aceptablefor the management conditios of our country. Simmental is a well adopted breed in the coastal/plain area of the country making possible the increase of milk production and the improvement of meat traits. Statgraphics Centurion XV was used for data analyzing.

Key words: Cattle, Simmental breed, milk, lactation.

Introduction

Simmental breed is one of the breeds spreead out during the last years in Albania. Simmental breed's heifers and semeen re-started to be imported after the year 2000, mainly from Austria and Germnay. One of the reasons of the Simmental importations is that small and medium scale farm owners of costal and hilly areas are sattisfied with milk & meat production of this breed (dual-purpose cattle).

Y. Biçoku, E. Sallaku, A. Hoda, Department of Animal Production, Faculty of Agriculture and Environment, Tirana Agricultural University. Corr. Author: Y Bicoku, Department of Animal Production, Faculty of Agriculture and Environment, Tirana Agricultural University, Tirane, Albania (+355 692756629; bicokuy@yahoo.com).

Other reasons for Simmental breed spread out in Albania: (a) very good fat content in milk, (b) very good carcass and meat quality, (c) good body and legs conformation, and (d) low level of stillbirth. Simmental breed for the first time is imported in 1972. In that time 97 cows and three bulls were imported from Austria and were managed in one of the formers state farms in Korce, souther-east part of the country (Frasheri S, 2003).

Materials and methods

Effects of heifers' calving age and length of the period of pregnancy of heifers imported and managed in Albania on the milk production of the first lactation;

For the herd taken in the study, established in a new environment, it can assume the hypothesis that the physiological endeavor related with the development of fetus and in general with the incurring of pregnancy cannot be the same with those characterized this breed in the country of origin. In order to clarify this, we would be limited only in the analyses of trait of milk production, for the reason that this was permitted the material in our disposal.

We tried to clarify the issues related with non genetical factors which effects the results obtained. In this manner, our intention was to provide and consider the adaptation of this genetical fond in the conditions of our country (farmers management) and to make suggestions for improvement of environmental factors (mainly feeding) which should result with the growth of production traits.

The herd taken in the study, 27 heads of heifers of Simmental breed, was imported from Austria in 18 October 2005 and was placed in the village Nikel of Kruja district, central part of the country. According to the analyzed milk production of the mothers and daughters (table 1), where the dates was taken from the heifer"s cards, it noticed that the 62.5 % of daughters deviated with 1 sigma and there is no deviation with 2 sigma, while 59.8% of the mothers deviated with 1 sigma and there is no a deviation with 2 sigma.

Table 1 – MILK PRODUCTION TRAITS

No of heads	Mean (X) Standard deviatian (s)	Average milk production (Kg)	Age in the first calving	Average milk production of mothers
27	X	3735	27,9	5499
	Δ	530,7	2,77	528,3

According to the different authors (Biçoku, 1995, Hurley, 2006) heifers produce more milk during the first lactation when their age is 30 or more months, however their life time milk production will be less than the heifer calving less than 30 months of age.

Interrelation between milk production of first lactation and feeding level.

Also, in our study we have taken in the reviewing even the relation between the milk production in the first calving and the feeding. The analyses of the lactation curve help us to identify the problems of the feeding and the management of cows herds (Mustafa, 2001).
Different authors (Tafaj, 1986, Shytaj, 2005) underline that more naturalized is the new ration for the animal more easily and faster the animal accepts it. However, in the changing of feed rations we must take in the consideration that microorganism needs 10-14 days to be adopted with the ration and to reach their optimal yield of breaking down and synthesis of nutrients in the rumen (Shytaj, 2005). This is clear indicate in the Figure 1 where the lactation curve of cows taken in the study has shown a great drop in the sixth and seventh month which is related with the insufficiency of feeds and not fulfilling the daily needs of cows. During this period has finished the corn silage and the introduction in the ration of beer cake and wheat straw has not reached to fulfill the quantity of energy in the ration. The same results were taken with the herd imported in 1972 (Figure 2). The lack of feed needed for this herd and the change of ration has made that the milk production in the fifth, sixth and seventh month, comparing with each other, has dropped 12-18 % from 6 % which is normal (Hurley L.W., 2006) as it is shown in Figure 3.

Fig 1 – LACTATION CURVE OF STUDED HERD

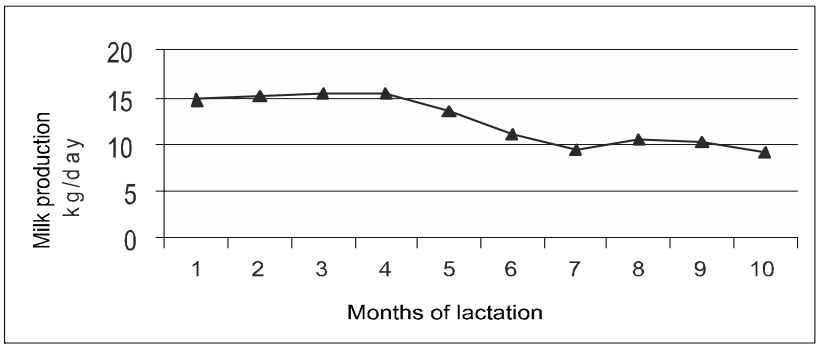


Fig 2. – LACTATION CURVE OF IMPORTED HERD IN 1972

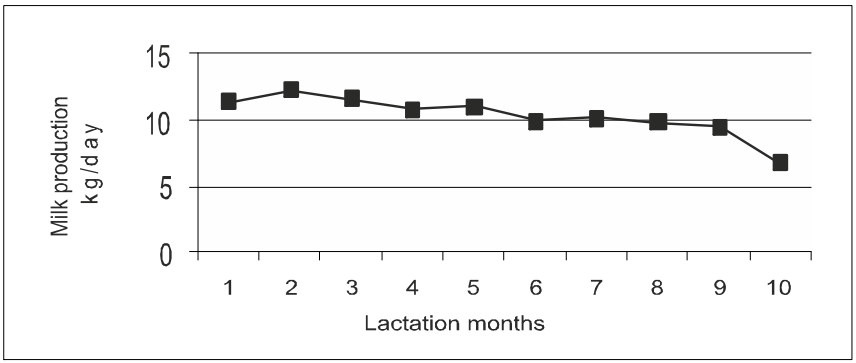
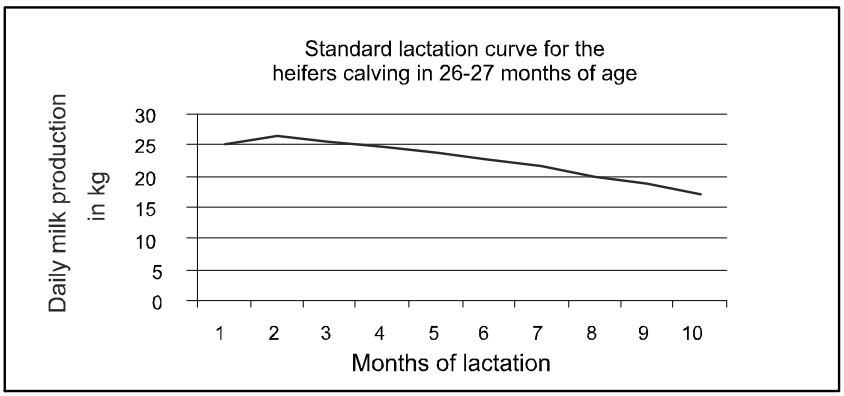


Fig 3. – STANDARD LACTATION CURVE



The feeding in the herd taken in the study was been based mainly in forage, hay combined with minimal quantity of concentrate feed. The calculation of feeding ration are made according to the French system of Milk Feed Unit (MFU), where for basic unit of evaluation is taken the net value of 1 kg barley standard equal with 1730 kkal.

One kg of milk is produced with 1.15 NjQ from 0.85-0.90 NjQ, while in the imported herd in the year 1972 one kg of milk is produced with 1.28 NjQ.

Statistical analysis

Data utilized for this study consisted of first lactation records of 27 Simmental cows.

Statgraphics Centurion XV, Linear model: Y = a + b*X * (simple regression) was used for data analyzing.

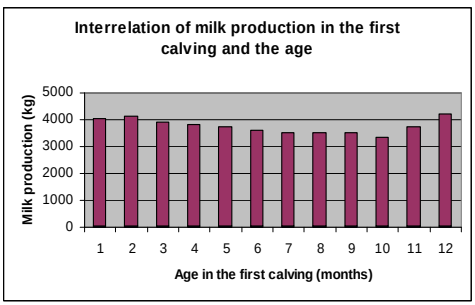
Results

The dissemination of crossing of existing cows with Simmental breed and the breeding pure breed cows came as a result of the demand of the farmers who immediately have noticed the improvement effect of this breed concerning the increase of milk production as well as live weight of calves in calving and their further behavor compared with the crossing with Black and White and Jersey, or the crossing with beef breeds. This is shown by the increase of number of heads of crossings and the pure breeding, in 1991 was 2500 heads while in 2004 was 11,225 heads.

Our data are in compliance with those of the other authors where the heifers that have calving in the age 33-34 months have given more milk than those of the age 28-32 months. It is noticed that there is a change from the production of mothers where in the age 29-31 months there is an increase of milk production, while to the daughters of the same group of age there is less milk production which can be explained with the months of passing of the pregnancy in Albania, which was been 2.7 month. With this can explain that the hiefers of group age 23-25 months has given more milk (3917 kg) that the other age group, as they have spent only 1.5 months of pregnancy in Albania.

Fig 4 – INTERRILATION BETWEEN MILK PRODUCTION IN THE FIRST LACTATION AND AGE IN THE FIRST CALVING

Daughters



Mothers

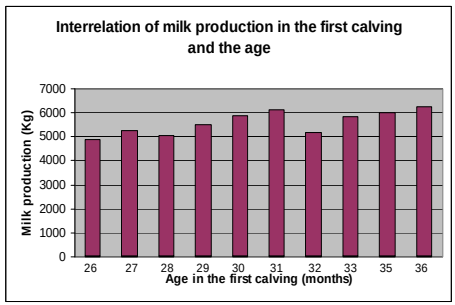


Fig. 5 – INTERELATION OF MILK PRODUCTION AND AGE AT CALVING (DAUGHTERS)

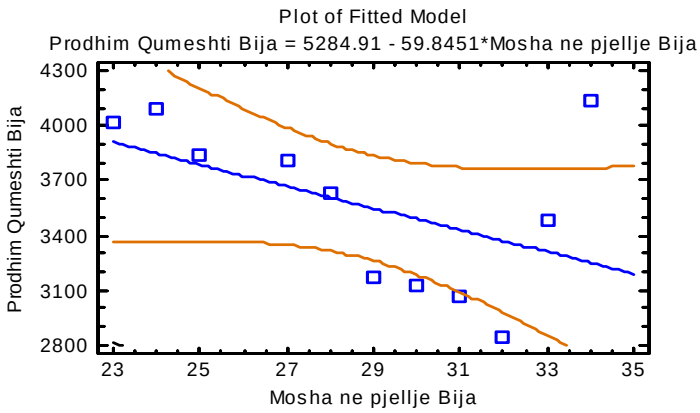


Fig. 6 – INTERELATION OF MILK PRODUCTION AND AGE AT CALVING (MOTHERS)

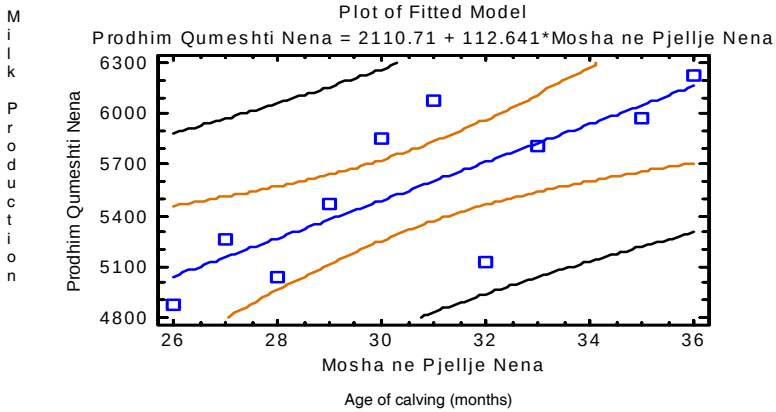
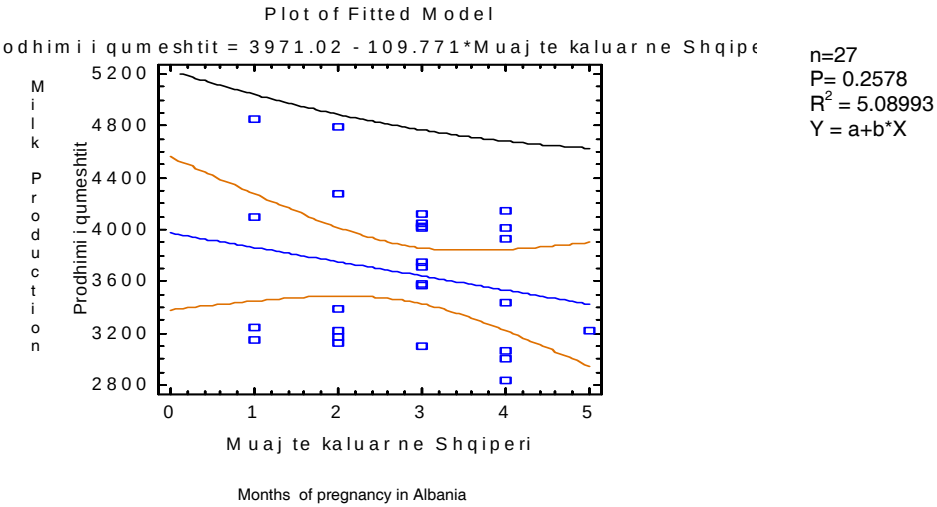


Fig 7. – INTERELATION OF MILK PRODUCTION AND MONTHS OF PREGNANCY IN ALBANIA



Milk Production was low during the winter season as the energy and dry matter of the feed ration is low and not in the required quantity. In addition, heifers passing more months of their pregnancy in Albania produced less milk.

Table 2 – INTERRELATION MONTHS OF PREGNACY IN ALBANIA VS MILK PRODUCTION

Indicator	23-25 months	26-28 months	29-31 months	32-34 months
Milk Production (kg)	3917	3697	3453	3485
Months of pregnacy in Albania	1.5	2.77	2.7	4

Tabel 3 – FEED RATION

Feed	Studied herd	Herd in Lunshje	Herd of first importation in 1972
Grasses %	35.2	35.3	76.7
Hay+ straw %	26.5	6.2	7.6
Concentrate %	16.9	23.7	15.7
Beer by-product %	26.0	34.8	
Milk Unit/cow/day	14.3	21.44	10.9

Discussion

Effects of heifers' calving age and length of the period of pregnancy of heifers imported and managed in Albania on the milk production of the first lactation;

Although we have not a statistical relation (to daughters) between the indicators for the level of confidence 95 % the correlation coefficient who is in the value -0,4823420 shows for negative moderated relation between the two indicators (n=27, P=0.133, R2 =23.2654, Y=a+b*X). While to the mothers the correlation coefficient with the value 0.779676 shows a strong relation between the two indicators (n=27, P=0.0078, R2 =60.7895,Y=a+b*X).

From the data obtained, it is noticed that we are dealing with a herd which has higher potential that the herd has reached during the first lactation in Albania, when the mothers has given 5,499 kg milk in the first lactation and the heifer taken in the study have produced 3,735 kg milk. It must be underlined that the indicator of milk production of parent mother of these heifers imported was lower (5,499 kg) compared with those of breed average in Austria, where the production of heifers/cows in the first calving is 5,778 kg milk. The same trend is indicated by other authors in Croatia and Turkey (Kaps et al., 2004, Çilek et al., 2005) when in the first lactation are taken 3,100-3,300 kg milk and after 10 years the production is increased in 4,100-4,700 kg milk.

The milk production of heifer's mothers of this herd is lower than the average of the breed as well as their purchase price of 1250 Euro/heifer, is lower from the average of heifers sold in Austria, 1409 Euro.

The production reached during the first lactation of these heifers, 3,735 kg of milk or 67.9 % of the production of mothers in the first lactation, is explained even with lack of experience of farmers (who breeds for the first time this breed) as well the feeding of these heifers/cows.

For each of the heifers, knowing the date of arrival in Albania and the calving date is calculated the duration of pregnancy period in our country. Based of this index it is made the grouping of animals in class with duration of 30 days.

The heifers /cows taken in analyses have had a shock from their feeding which better shown from their production. So the heifers that have calving 1-3 months after their arrival in Albania has produced 3,946 kg milk, while heifers that have spent over 4-5 months have produced 3,353 kg milk or 15 % less.

The age in calving of heifer was 27.9 months compared with 28.6 months which is the breed average in Austria.

Although, there is no a statistical relation between these indicators for the level of confidence 95 % and correlation coefficient which is in the value -0.225609 shows for weak negative relation between the two indicators (n=27,P= 0.2578,R2 =5.08993,Y =a+b* X). While, from the heifers imported in 1972, in the first lactation was produced 2,555.5 kg/milk (1820-3395 kg). The feeding was not in the needed level. The age in the first calving was 30.1 months (26 -36 months) (Frasheri, 2003).

While in the milking cows of "Agroteks /Kozara farming" the milk production was 4,652 kg/cow (Shytaj, 2005). The same is referred by other authors (Cilek, 2005) for the milk production of Simmental cows in the first calving in Turkey where the production was 2,683 -3,227 kg as well as in Russia with 3,371 kg. From some authors (Cilek et al., 2005 and Ugur et al., 1995) is underlined that the milk production of Simmental cows changed not only from one state to another state but even inside of zones of the same country.

So, comparing the data obtained in 1972 with those of the herd taken in our study it is noticed that in this herd is produced more milk not in absolute figures but even compared with the percentage of productivity daughter/mother. The main reasons are the better condition of management, feeding and milking.

The relation between the milk production in the first calving and the feeding

From our data comes out that in the first period of lactation (December – April) the ration does not content the requiret quantity of energy and dry matter which has influenced negatively in milk production and not allowing to use the genetical capacity of milk production of this breed. In the same conclusion has arrived Shytaj (2005) with the Simmental herd in the district of Lushnja. Regarding the concentrated feed used in our herd we can say that is under the physiological requirements of the first stage and second stage of lacation, although, we think that the use of greater quantity of concentrate would made possible to produce more milk from these cows.

The ration used in the farming under the study, where there is a prevalence of forage and hay feed, which are mainly produced in the farm, is appropriate for the condition of small and average farms in our country.

Comparing the level of milk production of this herd with those realized from the Simmental cows in Austria, and in other countries where is bred, in the first lactation are evident the reserves that this breed has for further increase

of milk productivity with the condition of the improvement of its feeding and management level.

Conclusion

Simmental is a well adopted breed in the coastal/plain area of the country making possible the increase of milk production and the improvement of meat traits. However, the import of Simmnetal breed as dual purpose cattle, in our country, is not implemented in full compliance with all the requirements of the breed and the breed did not show all the genetical potential in mik production. The main reason is that our farmers are not technically prepared to manage and follow the advices of the extensionists.

Simmental cattle, even in the condition of our country, are presented as a genetical fund with value for the increase of milk production and the improvement of meat qualities.

The duration of pregnancy in Albania is a factor which has shown a considerable influence in the incurring of this genetic fund. The results obtained in this study shows that in the cases when the import of animals is made without securing from the beginning the optimal environment according to their requirements, with efficiency would be better the import of pregnant heifers in the last period of pregnancy.

According to our results it would be better that their age in the first calving to be not less than 32 months. The heifers calving in the age of 33-34 months produced the same amount of milk withthose of the age 28-32 months. While the heifers of group age 23-25 months have produced more milk (3917 kg) then the other groups of age as they has spent only 1.5 month of pregnancy in Albania.

REFERENCES

1. Biçoku, Y. (1995): Gjedhi Holshtein në Shqipëri. Probleme gjenetike dhe të adaptimit. Doktoraturë, Universiteti Bujqësor i Tiranës.

2. Bujqesia Praktike (1998): Nevojat dhe Vlerat e Ushqimeve për Kafshët. Botim i Institutit të Kërkimeve Zooteknike.

3. Çilek S., E.M.Tekin (2005): Environmental Factors Affecting Milk Yield and Fertility Traits of Simmental Cows Raised at the Kazova State Farm and Phenotypic Correlations between These Traits. Turk J Vet Anim Sci 29 (2005) 987-993.

4. Frashëri S. (2003): Studime në Fushën e Zooteknisë dhe të Ekstensionit. F. 7-31, Botim i TOENA.

5. Hurley L.W. (2006): Lactation Biology (Other Factors Affecting Milk Yield and Composition). University of Illinois.

6. Jahresbericht Zucht Data (2005): Zuchtprogramme - Genetische Trends.

7. Kaps M., M. Spehar (2004): Estimation of Genetic Parameters and Breeding Value of Milk Traitsfor Simmental Cattle in Croatia Using a Lactation Animal Model. Agriculturae Conspectus Scientificus, Vol.69, No. 4, f. 91-94.

8. Mustafa A. (2001) : Feeding the Dairy Cow During Lactation. Dairy Production 342-450A, Department of Animal Science McGill University.

9. Rinderzucht Austria (2005): Recording Results of the Austrian Cattle Breeds.

10. Shytaj F. (2005): Studimi i ndikimit te sistemeve te te ushqyerit mbi treguesit e prodhimit dhe vleren ekonomike te gjedhi i races Simental. Disertacion per Master, shkurt 2005, UBT.

11. Tafaj M., Dh. Bogdani, P. Nakuci (1986): Mbi Nivelin dhe Strukturen e te Ushqyerit te Lopeve per Prodhimtari te Larte Qumeshti. Buletini i Shkencave Zooteknike vol 2 f.3-24.

12. Ugur F., M. Yanat., M. Ozhan, N. Tuzemen, R. Aydin, O. Akbulut (1995): Milk Production Characteristics of Simmental Cattle Reared in the Research Farm of Ataturk University. Turk. J. Vet. Anim. Sci., 1995; 19:365-368.