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COMPARATIVE STUDY ON THE MILK PRODUCTION AT GOATS AUTOCHTHONOUS BREEDS

CHETROIU RODICA¹, CĂLIN ION²

Abstract: *The paper presents the research results on milk production, conducted in the goat farm of S.C. AGROFAM HOLDING Fetești, at the two autochthonous breeds: Alba de Banat and Carpatina, for a period of 3 years, between 2012 - 2014. Thus, the productive levels of the two breeds show very significant statistic differences, Alba de Banat breed being upper than Carpatina with 40.94 to 46.05%. Also, there are productive differences between lactations, the highest milk production being obtained in lactation 3 of each year under study, with an upward trend from the first lactation. After the 3rd lactation, milk production declines, being near the amount of the first lactation. During the period under study, the average farm yields of the both breeds fall on downward curves, due both to the shifting from mechanical milking to manual milking and to decreasing of the lactation duration. Practicing the mechanical milking is a technological factor of prime importance both in terms of achieving increased milk production and for producing a hygienic product and switching from mechanical milking to manual milking is a factor of production decrease, affecting the economic results of the farm.*

Keywords: *milk, goats, lactations, breeds.*

INTRODUCTION

The main exploitation direction of goats in our country is the milk production, this product being a food product with a high biological value and therapeutic properties. The two autochthonous breeds which are exploited in Romania are Carpatina and Alba de Banat. Carpatina breed is an ancient, rustic, resistant breed, which was created through natural selection, while Alba de Banat is an ameliorated breed, with a higher productive potential compared to Carpatina. The researches in this paper were carried out in the goat farm of S.C. AGROFAM HOLDING Fetești.

MATERIAL AND METHOD

To determine the quantitative milk production, it was considered the period of suckling and the period of milking. The assessment of the milk quantity sucked by kids was done for two successive periods: the period of suckling from calving until the age of 28 days (the specific consumption is 5.5 kg milk sucked, for 1 kg weight gain), followed by the second period - from the age of 28 days to 45 days, when the kids weaning occurs (the specific consumption is 4.5 kg milk sucked, for 1 kg weight gain). From the summation of the milk quantities sucked in the two periods, has resulted the amount of milk during lactation.

Determination of the milked quantity of milk was done by the official control of milk production, applying the standard method A₄, for all lactating goats, on different lactations, performing 6 official controls, from April to September. The calculation of lactation period and of milk production per lactation was conducted using the method Fleischmann (Pascal, 2007):

$$MS = I_0M \left(\frac{M_1 + M_2}{2} \right) + I_1 \left(\frac{M_2 + M_3}{2} \right) + \dots + I_{n-1} \left(\frac{M_{n-1} + M_n}{2} \right) + I_n M_n$$

In which:

MS – milk production per lactation;

M₁, M₂, M_n – milk quantity at the control of 24 hours;

I₀ – period in days between the beginning date of milking and the date of the first control;

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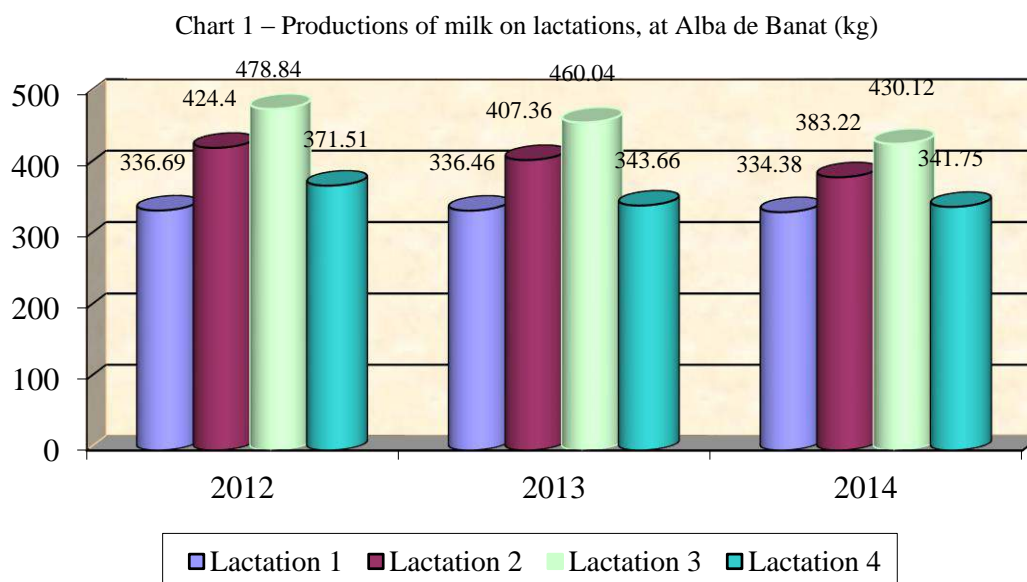
I_1, I_2, I_{n-1} – number of days between 2 controls;

I_n – number of days between the date of the last control and the date of ending lactation.

The evolution of milk quantity was monitored for a period of three years, during 2012-2014, on 4 lactations. Testing the statistical significance of differences between averages was performed by using *ANOVA Single Factor*, from Excel 2007 program.

RESULTS AND DISCUSSIONS

Chart 1 shows the comparative evolution of milk production at Alba de Banat breed, on different lactations, in the dynamics of the three years studied (2012, 2013, 2014).



The highest milk yields were obtained at lactation 3 of the each year under study, with an upward trend from the first lactation. After the 3rd lactation, the milk production declined, near the amount of the first lactations. Taftă V. (2002) shows that at the first lactation, the milk quantity is 20-30% lower compared to the 3rd lactation, as confirmed by the outcome of this research study.

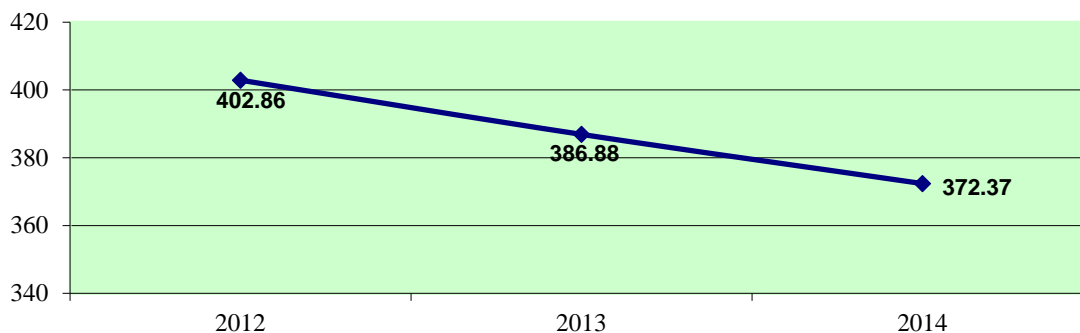
Testing the statistical significance of differences between the averages of milk productions using *ANOVA Single Factor* shows that, at Alba de Banat, between the 3 years studied, there are insignificant differences NS in terms of the average milk yields ($P > 0.05$). Using the same statistical test for testing the difference between lactates, there are very significant differences*** between the milk production of the four lactations ($P < 0.001$).

Table 1 – Average milk production (kg/head) at Alba de Banat – statistical indicators

Year	Average \pm standard error of the average	Coefficient of variability	% of 2012
2012	402,86 \pm 31,09	15,43	100
2013	386,88 \pm 29,13	15,06	96,03
2014	372,37 \pm 22,05	11,84	92,43

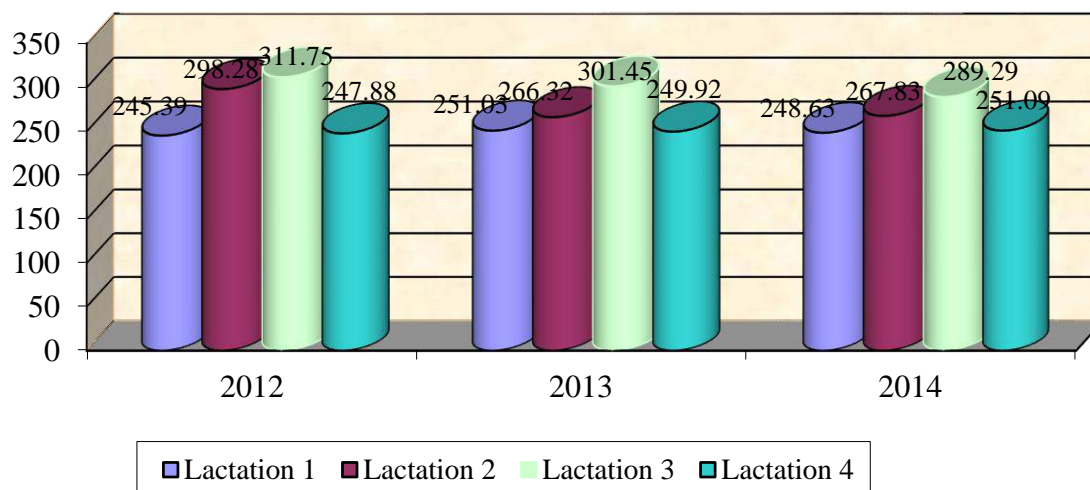
In Table 1 and Chart 2 are presented the averages of lactations of the 3 years studied, showing that the most average production was achieved in 2012, followed by a diminish in the coming years, as follows: 2013 decreased by 3.97% compared with 2012 and with 7.57% in 2014 compared to the same year.

Chart 2 – Evolution of average milk production at Alba de Banat (kg/head)



In Chart 3 is presented the evolution of milk productions at Carpatina breed, on different lactations, in the dynamics of the three years studied (2012, 2013, 2014).

Chart 3 – Milk productions on lactations at Carpatina (kg/head)



Like Alba de Banat breed, the largest milk productions at Carpatina were obtained at the lactation 3 of each year under study, with an upward trend from the first lactation.

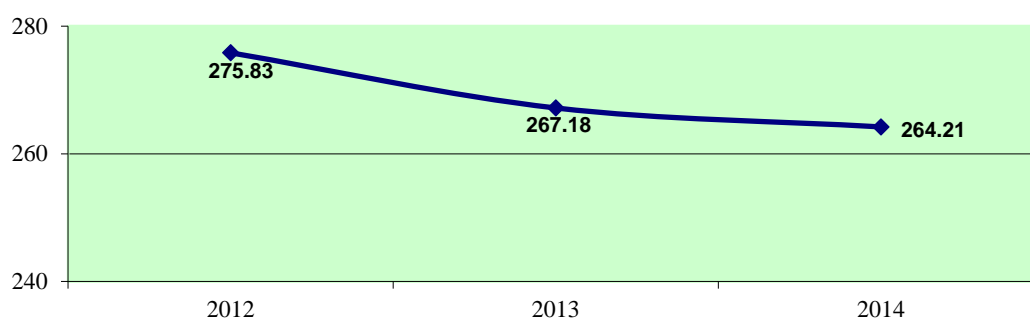
Testing the statistical significance of differences between the averages of milk production using ANOVA Single Factor, shows that at Carpatina, between the 3 years studied, there are insignificant differences NS in terms of average milk yields ($P > 0.05$). Using the same statistical test for testing the difference between lactations, there are very significant differences*** between the milk productions of the four lactations ($P < 0.001$).

Table 2 – Milk production (kg/head) at Carpatina – statistical indicators

Year	Average \pm standard error of the average	Coefficient of variability	% of 2012
2012	275,83 \pm 17,08	12,39	100
2013	267,18 \pm 12,02	9,00	96,86
2014	264,21 \pm 9,39	7,10	95,79

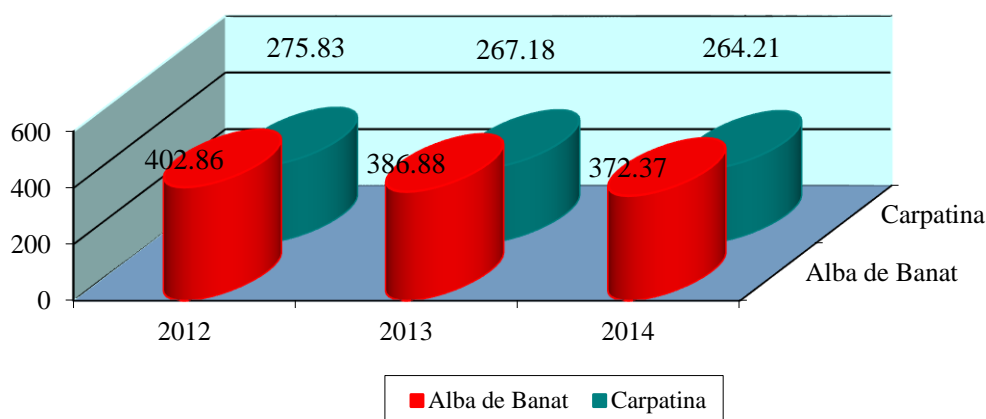
Table 2 and Chart 4 present the dynamics of the average milk productions from the years 2012, 2013, 2014, at Carpatina.

Chart 4 – Evolution of average milk production at Carpatina (kg/head)



In comparison, the average yields of the two breeds, in the evolution of the 3 years, are shown in Chart 5. In statistical terms, ANOVA Single Factor test shows that there are very significant differences between the average production levels of both races ($P < 0.001$), but between on-farm production of the three years studied no significant differences ($P > 0.05$).

Chart – Dynamics of average milk productions at the two breeds (kg/head)



Analyzing the evolutions of milk productions at the two breeds, it appears that, at Alba de Banat, the milk production levels are superior to Carpatina with 46.05% in 2012, with 44.80% in 2013 and with 40.94% in 2014. They also showed a downward trend from one year to another, the causes of these evolutions being, in general, technological, and, among them, the main causes being the transition from mechanical milking to manual milking and decreasing of the lactations period from one year to another. It should be noted that the company has a parlor with a milking plant with a capacity of 120 seats, which was not functional since 2013 because of malfunction. Therefore, it was switched to manual milking, finding thus reducing yields.

CONCLUSIONS

In conclusion, the productive levels of the two breeds show very significant statistical differences, a fact confirmed by other researchers (Călin, 2004; Taftă, 2008), Alba de Banat breed being productive superior to Carpatina breed with 40.94 to 46.05%.

Also, there are very significant differences between lactations production, the largest milk production being obtained at lactation 3 of each year under study, with an upward trend from the first lactation. After the 3rd lactation, milk production declines, hovering near the amount of the first lactation.

Another conclusion is that the practice of mechanical milking technology is a factor of prime importance both in terms of increased milk production and to obtain a hygiene product that complies

with the rules in the veterinary field. The transition from mechanical to manual milking is a factor of production decrease, affecting, ultimately, the economic results of the farm.

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