

**DETERMINANT FACTORS OF COW'S MILK PRODUCTION  
IN THE MOUNTAIN AREA**

Roger Catalin MANEA

National Agency for Animal Husbandry Department, Bucharest, Romania

E-mail: rogermanea@yahoo.com

**Abstract**

*The production of milk, the quantity of fat respectively constitute the main criterion of assessment of dairy cows in the mountain area and downhill. The average performance in the succession of eight lactations per total lactation is 3420.67 kg, and per normal lactation is 3209.20 kg milk. The limits vary between 1506 kg of milk and 8835 kg milk recorded for lactation and 1506 kg of milk and 7322 kg milk for normal lactation. The study of statistical parameters of index of the total duration of lactation allows us to affirm that the cows from the herd studied have the genetic potential to increase lactation beyond the limits of normal lactation of 305 per days. Milk production per day is higher with + 0.45 kg per total lactation than normal lactation. Extension of lactation and breast resting shortening represents loss of milk production in both current lactation and the next lactation. To estimate the effect of localities was used the analysis of variance within samples. Raw data tables have been processed to create tables of variances between herds of the 6 localities and within the herd in each locality. The influence of the locality on the milk production is null.*

*The output production of milk cows has as enablers: daily output and duration of lactation on her. The raise of the productive cows milk level in the mountain area and hence income breeders is achievable through the integration and expansion of biotechnology.*

Keyword: total lactation, normal lactation, variance, standard deviation, coefficient of variance.

**1. INTRODUCTION**

Animal husbandry in mountainous area is favoured by the existence of large areas of grassland and Alpine grazing meadows, having a length of approximately 180 days. The mountain pastures and meadows occupy 82.61 percent of the total farmland areas that underlie the growth of dairy cows.

Experimental researches have shown that cows in the mountain area have a low productive level. The level of productive dairy cows in the mountain area is influenced by the handicaps present in these areas: nutrition, housing construction, the organisation of breeding and the selling of the products. The production of milk and the quantity of fat is the consequence of genetic potential, restricted by the conditions of life, on the first place being the feeding. With regard to the feeding it is important the quantity of the dry matter the cow can ingest daily, the concentration of energy per kg of dry matter and energy-protein ratio of daily rations.

In the mountain region from the dairy cows ration the concentrates are missing, the concentration of energy ratio is lower. It can maintain an acceptable limits if the fibrous aliments have lower content of undigestible cellulose. The straw and coarse aliments or the leaves have little energy because they have low digestibility.

Natural or cultivated meadows ensures good quality fiber. They provide the necessary protein and because the cows are ruminant animals supply their protein ration with the protein resulting from fermentation processes that occur in the rumen.

Reproduction is mostly achieved through natural service, with unauthorized bulls without certified amelioration. The percentage of artificial breeding does not exceed 25% of the cows and female calves included. For progress towards the current solution is the integration of breeding on biotechnologies on the existing fund.

The artificial breeding make it possible to transmit artificial males genes to thousands of descendants (pressure selection by males). The increasing number of the offspring from females, a lot above the limits of the natural characteristics of the species by MOET (embryo transfer after multiple ovulații) adds extra genetic modification to the structure of the next generation.

The output production of milk cows has as enablers: daily output and duration of lactation on her.

**2. MATERIAL AND METHOD**

The study of this work has been done on the mountain area and downhill area of the Dambovită County represented by these 16 localities as it follows: Bărbulețu; Bezdead; Buciumeni; Căndești; Moroeni; Pietroșița; Puchenii; Runcu; Tătărani; Valea-Lungă; Văleni Dâmbovița; Vișinești; Vârfuri; Vulcana Băi; Pucioasa and Moșăieni. Research has been conducted on the herds of milk cows from the Brown bred in the succession of 8 lactations (n = 806 lactations must be used).

The index calculated were: media ( $\bar{x}$ ); variance ( $s^2$ ) – characterizing individual character deviation from the population mean and it is measured by calculating the

average quadratic deviation from the average; standard deviation (s) – what is the second measure of variability obtained by extracting the square root from variance; variability (V%) – that shows how percent of an average standard deviation; the standard error of the mean - the standard deviation of the mean of the sample, that actually is a measure of the dispersion of the population of what would appear by drawing repeated 'n' individuals in the population; tests of significance of differences in variances (the Fisher test); control of Charlier; test null hypothesis.

3. RESULTS AND DISCUSSIONS

The output production of milk cows has as enablers: daily output and duration of lactation.

3.1. The production of milk and fat in relation to the number of endpoints.

Milk production per normal lactation and total lactation was measured at a number of 806 lactations with serial number from 1 to 8. In table number 1 which presents these results it appears that the average performance in the succession of eight total lactations' is 3420.67 kg, and normal lactation is 3209.20 kg milk. The limits vary between 1506 kg of milk and 8835 kg milk recorded for lactation and 1506 kg of milk and 7322 kg milk for normal lactation. Average values can be regarded as normal for the livestock concerned whether to consider: the level of their improvement, fodder resources available to breeders and the mistakes that are made on the grounds that the breast resting and breeding pattern are neglected.

Table 1. Milk production in sequence of lactations per total lactation (a) and the normal lactation(b).

Lactation rang	n	Total lactation		
		average	minimum	maximum
1	162	3328.35	1506	8835
2	149	3297.15	1722	7140
3	138	3478.10	1970	5900
4	119	3403.19	1880	8627
5	95	3597.00	1762	7829
6	78	3528.79	1960	7985
7	46	3406.54	2216	6032
8	19	3326.26	2332	3885
Total	806	3420.67	1506	8835

Lactation rang	n	Normal lactation		
		average	minimum	maximum
1	162	3100.96	1506	4981
2	149	3054.00	1722	5721
3	138	3255.09	1900	5830
4	119	3190.80	1880	6551
5	95	3302.04	1762	6496
6	78	3367.70	1960	7322
7	46	3251.70	2216	5650
8	19	3151.37	2332	3851

Total	806	3209.20	1506	7322
-------	-----	---------	------	------

The extreme values are explainable, in the case of the minimum one, because of the the small body weight of the cow, the early mating in a row, and in the case of the maximum one through the neglecting of the reproduction of an animal with a higher genetic potential.

From the analysis of the variability of milk production per total lactation given in table number 2 it shows that 35.6% of the population studied has a yield below 3000 kg of milk, approximately 59.6% yields ranging from 3000-5000 kg and only 4.6% have more than 5000 kg milk yields.

A production of over 6500 kg per total lactation is made only by 1.1% of the studied herd.

Table 2. The range of variation and calculation to obtain the index value of milk production per total lactation.

Classes	frecv (f)	abat. (a)	fa	fa <sup>2</sup>	F (a+1) <sup>2</sup>	frecv %
1501-2235	41	-2	-82	164	41	5.1
2236-2970	246	-1	246	246	0	30.5
2971 -3705	279	0	0	0	279	34.6
3706 -4440	151	1	151	151	604	18.7
4441 -5175	51	2	102	204	459	6.3
5176 -5910	20	3	60	180	320	2.5
5911 -6645	8	4	32	128	200	1.0
6646 -7480	6	5	30	150	216	0.7
7481 -8115	2	6	12	72	98	0.2
8116 -8850	2	7	14	98	128	0.2
Total	∑f = 806		∑fa = 73	∑fa <sup>2</sup> = 1393	∑f (a+1) <sup>2</sup> = 2345	100.0

Control of Charlier shows that the data are correct:

$$\sum f(a+1)^2 = \sum fa^2 + 2\sum fa + \sum f ;$$

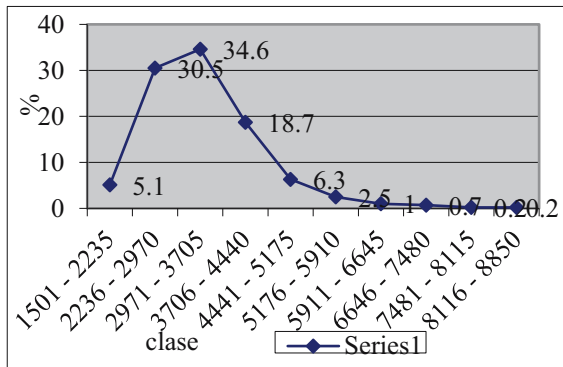
$$2345 = 1393 + 146 806 ;$$

For this range of variation obtained the statistics are:

$$\bar{x} = 3404.5 \pm 34,01 ; s^2 = 930221,67 ; s = 964,48 ;$$

$$\pm sx = 34,01 ; CV = 28,32.$$

The graph in Figure number 1 is presented the variability of milk production per total lactation. The graph has a single peak in which are placed the cows with productions ranging from 2971-3705 kg milk.



**Fig.1. Variability in the production of milk per total lactation.**

The analysis of the statistical parameters of milk production index on total lactation is shown in table 3.

**Table 3. Statistical parameters of the index of milk production depending on the number of total lactation.**

Lact.	n	X ± Sx	S <sup>2</sup>	S	V%
1	162	3328.35 ± 69.27	777532.3	881.78	26.49
2	149	3297.15 ± 73.66	808821.19	889.34	27.28
3	138	3478.10 ± 69.45	665948.52	816.06	23.46
4	119	3403.19 ± 89.67	957126.70	978.32	28.75
5	95	3597.00 ± 111.43	1180392.5	1086.5	30.20
6	78	3528.79 ± 129.72	1312178	1145.5	32.46
7	46	3406.54 ± 111.68	573359.23	757.20	22.23
8	19	3326.26 ± 99.15	186869.65	434.28	13.36

From table 2 it can be observed the following: standard deviation ranges between 434.28 kg in the 8<sup>th</sup> lactation and 1145.5 kg in the 6<sup>th</sup> lactation; the coefficient of variance record the minimum limit of 13.36% in the 8<sup>th</sup> lactation and a maximum limit of 30.20% in the 6<sup>th</sup> lactation ; the standard deviation from the average varies between 69.27 kg in the 1<sup>st</sup> lactation and 129.72 kg in the 6<sup>th</sup> lactation.

The study of statistical parameters of milk production per normal lactation are presented in table number 4.

**Table 4. Statistical parameters of index of milk production depending on the number of normal lactation.**

Lact.	n	X ± Sx	S <sup>2</sup>	S	V%
1	162	3100.96 ± 47.30	362597.46	602.16	19.42
2	149	3054.00 ± 55.70	462460.47	680.04	22.27

3	138	3255.09 ± 60.93	512475.27	715.87	21.99
4	119	3190.80 ± 665.26	506943.16	712.00	22.31
5	95	3302.04 ± 84.40	677146.83	822.89	24.92
6	78	3367.70 ± 100.08	780942.19	883.71	26.24
7	46	3251.70 ± 91.45	384456.22	620.05	19.07
8	19	3151.37 ± 99.56	188427.47	434.08	13.77

From this table it can be observed that the standard deviation is between 434.08 kg in the 8<sup>th</sup> lactation and 883.71 kg in the 6<sup>th</sup> lactation; the coefficient of variance has the minimum limit 13.77% in the 8<sup>th</sup> lactation and the maximum limit of 26.24% in the 6<sup>th</sup> lactation ; the standard deviation from the average varies between 47.30 kg in the 1<sup>st</sup> lactation and 100.08 kg in the 6<sup>th</sup> lactation.

From the index analysis of the percentage of total fat on total lactation and normal lactation in the succession of the eight lactations it results an average value close to 3.78% per total lactation and 3.79% per normal lactation, as shown in table 5. The minimum individual limit per total lactation and normal lactation is the same 2.69% , registered in the 5<sup>th</sup> lactation , and the upper limit is 4.93% registered in the 3<sup>th</sup> lactation for the total lactation and 4.77% for normal lactation. This is normal because as it is known the milk at the end of lactation curve, when the production is lower is fatter.

**Table 5. The percentage of milk in the fat in the succession of lactations on total lactation (a) and normal lactation (b).**

**a.**

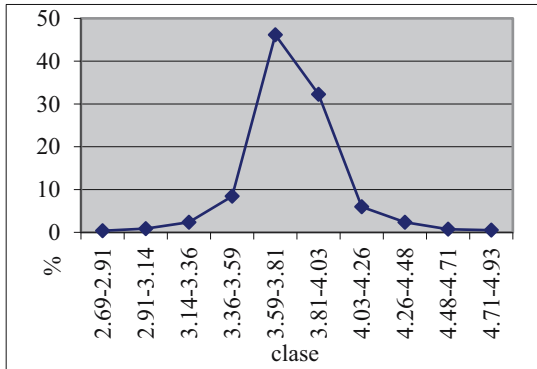
Lactation rang	n	Total lactation		
		average	minimum	maximum
1	162	3.78	3.28	4.48
2	149	3.81	3.34	4.93
3	138	3.78	3.01	4.93
4	119	3.79	2.88	4.58
5	95	3.79	2.69	4.51
6	78	3.76	2.88	4.49
7	46	3.84	2.95	4.55
8	19	3.79	3.38	4.48
Total	806	3.79	2.69	4.93

**b.**

Lactation rang	n	Normal lactation		
		average	minimum	maximum
1	162	3.78	3.28	4.48
2	149	3.79	3.31	4.77
3	138	3.75	2.98	4.77
4	119	3.77	2.88	4.77
5	95	3.78	2.69	4.51
6	78	3.76	2.88	4.49
7	46	3.84	2.95	4.55
8	19	3.78	3.38	4.48

Total	806	3.78	2.69	4.77
-------	-----	------	------	------

From the analysis of the variability of the percentage of milk fat set out in the total lactation shown in the table 6 and in the attached chart (Figure 2) shows that 84.36 percent of the herd studied has fat percentage between 3.59-4.26%, which means a fat content in the normal range. The graph of the percentage of fat has a single peak where the percentage is 46.15% and the fat percentage is within the normal range of 3.59 - 3.81.



**Fig.2. The variability in percentages of fat per total lactation**

**Table 6. The variability in the percentage of fat per total lactation.**

Classes (%)	absolute frequency	relative frequency
2.69 - 2.91	3	0.37
2.91 - 3.14	7	0.87
3.14 - 3.36	19	2.36
3.36 - 3.59	68	8.44
3.59 - 3.81	372	46.15
3.81 - 4.03	260	32.26
4.03 - 4.26	48	5.96
4.26 - 4.48	19	2.36
4.48 - 4.71	6	0.74
4.71 - 4.93	4	0.50
Total	806	100.00

From this analysis of the index of the fat quantity per total lactation and normal lactation in the succession of the eight lactations it result a close average value, respectively 129.64 kg per total lactation and 121.30 kg per normal lactation (situation presented in table 7). The minimum individual limit per total lactation and normal lactation is the same 59.96 kg, and the maximum limit is 375.9 kg recorded in the first lactation for the total lactation and 291.2 kg for normal lactation registered in the 6<sup>th</sup> lactation.

**Table 7. The quantity of the fat in the succession of lactations on total lactation (a) and normal lactation (b).**

Lactation rang	n	Total lactation		
		average	minimum	maximum
1	162	126.07	59.96	375.9
2	149	125.45	66.90	303.9
3	138	131.21	74.87	248.4
4	119	129.12	71.94	329.4

5	95	136.63	71.70	328.4
6	78	132.63	70.00	317.5
7	46	130.89	90.36	261.4
8	19	122.26	95.02	155.5
Total	806	129.64	59.96	375.9

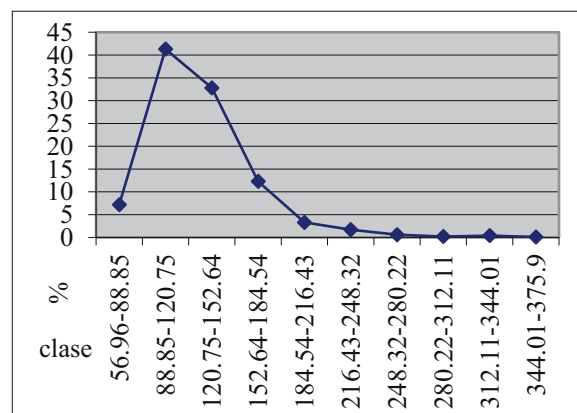
**b.**

Lactation rang	n	Normal lactation		
		average	minimum	Maximum
1	162	117.31	59.96	215.9
2	149	115.95	66.90	213.2
3	138	121.70	72.21	245.3
4	119	120.29	71.94	241.7
5	95	124.84	71.70	240.6
6	78	126.68	70.00	291.2
7	46	125.13	84.40	210
8	19	119.26	87.55	155.5
Total	806	121.30	59.96	291.2

From the analysis of the variability in the amount of fat per total lactation shown in the table 8 and in the attached chart (fig. 3) result that ~ 3% of the population studied has over 216 kg fat per total lactation and 81.3 percents has under 184.54 kg fat.

**Table 8. The variability in the amount of total fat per total lactation.**

classes	absolute frequency	relative frequency
56.96 - 88.85	58	7.2
88.85 - 120.75	333	41.3
120.75 - 152.64	264	32.8
152.64 - 184.54	99	12.3
184.54 - 216.43	27	3.3
216.43 - 248.32	14	1.7
248.32 - 280.22	5	0.6
280.22 - 312.11	2	0.2
312.11 - 344.01	3	0.4
344.01 - 375.9	1	0.1
Total	806	100.0



**Fig.3. The variability in the amount of fat in milk total lactation.**

**3.2. Milk production in relation to the duration of lactation**

The duration of lactation depends on the interval between calving, resting breast and the potential of protein synthesis, of genetic determinant of cows. From the experience gained by breeders over time it has come to the unanimous opinion that a normal lactation has a length of 305 days, and the rest of the breast for a period of 60 days.

The variability in the duration of lactation is shown in table 9 and highlighted in the graph in figure 4.

**Table 9. The variability in the duration of lactation in cows from the mountain area**

Classes	frecv. (f)	abat. (a)	fa	fa <sup>2</sup>	F (a+1) <sup>2</sup>	(f) %
178 - 231	1	-2	-2	4	1	0.1
232 - 285	50	-1	-50	50	0	6.2
286 - 339	511	0	0	0	511	63.4
340 - 393	140	+1	140	140	560	17.4
394 - 447	47	+2	94	188	423	5.8
448 - 501	20	+3	60	180	320	2.5
502 - 555	14	+4	56	224	350	1.7
556 - 609	12	+5	60	300	432	1.5
610 - 663	6	+6	36	216	294	0.8
664 - 717	5	+7	35	245	320	0.6
$x_0 = 313$	$\sum f = 806$		$\sum fa = 429$	$\sum fa^2 = 1547$	$\sum f (a+1)^2 = 3211$	$\sum f\% = 100$

Control of Charlier shows that the data are correct:

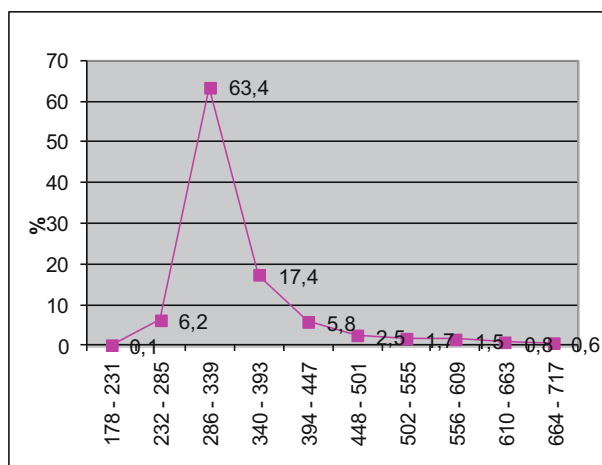
$$\sum f(a+1)^2 = \sum fa^2 + 2\sum fa + \sum f ;$$

$$3211 = 1547 + (2 \times 429) + 806 ;$$

For this range of variation obtained the statistics are:

$$\bar{x} = 341,74 \pm 2,44 ; s^2 = 4778 ; s = 69,12 ;$$

$$\sigma = 69,2 ; C.V = 20,22.$$



**Fig.4. The variability in the duration of lactation in cows from the mountain area**

The average duration of lactation of 341 days indicates that the cows have the potential need for extending genetic endpoints if the interval between calving exceeds 365 days. In the table 10 are presented the statistics variation of total duration of lactation for lactations with successive serial numbers.

**Table 10. The statistical parameters of the index of the duration of lactation, depending on the number of total lactation**

Lt	n	X ± Sx	S <sup>2</sup>	S	V%
1	162	341.07 ± 5.18	4344.56	65.91	19.32
2	149	339.66 ± 5.10	3884.26	62.32	18.35
3	138	344.52 ± 5.85	4721.32	68.71	19.94
4	119	337.56 ± 7.27	6296.84	79.35	23.51
5	95	348.72 ± 8.87	7477.97	86.48	24.80
6	78	328.28 ± 7.27	4121.81	64.20	19.56
7	46	323.48 ± 5.59	1436.74	37.90	11.72
8	19	320.63 ± 17.89	6086.80	78.02	24.33

From the study of statistical parameters of the index of the total duration of lactation results the following:

- the coefficient of variance has the values close to the overall average of 20.22, the minimum value is signup in the 7th lactation respectively 11.72%, and the maximum one in the 5th lactation is 24.80%;

- the average values of the duration of lactation are quite high since the first lactation.

These findings allow us to affirm that the cows from the her studied have the genetic potential to increase lactation beyond the limits of normal lactation of 305 days.

In table 11 we did an analysis of production index of milk/day on total lactation and on normal lactation, studying whether prolonging lactation affect milk production and if it is economical.

**Table 11. The comparative analysis of the index of the milk production per day, on total lactation (a) and on the normal lactation (b).**

**a.**

Lactation	Total lactation (average)		
	Production/ lactating (kg)	The duration of the (days)	Production/ day (kg)
(1)	(2)	(3)	(4)
1	3328.35	341.07	9.76
2	3297.15	339.66	9.71
3	3478.1	344.52	10.10
4	3403.19	337.56	10.08
5	3597.00	348.72	10.31
6	3528.79	328.28	10.75
7	3406.54	323.48	10.53
8	3326.26	320.63	10.37
total	3420.67	335.49	10.20

**b.**

Lact.	Normal lactation (average)			
	Production/ lactating (kg)	The duration of the (days)	Production/ day (kg)	Dif ± (7-4)=8
(1)	(5)	(6)	(7)	(8)

1	3100.96	302.9	10.24	+ 0.48
2	3054	301.38	10.13	+ 0.43
3	3255.09	302.87	10.75	+ 0.65
4	3190.8	301.04	10.60	+ 0.52
5	3302.04	301.09	10.97	+ 0.65
6	3367.7	300	11.23	+ 0.48
7	3251.7	301.7	10.78	+ 0.25
8	3151.37	299.63	10.52	+ 0.14
total	3209.2	301.32	10.65	+ 0.45

From this table it can be observed that the production of milk/day is higher than + 0.45 kg per normal lactation than per total lactation. For predicting the loss of the milk production potential due to the continuation of lactations we have been started from the assumption that this loss is locates at a daily milk production and that is not present during the rest of the breast. How breast resting on the herd studied was estimated to have a term of 62 days, it follows that the loss of 0.45 kg milk per day is locates at 303 days of lactation. In this case, the loss is 136.35 kg for one year.

Compared to the average production per normal lactation which is of 3209 kg, the loss of the milk due to the continuation of lactation is estimated to be 4%.

This loss is quite low because breeding disorders are reduced in number and interval between calving is only 402 days, what did that to prolong the lactation with only 30.49 days (335.49-305).

In fact, there are losses due to the short lactations which last less than 305 days.

After the data in table 9 it can be expected that a cow has lost 127 days of the normal lactation, 50 cows have lost on average 74 days and 130 cows lost 20 days from the normal lactation resulting in a total 6428 days without milk. The average for the 806 cows means 10 days without production at the end of each lactation.

After Elena Ghiță and M Paraschivescu, it can be expected that for a normal lactation of 3209 kg milk, the daily production of the last week is 5.5 kg. This means still 55 kg (10 x 5.5 kg) lost for each lactation.

In this way results a total of 187.35 kg of milk or 5.8% lost milk from the potential of the cows. This loss is caused by the neglect of detection of disorders breeding and the mating cows before a normal postpartum rest for 60 days. In conclusion, the extension of lactation and respectively the shortening of the breast resting means loss of milk production in both respective lactation and the next lactation .

### 3.3. The milk production in relation to the localities in which they were bred and exploited.

If the first part has been delivered to milk production in relation to the number of lactation, which means with the age of the animals in this chapter are analyzed the variation in milk yields per total lactation and normal lactation in relation with the localities in which they were bred and exploited. The six municipalities taken into study are: Pucioasa(1), Moțăeni (2), Buciumeni (3), Pietroșița (4), Tătărani (5) and Căndești (6).

The data are presented in the table 12 și 13.

To estimate the effect of localities it was conducted the analysis of variance within samples, which were formed from the personnel of a locality and between samples, so between performances recorded in the six localities in which could constitute such proof.

For the analysis of variance were processed the raw data to draw up tables showing variances between herds of the 6 municipalities and within the herd in each commune.

For readiness it was used the correction factor.

For total lactation are use the data from table 12.

**Table 12. The variation in milk yields per total lactations in relation to towns in mountain area**

Cities and towns	1	2	3	4	5	6	Tot.
classes	f	f	f	f	f	f	f
1506 - 2239	3	3	3	11	11	10	41
2239 - 2972	12	4	2	149	45	36	248
2972 - 3705	16	21	28	42	93	82	282
3705 - 4438	9	42	34	12	26	23	146
4438 - 5171	5	8	21	2	9	6	51
5171 - 5904	4	6	6	x	4	x	20
5904 - 6637	2	2	4	x	x	x	8
6637 - 7370	2	2	2	x	x	x	6
7370 - 8103	x	x	2	x	x	x	2
8103 - 8836	x	x	2	x	x	x	2
Total	53	88	104	216	188	157	806

For the total use of lactation are use the following values:

- total high = T (the number of various measured or lactation records used) = 806;
- the number of samples = of localities = 6;
- the number of objects = N = of classes of all samples = 42;

The correction factor is the ratio between the number of various square and the number of classes from all samples.

$$\frac{T^2}{N} = \frac{806^2}{42} = 15467;$$

The sum of squares of different frequency on the 6 municipalities is:

1	2	3	4	5	6
f <sup>2</sup>	f <sup>2</sup>	f <sup>2</sup>	f <sup>2</sup>	f <sup>2</sup>	f <sup>2</sup>
9	9	9	121	121	100
144	16	4	22201	2025	1296
256	441	784	1764	8649	6724
81	1764	1156	144	676	529
25	64	441	4	81	36
16	36	36	x	16	x
4	4	16	x	x	x
4	4	4	x	x	x
x	x	4	x	x	x
x	x	4	x	x	x
539	2338	2458	24234	11568	8685

The total sum of squares is:

$$(539 + 2338 + 2458 + 24234 + 11568 + 8685) - 15467 = 49822 - 15467 = 34355 ;$$

The sum of squares between samples is:

$$\left( \frac{53^2}{8} + \frac{88^2}{8} + \frac{104^2}{10} + \frac{216^2}{5} + \frac{188^2}{6} + \frac{157^2}{5} \right) - 15467 = 7103 ;$$

The sum of squares between samples (between settlements) is given by the total sum of squares (34355) minus the sum of the squares between samples (806) and results: 34355 - 806 = 27252 .

The total degrees of freedom are: 42 - 1 = 41.

The degrees of freedom of the sample are: 6 - 1 = 5.

The degrees of freedom between the samples are:

$$41 - 5 = 36.$$

The analysis of variance should be presented as follows:

source of variation	the sum of squares	degrees of freedom	estimated variation
between settlements	7103	5	1420,6
in localities	27252	36	757

The value of „F” is:

$$F = 1420,6 / 757 = 1,87$$

In the table drawn up after Senedecor, for the probability of 5% the value corresponding to the degrees of freedom -36, for the largest value is 5 and for the smallest value is 4.4 .For the probability of 1% the value of „F” is 9.0.

We come to the conclusion that the difference in variance between the evidence and the in evidence is insignificant for a 1% probability but also for a probability of 5%.

The same calculation can be made for the normal lactation using the data in table 13.

**Table 13. The variation of milk productions per normal lactations in relation to the towns in mountain area**

Cities and towns	1	2	3	4	5	6	Tot.
clase	f	f	f	f	f	f	f
1506	5	3	3	34	18	14	77
2239	-	16	8	7	132	52	46
2972	-	15	43	35	42	96	82
3705	-	9	24	41	8	18	15
4438	-	6	8	9	x	4	x
5171	-	2	2	6	x	x	x
5904	-	x	x	2	x	x	x
6637	-	x	x	x	x	x	x
7370	-	x	x	1	x	x	x
8103	-	x	x	x	x	x	x
8836	-	x	x	x	x	x	x
Total	53	88	104	216	188	157	806

For normal lactation are used the following values:

- the number of varitions = T = 806 ;

- the number of classes in the framework samples (N), is 34.

It results a correction factor with the value of 19106 calculated according to the following formula :

$$\frac{T^2}{N} = \frac{806^2}{34} = 19106 ;$$

The sum of squares of different frequency is:

1	2	3	4	5	6
f <sup>2</sup>	f <sup>2</sup>	f <sup>2</sup>	f <sup>2</sup>	f <sup>2</sup>	f <sup>2</sup>
25	9	9	1156	324	196
256	64	49	17424	2704	2116
225	1849	1225	1764	9216	6724
81	567	1681	64	324	225
36	64	81	x	16	x
4	4	36	x	x	x
x	x	4	x	x	x
x	x	x	x	x	x
x	x	1	x	x	x
x	x	x	x	x	x
627	2566	3086	20405	12584	9261

The total sum of squares is:

$$(627 + 2566 + 3086 + 20405 + 12584 + 9261) - 19106 = 29423 ;$$

The square of the total samples is 8900;

The total sum of squares is: 29423 - 8900 = 20523;

The total number of degrees of freedom is: 34 - 1 = 33;

The degrees of freedom are : 6 - 1 = 5;

The degrees of freedom between samples are : 33 - 5 = 28

The analysis of variance shall present such:

source of variation	the sum of squares	degrees of freedom	estimated variation
between settlements	8900	5	1780
in localities	20523	28	732,96

„F” is the ratio of the estimated variation among towns and estimated variation within towns.

$$F = 1780 / 732,96 = 2,43 ;$$

For the degrees of freedom in this table the value of F is 4.4% for 5% probability and 9 for the 1% probability. The value of 2.43 is lower for both probabilities which means that the difference in variance between the evidence and in the evidence is insignificant. The influence of the localities on the milk production is null.

The milk production is influenced only by the number and duration of lactation.

#### 4. CONCLUSIONS

- ✓ The average performance in the succession of eight lactations per total lactation is 3420.67 kg, and per normal lactation is 3209.20 kg milk. The limits vary between 1506 kg of milk and 8835 kg milk recorded for lactation and 1506 kg of milk and 7322 kg milk for normal lactation.
- ✓ The amount of fat in the succession of eight lactation has an average of 129.64 kg per total lactation and 121.30 kg per normal lactation. The minimum individual limit per total lactation and normal lactation is the same 59.96 kg, and the maximum is 375.9 kg for total lactation and 291.2 kg for normal lactation.
- ✓ The low average production of fat requires improvement using the crossing of infusion with purebred bulls Jersey.
- ✓ The paper presents an original method that estimate the negative effects given by the extending over 305 days of lactation or shortening it under this term. The average duration of lactation of 341 days indicates that the cows have the genetic potential for extending endpoints if the interval between calving exceeds 365 days.
- ✓ The extension of lactation and the shortening of breast resting represents the loss of milk production in both respective lactation and next lactation.
- ✓ Through the analysis of variance for milk's productions per total lactations and per normal lactations in relation with the lactations in which they were bred and exploited demonstrates that the influence of localities on the milk production is null.
- ✓ The milk production is influenced only by the number and duration of lactation and not by the municipalities where cows were bred and exploited.
- ✓ The efficiency increase of cows from the mountain area can be achieved through good management of

breeding, respectively getting a calf every year. In this way a cow can has a lactation of 305 days and it can be ensure a breast rest for 60 days.

- ✓ In the mountain areas is preferable to submit through the continued improvement of autochthonous herds that have a good organic resistance and to be very well adapted to the mountain conditions and the area's forage resources (suitable for grazing), while imports should be restricted to „cores” great breeding value, valuable, Bulls semen.

#### 5. REFERENCES

- [1] Alexoiu, A., (1988) – Practical guide to the selection and control of homogeneous in cattle farms. Ed. Ceres, Bucharest;
- [2] Bogdan, A.T. și colab., (1985) – Fertility, fertility and prolificacy in cattle breeding. Vol. I, II, Ed. Dacia, Cluj-Napoca;
- [3] Curelariu, Niculina, Georgescu, Gh., Diaconescu, Șt., (1980) - Research on the duration of exploitation of milk cows on a farm. Technical report of the reception, IANB;
- [4] Cristensen, L.G., (1992) – Aspects of MOETS in dairy cattle breeding, 8<sup>th</sup> World Holstein Friesian Conference, Budapest, Hungary ;
- [5] Dinescu, S., Tontsch, A.M., (2001) - Livestock-ideas for performance and competitivitate. A.N.C. M.A.A. P-A-1, Bucharest; [6] Dinescu, s., Ștefănescu, Gheorghe, (1997)-raising cows for milk. Ed. Ceres, Bucharest;
- [7] Drăgănescu, I.C., (1997) - Maximizing the genetic process for characters in cattle milk production. Doctoral thesis, UȘAMV, Bucharest;
- [8] Furtunescu, Al. și colab., (1960) - Research on the growth of cattle bred in the area of Brown Scholar Wallachia. Workers. Șt. IANB, vol. 4, series C, Bucharest;
- [9] Georgescu, D., și colab., (1995) – Experimental contributions to the establishment of a scheme for feeding cattle breed Brown. Workers. Șt. ICPCB, vol. 15, Cattle Bucharest;
- [10] Georgescu, GH., Ujică, V., și colab., (1994) - Treaty of raising cattle, vol. 1-1998, vol. 2-1989, vol. 3, 1994, ed. Ceres, Bucharest;
- [11] Georgescu, GH., Grosu, H., (1994) - Concepts and principles regarding the improvement of cattle. Simp. CNRSA National Bucharest;
- [12] Grosu, H. și colab., (1996) – Prediction value of improvements at dairy steers. Balotești ICPCB Communication; [16] Gander, h., Wheelwright, C.M. (2015)-estimation of the improvement in cattle based on the patterns of control (Test day models), ed. Ceres, Bucharest;
- [14] Manea, R.C., (2005) - Livestock handicaps in mountain area. Agro-Information and education ISBN 973-85907-6-0, ed. fortress of;
- [15] Manea, R.C., 2005, Doctoral thesis: research on biotechnological processes integration in breeding dairy cows in the mountain area of the County of Dâmbovița in Bucharest;
- [16] Mihai, Gh. Și colab., (1980) – Contributions to the establishment of ethology pasture to breed female bovine animals from youth Brown. Symposium "problems of improvement, technology growth and pathology in cattle and sheep." Ed. Cluj-Napoca;
- [17] Negruțiu, E., Petre, A., (1970) - Genetic parameters you cattle populations and Brown Pied Maramures in



- Transylvania. Rev. By Zoot. and Med.Vet, No 11, Bucharest;
- [18] Neață, Gh. și colab., (1994) - Observation of morfoproductive properties of Brown breed heifers imported from Austria. Simpoz. Șt. National U.A.M.V., Iași, 15-16 dec;
- [19] Paraschivescu, M., (2005) -Reproduction in dairy cow, Academy of agricultural and forestry Sciences Institute C-D for Cattle-Balotești;
- [20] Rey ,R., (1979) - The future in the Carpathians, Craiova, Scrisul romanesc;
- [21] Sandu, Gh., (1995) – Experimental models in animal breeding. Ed. Coral, Sanivet, Bucharest;
- [22] Snedecor, G.W., (1968) – The statistical methods applied in agriculture and biology research. Edit. Did. and Ped., Bucharest;
- [23] Silvaș, E ., (1998) – Upgrading technology of raising cattle. Ed. Did. and the Ped., Bucharest;
- [24] Tacu, A., (1968) - Statistical methods in animal husbandry and veterinary medicine. Ed. Agrosilvică, Bucharest;
- [25]Velea,C., (1983) - Cattle Rearing technology, Ed. Dacia, Cluj.