



Production parameters in a private dairy cattle farm from Bistrita Nasaud County

Vasile Cighi, Bogdan Georgescu, Cornel I. Burzo, Bogdan A. Vlaic

¹ Faculty of Animal Science and Biotechnology, University of Agricultural Sciences and Veterinary Medicine, Cluj-Napoca, Romania. Corresponding author: B. A. Vlaic, bogdan.vlaic@usamvcluj.ro

Abstract. The aim of this study was to highlight the main morpho-productive characteristics of Bălțată Românească cattle raised on a farm, in order to establish an improvement strategy that would lead to the quantitative increase and qualitative improvement of their productions. The results obtained on the studied cattle group for all 107 completed lactations, show that the average milk production on total lactations (360.33 days) was 6786.10 ± 116.12 kg, on normal lactations (299.69 days) it was 6083.14 ± 81.20 kg, and at the mature equivalent, the calculated average yield was 6508.33 ± 85.32 kg. Regarding the fat yield, the average amount of fat obtained on total lactations was 272.66 ± 5.07 kg (4.01%), on normal lactations it was 242.36 ± 3.37 kg (3.99%), and at mature equivalent, the calculated average yield was 258.10 ± 3.50 kg (3.97%). In addition, the average amount of protein obtained on total lactations was 225.41 ± 4.16 kg (3.32%), on normal lactations it was 200.37 ± 2.80 kg (3.30%), and at mature equivalent, the calculated average yield was 213.37 ± 2.89 kg (3.28%).

Key Words: Baltata Romaneasca, milk fat, milk protein, milk yield.

Introduction. Bălțata românească is an improved native cattle breed. It was formed following a long absorption cross between the local cows (sura de stepă breed, the Transylvanian variety) with Simmental bulls (Velea 2013). The breed was homologated in 1959. After this year, the breed has been improved by selection and infusion with the Alpenfleckvieh, Deutsches Fleckvieh, Simmental and recently, with Red Holstein. It is also a breed for milk and meat production, being very suitable for farms and households (Velea & Mureșan 2012ab).

Milk quality is influenced by many factors, including rank lactation (Raducu et al 2016). The lactation produces significant changes on the physico-chemical parameters of milk (Miresan et al 2015). Depending on the feed and maintenance conditions, milk production varies widely. On average, the production is 3000-3500 kg of milk per lactation, with a fat content of 3.7-3.8%. In elite farms and in those where appropriate exploitation conditions are maintained, yields of over 4500 kg of milk per lactation can be obtained (Onaciu 2013).

Bălțata Românească is the most popular cattle breed in Romania. It is renowned for good meat and milk productions, as well as for its resistance and growing suitability. This breed is well adapted to the environment, with good results all over the country, as we have a continental climate. It is a long productive animal, suitable for growing in small farms as well as in intensive breeding establishments (Han & Bobis 2018).

Material and Method. The main research objective was to analyze the main parameters for milk production on successive lactations and total lactations. This study was performed with the help of secondary data from official control, analysis bulletins and farm records, based on ended lactations between 2015 and 2021.

To evaluate the milk production/lactation, the following were analyzed: total milk production, standardized milk production, milk production at mature equivalent. The analyzed parameters per lactation were: duration of lactation, amount of milk; amount and average percentage of fat; average amount and percentage of protein.

The biological material consisted of 69 subjects, of which 35 were dairy cows. Data were statistically analyzed using the "Statistica version 9".

Results and Discussion. Phenotypic means, standard deviation, standard error of the mean, coefficient of variation, maximum and minimum values of milk production (1st lactation) are presented in Table 1.

Table 1
Milk production traits (Lactation I)

L	Parameters	n	Period (days)	Milk (kg)	Fat (kg)	Fat (%)	Protein (kg)	Protein (%)
Total lactation	Mean (X)	24	358.71	5940.29	237.84	3.99	196.83	3.30
	Error (Sx)	24	9.44	234.26	12.06	0.06	8.97	0.04
	Std. dev (s)	24	46.23	1147.66	59.08	0.31	43.96	0.17
	Coef. var. (V%)	24	12.89	19.32	24.84	7.82	22.33	5.21
	Min.	24	306	4279	161.75	3.44	134.36	2.95
	Max.	24	456	8481	407.94	4.81	314.65	3.71
Normal lactation	Mean (X)	24	305	5424.50	214.73	3.96	177.75	3.28
	Error (Sx)	24	0.00	182.26	8.39	0.06	6.32	0.03
	Std. dev (s)	24	0.00	892.88	41.09	0.29	30.96	0.15
	Coef. var. (V%)	24	0.00	16.46	19.14	7.40	17.42	4.71
	Min.	24	305	4270	161.41	3.44	134.08	2.95
	Max.	24	305	6906	325.96	4.72	250	3.62
Mature equivalent (ME)	Mean (X)	24	305	6400.86	251.23	3.92	207.97	3.25
	Error (Sx)	24	0.00	215.07	9.81	0.06	7.39	0.03
	Std. dev (s)	24	0.00	1053.62	48.08	0.29	36.22	0.15
	Coef. var. (V%)	24	0.00	16.46	19.14	7.40	17.42	4.72
	Min.	24	305	5039	188.85	3.41	156.87	2.92
	Max.	24	305	8149	381.38	4.68	292.50	3.59

The amount of protein obtained per total lactation was 196.83±8.97 kg (3.30%), per normal lactation was 177.75±6.32 kg (3.28%), and at the mature equivalent, the calculated yield was 207.97±7.39 kg (3.25%). Regarding milk production, the average milk production per total lactation (358.71 days) was 5940.29±234.26 kg, per normal lactation (305.00 days) was 5424.50±182.26 kg, and at the mature equivalent, the calculated production was 6400.86±215.07 kg. Nistor et al (2011) found in Baltata Romaneasca heifers from Buzias farm a lower milk yield (3920.63±58.68 kg). A lower milk yield (3789±83.1 kg) was also found in Turkish Simmental heifers (Çilek & Tekin 2005) and also 3795.1±74.3 kg in the Serbian Simmental (Petrović et al 2009). For Romanian spotted heifers, Nistor et al (2011) found a productive mature equivalent for milk production of 4 818.45 kg. The coefficient of variation (V%) of 19.32% indicates a relatively homogeneous herd in terms of milk production.

The amount of fat obtained per total lactation was 237.84±12.06 kg (3.99%), per normal lactation was 214.73±8.39 kg (3.96%), and at the mature equivalent, the calculated production was 251.23±9.81 kg (3.92%). Also, regarding the fat yield, our values are higher than the values obtained by Nistor et al (2011) in Baltata Romaneasca heifers from Buzias farm (153.45±2.32 kg). Pantelić et al (2009) found in Central Serbian Simmental a fat yield in the first lactation of 203.3 kg. Slovenian Simmental produced a fat yield of 160±46.1 kg (Logar 2007), while the Poland Simmental produced a yield of 184 kg (Felenczak et al 2008). A lower fat yield was found in Serbian Simmental heifers, and Croatian Simmental heifers, with 144.48 kg and 139 kg respectively (Kapš & Špehar 2004; Petrović et al 2009).

The amount of protein obtained per total lactation was 196.83±8.97 kg (3.30%), per normal lactation was 177.75±6.32 kg (3.28%), and at the mature equivalent, the calculated yield was 207.97±7.39 kg (3.25%). The average protein yield (126.46±2.16

kg) found by Nistor et al (2011) was lower than the protein yield found in our study. Productive maturity equivalent for protein yield (152.26 kg) found in Baltata Romaneasca from Buzias farm was also low. Kapš & Špehar (2004) found in Croatian Simmental in the first lactation a protein yield of 127 kg. The protein yield in Poland Simmental was 158 kg (Felenczak et al 2008) and in Montbeliard breed it was 179.85 kg (Maciuc et al 2010).

The milk fat percentage obtained by us (3.99%) is very close to the values obtained Nistor et al (2011), 3.81%. Fat percentage in the Serbian Simmental was 3.82% (Petrović et al 2009), while in Central Serbian Simmental was 3.89% (Pantelić et al 2009). A very high value (4.08%) for the fat percentage was found in the Poland Simmental heifers (Felenczak et al 2008). The average percentage of protein content found by us is 3.30%, which is very close to the values obtained by Nistor et al (2011) (3.19%). A higher protein content was found in Poland Simmental heifers 3.52% (Felenczak et al 2008) and in Montbeliard breed from eastern Romania 3.31% (Maciuc et al 2010).

Table 2 presents the phenotypic means, standard deviation, standard error of the mean, coefficient of variation, maximum and minimum values of milk production (2nd lactation).

Table 2

Milk production traits (Lactation II)

<i>L</i>	<i>Parameters</i>	<i>n</i>	<i>Period (days)</i>	<i>Milk (kg)</i>	<i>Fat (kg)</i>	<i>Fat (%)</i>	<i>Protein (kg)</i>	<i>Protein (%)</i>
Total lactation	Mean (X)	22	369.20	7098.27	285.61	4.02	236.01	3.32
	Error (Sx)	22	15.22	201.26	9.19	0.05	7.39	0.03
	Std. dev (s)	22	71.38	943.99	43.09	0.21	34.68	0.14
	Coef. var. (V%)	22	19.33	13.30	15.09	5.31	14.69	4.35
	Min.	22	239	4655	175.49	3.77	150.82	2.96
	Max.	22	494	8053	351.30	4.73	274.61	3.64
Normal lactation	Mean (X)	22	297.60	6284.60	250.55	3.99	207.27	3.30
	Error (Sx)	22	3.82	186.70	7.59	0.04	6.53	0.03
	Std. dev (s)	22	17.92	875.71	35.61	0.20	30.65	0.14
	Coef. var. (V%)	22	6.02	13.93	14.21	5.10	14.79	4.25
	Min.	22	239	4655	175.49	3.77	150.82	2.93
	Max.	22	305	7703	307.35	4.67	253.43	3.59
Mature equivalent (ME)	Mean (X)	22	297.60	6913.27	273.10	3.95	225.93	3.27
	Error (Sx)	22	3.82	205.37	8.27	0.04	7.12	0.03
	Std. dev (s)	22	17.92	963.26	38.81	0.20	33.41	0.14
	Coef. var. (V%)	22	6.02	13.93	14.21	5.11	14.79	4.25
	Min.	22	239	5121	191.29	3.74	164.40	2.90
	Max.	22	305	8473	335.01	4.63	276.24	3.56

The average milk production per total lactation (358.71 days) was 5940.29±234.26 kg, per normal lactation (305.00 days) it was 5424.50±182.26 kg, and at the mature equivalent, the calculated production was 6400.86±215.07 kg. Dolis et al (2011) found an average milk production of 8519.10 kg (total lactation) and 7151.38 kg (normal lactation) for the 2nd lactation for 1196 cows raised in four Romanian farms. The fat yield obtained per total lactation was 237.84±12.06 kg (3.99%), per normal lactation was 214.73±8.39 kg (3.96%), and at the mature equivalent, the calculated production was 251.23±9.81 kg (3.92%). Dolis et al (2011) found a fat yield of 358.42 kg, with a fat percentage of 4.20% for total lactation and 300.61 kg with a fat percentage of 4.19% for normal lactation.

The protein yield obtained per total lactation was 196.83±8.97 kg (3.30%), per normal lactation was 177.75±6.32 kg (3.28%), and at the mature equivalent, the calculated yield was 207.97±7.39 kg (3.25%). The protein yield found by Dolis et al

(2011) was higher for total (285.50 kg) and for normal lactation (240.61 kg), with a protein percentage of 3.36 %.

Table 3 presents data on the mean and variability of production indices for the 3rd lactation. The average milk production per total lactation (365.56 days) was 7266.88±302.58 kg, per normal lactation (302.00 days) was 6416.75±168.91 kg, and at the mature equivalent, the calculated production was 6737.63±177.38 kg. Dolis et al (2011) found an average milk production of 7667.49 kg for total lactation and 6652.68 kg for normal lactation in the 3rd lactation for 1196 cows raised in four Romanian farms.

Table 3

Milk production traits (Lactation III)

<i>L</i>	<i>Parameters</i>	<i>n</i>	<i>Period (days)</i>	<i>Milk (kg)</i>	<i>Fat (kg)</i>	<i>Fat (%)</i>	<i>Protein (kg)</i>	<i>Protein (%)</i>
Total lactation	Mean (X)	19	365.56	7266.88	289.90	4.00	237.58	3.27
	Error (Sx)	19	13.99	302.58	12.27	0.05	10.52	0.04
	Std. dev (s)	19	60.97	1318.90	53.49	0.22	45.84	0.16
	Coef. var. (V%)	19	16.68	18.15	18.45	5.62	19.29	4.79
	Min.	19	285	4961	195.96	3.65	166.19	2.94
	Max.	19	485	9614	393.21	4.68	315.39	3.47
Normal lactation	Mean (X)	19	302.00	6416.75	253.93	3.97	208.12	3.25
	Error (Sx)	19	1.54	168.91	6.13	0.05	5.49	0.03
	Std. dev (s)	19	6.73	736.27	26.70	0.21	23.95	0.15
	Coef. var. (V%)	19	2.23	11.47	10.51	5.31	11.51	4.59
	Min.	19	285	4961	195.96	3.64	166.19	2.91
	Max.	19	305	7599	307.00	4.61	243.93	3.41
Mature equivalent (ME)	Mean (X)	19	302.00	6737.63	266.12	3.96	218.11	3.24
	Error (Sx)	19	1.54	177.38	6.42	0.05	5.76	0.03
	Std. dev (s)	19	6.73	773.19	27.98	0.21	25.10	0.15
	Coef. var. (V%)	19	2.23	11.48	10.51	5.32	11.51	4.60
	Min.	19	285	5209	205.37	3.63	174.17	2.90
	Max.	19	305	7979	321.74	4.60	255.64	3.40

The amount of fat obtained per total lactation was 289.90±12.27 kg (4.00%), per normal lactation was 253.93±6.13 kg (3.97%), and at the mature equivalent, the calculated yield was 266.12±6.42 kg (3.96%). The fat percentage found by Raducu et al (2016) for the same breed in 3 farms from Salaj county ranged between 3.66% and 4.25%. The amount of protein obtained by total lactation was 237.58±10.52 kg (3.27%), by normal lactation it was 208.12±5.49 kg (3.25%), and at the mature equivalent, the calculated production was 218.11±5.76 kg (3.24%). The protein percentage found by Raducu et al (2016) (3.36%-3.53%) was very closed to our values.

Data on the mean and variability of production indices for the 4th lactation are presented in Table 4. The average milk production per total lactation (358.44 days) was 6884.89±282.11 kg, per normal lactation (296.56 days) was 6183.00±190.69 kg, and at the equivalent maturity, the calculated production was 6244.89±192.62 kg. Dolis et al (2011) found an average milk production of 7171.78 kg (total lactation) and 6526.77 kg (normal lactation) for the 4th lactation for 1196 cows raised in four Romanian farms.

Table 4

Milk production traits (Lactation IV)

<i>L</i>	<i>Parameters</i>	<i>n</i>	<i>Period (days)</i>	<i>Milk (kg)</i>	<i>Fat (kg)</i>	<i>Fat (%)</i>	<i>Protein (kg)</i>	<i>Protein (%)</i>
Total lactation	Mean (X)	15	358.44	6884.89	277.47	4.03	230.59	3.35
	Error (Sx)	15	19.24	282.11	11.75	0.06	9.98	0.06
	Std. dev (s)	15	74.50	1092.60	45.52	0.24	38.67	0.22
	Coef. var. (V%)	15	20.79	15.87	16.41	5.89	16.77	6.66
	Min.	15	264	5394	203.89	3.71	175.84	3.04
	Max.	15	471	8523	360.91	4.50	308.13	3.73
Normal lactation	Mean (X)	15	296.56	6183.00	247.41	4.01	205.40	3.33
	Error (Sx)	15	4.34	190.69	7.31	0.06	5.95	0.06
	Std. dev (s)	15	16.82	738.53	28.30	0.24	23.05	0.22
	Coef. var. (V%)	15	5.67	11.94	11.44	5.92	11.22	6.65
	Min.	15	264	5036	201.94	3.70	170.72	3.03
	Max.	15	305	7175	276.05	4.50	235.67	3.73
Mature equivalent (ME)	Mean (X)	15	296.56	6244.89	249.39	4.00	207.05	3.32
	Error (Sx)	15	4.34	192.62	7.37	0.06	6.00	0.06
	Std. dev (s)	15	16.82	746.03	28.52	0.24	23.24	0.22
	Coef. var. (V%)	15	5.67	11.95	11.44	5.92	11.22	6.65
	Min.	15	264	5086	203.56	3.69	172.09	3.02
	Max.	15	305	7247	278.26	4.49	237.56	3.72

The amount of fat obtained per total lactation was 277.47 ± 11.75 kg (4.03%), per normal lactation was 247.41 ± 7.31 kg (4.01%), and at the equivalent maturity, the calculated production was 249.39 ± 7.37 kg (4.00%). Dolis et al (2011) found an average fat yield of 296.98 kg and 4.20% for the total lactation. The value fat yield and percentage for the normal lactation was 278.97 kg and 4.24%. The amount of protein obtained per total lactation was 230.59 ± 9.98 kg (3.35%), per normal lactation was 205.40 ± 5.95 kg (3.33%), and at the equivalent maturity, the calculated yield was 207.05 ± 6.00 kg (3.32%).

Table 5 presents data on the mean and variability of production indices for the 5th lactation. The average milk production per total lactation (349.25 days) was 6697.19 ± 216.16 kg, per normal lactation (296.44 days) was 6080.81 ± 126.97 kg, and at the mature equivalent, the calculated production was 6141.63 ± 128.24 kg.

The amount of fat obtained per total lactation was 271.05 ± 9.22 kg (4.05%), per normal lactation was 244.47 ± 5.62 kg (4.02%), and at the mature equivalent, the calculated yield was 246.92 ± 5.68 kg (4.02%).

The amount of protein obtained per total lactation was 225.39 ± 8.08 kg (3.36%), per normal lactation was 203.13 ± 5.03 kg (3.34%), and at the mature equivalent, the calculated yield was 205.16 ± 5.08 kg (3.34%).

Table 5

Milk production traits (Lactation V)

<i>L</i>	<i>Parameters</i>	<i>n</i>	<i>Period (days)</i>	<i>Milk (kg)</i>	<i>Fat (kg)</i>	<i>Fat (%)</i>	<i>Protein (kg)</i>	<i>Protein (%)</i>
Total lactation	Mean (X)	27	349.25	6697.19	271.05	4.05	225.39	3.36
	Error (Sx)	27	14.00	216.16	9.22	0.04	8.08	0.04
	Std. dev (s)	27	72.74	1123.19	47.91	0.23	42.00	0.23
	Coef. var. (V%)	27	20.83	16.77	17.68	5.71	18.63	6.84
	Min.	27	239	4418	178.05	3.65	144.47	2.87
	Max.	27	496	8929	364.30	4.59	302.69	3.79
Normal lactation	Mean (X)	27	296.44	6080.81	244.47	4.02	203.13	3.34
	Error (Sx)	27	3.79	126.97	5.62	0.05	5.03	0.04
	Std. dev (s)	27	19.68	659.77	29.20	0.24	26.13	0.23
	Coef. var. (V%)	27	6.64	10.85	11.95	5.85	12.86	6.86
	Min.	27	239	4418	178.05	3.65	144.47	2.87
	Max.	27	305	6920	279.90	4.59	237.84	3.79
Mature equivalent (ME)	Mean (X)	27	296.44	6141.63	246.92	4.02	205.16	3.34
	Error (Sx)	27	3.79	128.24	5.68	0.05	5.08	0.04
	Std. dev (s)	27	19.68	666.36	29.50	0.24	26.39	0.23
	Coef. var. (V%)	27	6.64	10.85	11.95	5.85	12.86	6.86
	Min.	27	239	4462	179.83	3.65	145.91	2.87
	Max.	27	305	6989	282.70	4.59	240.22	3.79

Table 6 highlights the results of our study on all lactations.

Table 6

Milk production traits (all lactations)

<i>L</i>	<i>Parameters</i>	<i>n</i>	<i>Period (days)</i>	<i>Milk (kg)</i>	<i>Fat (kg)</i>	<i>Fat (%)</i>	<i>Protein (kg)</i>	<i>Protein (%)</i>
Total lactation	Mean (X)	107	360.33	6786.10	272.66	4.01	225.41	3.32
	Error (Sx)	107	6.18	116.12	5.07	0.02	4.16	0.02
	Std. dev (s)	107	63.96	1201.17	52.45	0.24	43.01	0.18
	Coef. var. (V%)	107	17.75	17.70	19.23	5.96	19.08	5.53
	Min.	107	239	4279	161.75	3.44	134.36	2.87
	Max.	107	496	9614	407.94	4.81	315.39	3.79
Normal lactation	Mean (X)	107	299.69	6083.14	242.36	3.99	200.37	3.30
	Error (Sx)	107	1.38	81.20	3.37	0.02	2.80	0.02
	Std. dev (s)	107	14.27	839.92	34.83	0.23	28.97	0.18
	Coef. var. (V%)	107	4.76	13.81	14.37	5.80	14.46	5.40
	Min.	107	239	4270	161.41	3.44	134.08	2.87
	Max.	107	305	7703	325.96	4.72	253.43	3.79
Mature equivalent (ME)	Mean (X)	107	299.69	6508.33	258.10	3.97	213.37	3.28
	Error (Sx)	107	1.38	85.32	3.50	0.02	2.89	0.02
	Std. dev (s)	107	14.27	882.53	36.15	0.23	29.85	0.18
	Coef. var. (V%)	107	4.76	13.56	14.01	5.83	13.99	5.44
	Min.	107	239	4462	179.83	3.41	145.91	2.87
	Max.	107	305	8473	381.38	4.68	292.50	3.79

The average milk production on total lactations (360.33 days) was 6786.10±116.12 kg, on normal lactations (299.69 days) it was 6083.14±81.20 kg, and at the mature equivalent, the calculated average yield was 6508.33±85.32 kg.

The average amount of fat obtained on total lactations was 272.66±5.07 kg (4.01%), on normal lactations it was 242.36±3.37 kg (3.99%), and at mature equivalent, the calculated average yield was 258.10±3.50 kg (3.97%).

The average amount of protein obtained on total lactations was 225.41±4.16 kg (3.32%), on normal lactations it was 200.37±2.80 kg (3.30%), and at mature equivalent, the calculated average yield was 213.37±2.89 kg (3.28%).

Conclusions. Our results show that the studied cows from the Bistrita Nasaud farm have a higher production than the average of the breed, but it needs to be carefully and continuously improved. These results lead us to believe that the entire herd of cows has a very good productive potential, which, complemented with an appropriate exploitation technology, would give very good results. It is necessary to continuously optimize the feeding and maintenance technology used, as well as to pay more attention to all the factors influencing milk production and reproduction.

In addition, raising the productive genetic potential will be possible using bulls of high genetic value, in order to achieve genetic progress in cattle populations. The variability of this herd allows us to use selection (as the main tool) in the breeding process.

Conflict of Interest. The authors declare that there is no conflict of interest.

References

- Maciuc V., Creangă Ș., Schutz M., Russel M., Ujică V., 2010 Montbeliard breed in eastern Romania. *Lucrări Științifice. Seria Zootenie* 54:164-169.
- Mireșan V., Coroian A., Sur G., Răducu C., Odagiu A., Andronie L., Coroian C. O., 2015 Evaluation of hematological profile in dairy cows, Bălțată românească breed. *ProEnvironment* 8:601-605.
- Nistor E., Bampidis V., Matiuti M., Pentea M., Pet L., Ciolac V., 2011 Variability of production traits in first lactation Romanian spotted breed heifers. *Scientific Papers: Animal Science & Biotechnologies* 44(1):320-323.
- Onaciu G., 2013 [Cattle breeding]. Casa Cărții de Știință, Cluj-Napoca, Romania. [In Romanian].
- Petrović M. D., Skalicki Z., Petrović M. M., Bogdanović V., 2009 The effect of systematic factors on milk yield in Simmental cows over complete lactations. *Biotechnology in Animal Husbandry* 25(1-2):61-71.
- Răducu C., Mireșan V., Coroian A., Pop C., Coroian C. O., Cocan D., Andronie L., 2016 Study on the milk quality parameters in three farms from Sălaj county. *Bulletin UASVM Animal Science and Biotechnologies* 73(2):256-258.
- Velea C., 2013 [Cattle breeding treaty]. Risoprint, Cluj-Napoca, Romania. [In Romanian].
- Velea C., Mureșan G., 2012b [Cattle breeding treaty. Volume 1]. Risoprint, Cluj-Napoca, Romania. [In Romanian].
- Kapš M., Špehar M., 2004 Estimation of genetic parameters and breeding values of milk traits for Simmental cattle in Croatia using a lactation animal model. *Agriculturae Conspectus Scientificus* 69(4):91-94.
- Çilek S., Tekin M. E., 2005 Environmental factors affecting milk yield and fertility traits of Simmental cows raised at the Kazova state farm and phenotypic correlations between these traits. *Turkish Journal of Veterinarian Animal Science* 29:987-993.
- Felenczak A., Gil Z., Adamczyk K., Zapletal P., Frelich J., 2008 Polymorphism of milk k-casein with regard to milk yield and reproductive traits of Simmental cows. *Journal of Agrobiology* 25(2):201-207.
- Pantelić V., Novaković Ž., Ostojić-Andrić D., 2009 Selection of bull dams in population of Simmental cattle. *Biotechnology in Animal Husbandry* 25(5-6):301-313.

- Doliş L., Gîlcă I., Doliş M., 2011 Research regarding production and reproductive traits on the first four lactation, in Romanian Black and White dairy cows. *Lucrari stiintifice. Seria Zootehnie* 55:191-195.
- Velea C., Mureşan G., 2012a [Cattle breeding treaty. Volume 1]. Risoprint, Cluj-Napoca, Romania. [In Romanian].
- Han I., Bobiş O., 2018 Currents and perspectives in dairy and meat cattles breeding in Romania, with emphasys on Apuseni area. *Agricultura* 1-2:139-144.
- *** Logar B., 2007 Effect of breed fraction on dairy traits in cattle. Available at: www.kgzs-ms.si/users_slike/metkab/ZED10/ZEDP14-Logar.Doc.

Received: 19 November 2021. Accepted: 04 December 2021. Published online: 21 December 2021.

Authors:

Vasile Cighi, University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca, Faculty of Animal Science

and Biotechnologies, Calea Mănăştur no. 3-5, 400372 Cluj-Napoca, Romania, e-mail: vasile_cighi@yahoo.com

Bogdan Georgescu, University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca, Faculty of Animal

Science and Biotechnologies, Calea Mănăştur no. 3-5, 400372 Cluj-Napoca, Romania, e-mail:

georgescu.bogdan63@yahoo.com

Bogdan Alin Vlaic, University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca, Faculty of Animal

Science and Biotechnologies, Calea Mănăştur no. 3-5, 400372 Cluj-Napoca, Romania, e-mail:

bogdan.vlaic@usamvcluj.ro

Ioan Cornel Burzo, University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca, Faculty of Animal

Science and Biotechnologies, Calea Mănăştur no. 3-5, 400372 Cluj-Napoca, Romania, e-mail:

burzoioancornel@gmail.com

This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original author and source are credited.

How to cite this article:

Cighi C., Georgescu B., Vlaic B. A., Burzo I. C., 2021 Production parameters in a private dairy cattle farm from Bistrita Nasaud County. *ABAH Bioflux* 13(2):84-91.