Scientific Papers. Series D. Animal Science. Vol. LXIII, No. 1, 2020
ISSN 2285-5750; ISSN CD-ROM 2285-5769; ISSN Online 2393-2260; ISSN-L 2285-5750

STUDY REGARDING FATHER'S INFLUENCE ON PERFORMANCE OF DAIRY COW'S POPULATION FROM RESEARCH AND DEVELOPMENT STATION FOR CATTLE REARING DANCU, IAȘI

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Abstract

It is known that the performances of the cows are influenced by the value of the mother and the value of the father for which it is important to know and group the performances so that the influence of the father can be highlighted. Therefore, the present study was conducted in order to identify the families of bulls, to study the performances of their daughters and also to determine their influence on these performances, analyzing the performances for milk production, percentage and quantity of fat and protein for cows that have completed maximum IV lactation. The biological material studied was grouped into 19 families with a total of 262 milk cows, the family with the highest milk production being given by the family with the Janther bull with an average production of 7975.80 ± 225.16 kg milk while the family with the smallest amount of milk was that of the bull Jecko Embriotransfer with an average production of 6474.20 ± 546.12 kg. The results obtained from this study indicate that the bull with the most influence on the descendants is the Janther bull, having the highest average yields on the quantity of milk, the quantity of fat in milk as well as on the quantity of proteins.

Key words*: fat, milk, quality, protein.*

INTRODUCTION

Cattle are the largest farm animals in the world and play an extremely important role globally both as a source of food and because they help increase and maintain the fertility and health of the earth (Acatincăi, 2004).

The importance of raising cattle is given by the variety of products they provide, they are divided into main products: milk and meat and by-products: skins, slaughterhouse by-products, horns, blood, hair, nails and manure (Șumovschi, 2016).

The importance of milk lies both in the special nutritional value and the fact that it can be transformed into a very large and diverse number of dairy products (over 1000 products) which contributes to the diversification of human nutrition.

The large milk productions that can be obtained nowadays from this species are the results of the work of man who, by applying methods of genetic improvement, has perfected the breeds of cattle (Ivancia, 2007; Creangă et al., 2008; Saraz et al., 2017).

Although the amount of milk is the main factor that gives profitability to a dairy farm, the quality of milk also has an important economic impact, especially the percentage of milk fat, which dictates its price (Atasever et al., 2018; Schlee et al., 1994; Bishop et al., 1994; Croiseau et al., 2009).

The percentage of milk protein and especially the casein fraction kappa - casein has a particularly important role in the cheese industry, this fraction having a special impact in the coagulation stage of milk (Ivancia, 2004; Aston et al., 1994).

Currently, in Romania, milk production does not meet the requirements at the national level, so it is necessary to increase milk production both by improving maintenance conditions and by improving the quantity and quality of milk (Drăgotoiu and Pop, 2015; Pîntea et al., 2008; De Brabander et al., 1999).

To achieve this goal, it is necessary to know the breeding value of cattle and their influence on offspring. In this paper we aimed to identify the families of bulls, to study the performance of their daughters and to determine what is their influence on these performances. Therefore, we analyzed the performance for milk production, analyzing the amount of milk, the percentage and the amount of fat and the percentage and the amount of protein, in cows that completed a maximum of IV lactation in 2017.

MATERIALS AND METHODS

The biological material was represented by 262 dairy cows of the Bălțată cu negru Românească (Romanian Black Spotted) breed located within the Dancu Iași Cattle Breeding Research and Development Station with lactations concluded between 01.10.2016 - 10.10.2017.

Some of the information was taken from the registers of "Classification of females according to milk production in MS, on standard lactation, with determined production and statistically relevant" between 01.10.2016 - 30.09.2017. According to the data taken, a sorting was performed that would allow us to form families by bulls.

Data on the amount of milk, percentage and amount of fat, percentage and amount of protein were statistically processed.

Compiling families according to father.

Bull River George Morty Keith, USA 00006159377, has 8 daughters inside the resort with lactations concluded between 01.10.2016 - 10.10.2017.

Bull Lantana, DE 000937712020, has 16 daughters inside the resort with lactations concluded between 01.10.2016 - 30.09.2017.

Mason Taurus, FR 002258172065, has 9 daughters inside the resort with lactations concluded between 01.10.2016 - 30.09.2017

Bull Aquolino, IT 004902500933, has 6 daughters inside the resort with lactations concluded between 01.10.2016 - 30.09.2017.

Bull Janther, DE 000343983068, has 5 daughters inside the resort with lactations concluded between 01.10.2016 - 30.09.2017

Bull Esprel, DE 000341614334, has 4 daughters inside the resort with lactations concluded between 01.10.2016 - 30.09.2017.

Bull Amedo E.T. DE 001601144673, has 8 daughters inside the resort with lactations concluded between 01.10.2016 - 30.09.2017**.**

Bull Harry E.T. USA 0060083723, has 6 daughters inside the resort with lactations concluded between 01.10.2016 - 30.09.2017**.**

Bull Alidio, IT 004902500933, has 5 daughters inside the resort with lactations concluded between 01.10.2016 - 30.09.2017.

Bull Master, DE 000940486348, has 5 daughters inside the resort with lactations concluded between 01.10.2016 - 30.09.2017**.**

Bull Matron, NL 00034904965, has 5 daughters inside the resort with lactations concluded between 01.10.2016 - 30.09.2017**.**

Bull Tunis, DE 001401422341, has 5 daughters inside the resort with lactations concluded between 01.10.2016 - 30.09.2017**.**

Bull Jobs E.T., DE 000347023454, has 6 daughters inside the resort with lactations concluded between 01.10.2016 - 30.09.2017.

Bull Enos E.T., DE 000113140063, has 3 daughters inside the resort with lactations concluded between 01.10.2016 - 30.09.2017.

Bull Jecko E.T., DE 000578914022, has 3 daughters inside the resort with lactations concluded between 01.10.2016 - 30.09.2017**.**

Bull Omajo Wideview Ballack, NL 000427218361, has 42 daughters inside the resort with lactations concluded between 01.10.2016 - 30.09.2017.

Bull Bonos, NL 000350854757, has 38 daughters inside the resort with lactations concluded between 01.10.2016 - 30.09.2017.

Bull Elevit, DE 000943121111, has 38 daughters inside the resort with lactations concluded between 01.10.2016 - 30.09.2017.

Jockmon E.T. bull, DE 000374303216, has 39 daughters inside the resort with lactations concluded between 01.10.2016 - 30.09.2017.

RESULTS AND DISCUSSIONS

The main characteristics pursued were represented by the performances of the families; in order to be able to observe the father's influence on the daughters' productions, it was necessary to calculate the family averages, the standard deviation from the average and the coefficient of variability within the families for each character studied.

A first index followed was represented by the quantity of milk, where it is found that the highest average was obtained in the Janther bull family, 7975.80 ± 225.16 kg of milk, the variations being between 7408 and 8495 kg of milk (Table 1).

Table 1. Estimators for the quantity of milk character (kg)

No	The name of the bull	No. daughters/bull	$\overline{X} \pm s_{\overline{X}}$ (kg)	V (%)	Limitation	
					Min.	Max
1	RIVER	8	7626.53±328.22	12.17	6650	8848
2	LANTANA	15	7586.35±145.15	7.65	6609	8470
3	MASON	9	7748.44±166.6	6.45	7085	8781
4	AQUOLINO	16	7269.27±184.86	10.17	5911	8594
5	JANTHER	5	7975.80±225.16	6.31	7408	8495
6	ESPREL	4	7735.00±306.90	7.94	6943	8338
7	AMEDO E.T.	8	7187.25±178.71	7.03	6676	8273
8	HARRY E.T.	6	7268.50±288.36	9.72	6099	8214
9	ALIDIO	5	7290.40±127.99	3.93	6865	7637
10	MASTER	5	6785.00±123.15	4.36	6302	7076
11	MATRON	5	6943.80±164.24	5.28	6488	7450
12	TUNIS	5	7805.20±341.08	9.77	6870	8585
13	JOBS E.T.	6	7251.67±263.87	8.91	5984	7747
14	ENOS E.T.	3	7564.67±178.00	4.07	7270	7885
15	JECKO E.T.	5	6474.20±546.12	18.86	5076	7781
16	BOBAS	38	7065.68±110.03	9.60	5396	9265
17	ELEVIT	38	7042.88±115.93	10.15	5273	8722
18	JOCKMON E.T.	39	7243.76±105.23	9.08	5761	9094
19	O.W. BALLACK	42	7535.62±117.44	10.10	4608	8848

Regarding the studied character, it presented a very good homogeneity, the value of the coefficient of variation being 6.31%.

As for the smallest amount of milk, it was obtained from the family of the bull Jecko E.T. namely, 6474.20 ± 546.12 kg of milk with variation limits between 5076 and 7781 kg of milk.

For the percentage of milk fat, it is found that the highest average was obtained in the Mason bull family, 4.25 ± 0.017% milk fat, varying between 4.12 and 4.25% (Table 2).

The lowest average fat percentage was obtained in the Matron bull family, namely, 4.10 ± 0.014% milk fat with variation limits between 4.08 and 4.16% milk fat (Table 2). Studying the coefficient of variation for the percentage of milk fat, it can be seen that the most homogeneous family is the family of the Harry Embriotransfer bull (V% = 0.32) and the most heterogeneous family is that of the bull Enos Embriotransfer (V% = 2.89) (Table 2).

For the amount of milk fat, it is found that the highest average was obtained in the Janther bull family, 330.00 ± 11.91 kg fat, ranging between 300 and 356 kg total fat in milk.

The lowest average amount of fat in milk was obtained in the family of the bull Jecko Embriotransfer, 277.20 ± 23.54 kg with variation limits between 213 and 230 kg total fat in milk (Table 3).

Table 2. Milk fat percentage (%) estimators

No	The name of the bull	No. daughters / bull	$\overline{X} \pm s_{\overline{X}}$ (%)	V (%)	Limitation	
					Min.	Max.
0	1	2	3	4	5	6
1	RIVER	8	4.15±0.022	1.53	4.05	4.26
2	LANTANA	15	4.14±0.011	1.05	4.03	4.24
3	MASON	9	4.25±0.017	1.20	4.12	4.29
4	AQUOLINO	16	4.15±0.018	1.73	3.94	4.25
5	JANTHER	5	4.13±0.04	1.45	4.04	4.19
6	ESPREL	4	4.17±0.04	2.04	4.08	4.29
7	AMEDO E.T.	8	4.14±0.014	0.93	4.09	4.20
8	HARRY E.T.	6	4.15±0.005	0.32	4.13	4.16
9	ALIDIO	5	4.18±0.009	0.47	4.16	4.21
10	MASTER	5	4.17±0.015	0.80	4.13	4.22
11	MATRON	5	4.15±0.014	0.78	4.08	4.16
12	TUNIS	5	4.12±0.021	1.16	4.07	4.17
13	JOBS E.T.	6	4.11±0.020	1.21	4.06	4.20
14	ENOS E.T.	3	4.20±0.07	2.89	4.13	4.34
15	JECKO E.T.	5	4.15±0.016	0.84	4.11	4.20
16	BOBAS	38	4.15±0.009	1.32	4.05	4.29
17	ELEVIT	38	4.15±0.008	1.14	4.05	4.27
18	JOCKMON E.T.	39	4.13±0.007	1.02	4.05	4.26
19	O.W. BALLACK	42	4.17±0.008	1.30	4.02	4.29

Table 3. Milk fat estimators (kg)

No	The name of the bull	No. daughters / bull	$\overline{X} \pm s_{\overline{X}}$ (kg)	V (%)	Limitation	
					Min.	Max.
1	RIVER	8	316.88±14.1	12.58	259	369
2	LANTANA	15	311.21±6.39	8.21	231	359
3	MASON	9	329.00±6.06	5.23	302	362
4	AQUOLINO	16	302.50±8.67	11.50	241	364
5	JANTHER	5	330.00±11.19	7.58	300	356
6	ESPREL	4	323.00±15.18	9.40	285	348
7	AMEDO E.T.	8	297.63±7.66	7.28	275	343
8	HARRY E.T.	6	308.50±7.42	5.89	294	340
9	ALIDIO	5	305.00±5.50	4.03	286	318
10	MASTER	5	291.00±4.15	3.19	280	305
11	MATRON	5	284.60±7.06	5.55	263	305
12	TUNIS	5	321.60±12.66	8.80	287	349
13	JOBS E.T.	6	304.83±3.81	3.14	294	318
14	ENOS E.T.	3	317.67±4.81	2.62	311	327
15	JECKO E.T.	5	277.20±23.54	18.99	213	320
16	BOBAS	38	290.06±4.43	9.41	224	378
17	ELEVIT	38	294.24±4.92	10.30	221	363
18	JOCKMON E.T.	39	300.02±4.36	9.07	237	376
19	O.W. BALLACK	42	315.22±4.91	10.10	193	366

Regarding the percentage of milk protein, it is found that although the highest average was equal to the families of River, Janther and Alidio bulls with an average production of 3.47%, the Alidio bull family has the lowest standard deviation of the average, of ± 0.14 compared to the standard deviation of the average River and Janther bulls that have a standard deviation of ± 0.18 of the percentage of milk protein (Table 4).

The lowest average protein percentage was obtained in the Tunis bull family with an average milk protein production of 3.39 ± 0.015 with limits between 3.37 and 3.45%.

The study of the coefficient of variation for the percentage of milk protein can be found that the most homogeneous family is the Lantana bull family (V% = 0.4), and the most heterogeneous family is that of the Enos Embryotransfer bull (V% = 1.91) (Table 4).

Table 4. Milk protein percentage (%) estimators

No	The name of the bull	No. daughters/bull	$\bar{X} \pm s_{\bar{X}}$ (%)	V (%)	Limitation	
					Min.	Max.
0	1	2	3	4	5	6
1	RIVER	8	3.47±0.018	1.46	3.39	3.55
2	LANTANA	15	3.45±0.003	0.40	3.36	3.52
3	MASON	9	3.34±0.021	1.82	3.37	3.56
4	AQUOLINO	16	3.45±0.005	0.61	3.42	3.50
5	JANTHER	5	3.47±0.018	1.18	3.40	3.51
6	ESPREL	4	3.43±0.015	0.87	3.40	3.47
7	AMEDO E.T.	8	3.47±0.012	1.01	3.42	3.51
8	HARRY E.T.	6	3.46±0.023	1.65	3.38	3.51
9	ALIDIO	5	3.47±0.014	0.92	3.43	3.52
10	MASTER	5	3.44±0.017	1.10	3.40	3.49
11	MATRON	5	3.45±0.009	0.60	3.43	3.48
12	TUNIS	5	3.39±0.015	0.97	3.37	3.45
13	JOBS E.T.	6	3.43±0.017	1.23	3.39	3.51
14	ENOS E.T.	3	3.44±0.034	1.91	3.38	3.51
15	JECKO E.T.	5	3.43±0.026	1.72	3.36	3.49
16	BOBAS	38	3.45±0.008	1.39	3.38	3.60
17	ELEVIT	38	3.44±0.006	1.15	3.38	3.55
18	JOCKMON E.T.	39	3.45±0.007	1.21	3.38	3.61
19	O.W. BALLACK	42	3.43±0.006	1.12	3.35	3.49

For the amount of protein, it is found that the highest average was obtained in the Esprel bull family, 265.75 ± 10.09 kg of protein (Table 5) ranging between 238 kg and 283 kg of protein in milk.

The lowest average amount of protein in milk was obtained in the family of the bull Jecko Embriotransfer, 228.40 ± 19.05 (Table 5) with limits between 177 and 264 kg of protein in milk.

Tablel 5. Protein quantity estimators (kg)

No	The name of the bull	No. daughters / bull	$\bar{X} \pm s_{\bar{X}}$ (%)	V (%)	Limitation	
					Min.	Max.
1	RIVER	8	264.38±10.81	11.57	218	303
2	LANTANA	15	260.75±4.89	7.5	226	295
3	MASON	9	268.00±5.23	5.86	248	297
4	AQUOLINO	16	259.16±5.07	7.83	204	297
5	JANTHER	5	276.80±8.42	6.80	252	296
6	ESPREL	4	265.75±10.09	7.59	238	283
7	AMEDO E.T.	8	249.00±5.94	6.74	229	284
8	HARRY E.T.	6	257.17±6.32	6.02	240	282
9	ALIDIO	5	253.20±5.12	4.52	235	265
10	MASTER	5	240.80±2.54	2.36	233	249
11	MATRON	5	240.00±5.93	5.53	223	259
12	TUNIS	5	264.60±10.78	9.12	237	289
13	JOBS E.T.	6	254.67±3.45	3.32	245	266
14	ENOS E.T.	3	260.33±5.33	3.55	255	271
15	JECKO E.T.	5	228.40±19.05	18.65	177	264
16	BOBAS	38	242.14±3.71	9.45	189	316
17	ELEVIT	38	243.61±3.91	9.88	187	301
18	JOCKMON E.T.	39	250.25±3.36	8.39	201	313
19	O.W. BALLACK	42	258.92±3.88	9.71	155	300

Regarding the coefficient of variation for the amount of milk protein, it can be seen that the most homogeneous family is the Master bull family (V% = 2.36) and the most heterogeneous family is that of the Jecko Embriotransfer bull (Table 5).

CONCLUSIONS

For the study, 19 families were grouped with a total of 262 dairy cows.

For the quantity of milk the family with the highest milk production was that of the Janther bull where the average production was 7975.80 ± 225.16 kg of milk ranging between 7408 and 8495 kg of milk while the family with the lowest average production was the bull family Jecko Embryotransfer with an average milk production of 6474.20 ± 546.12 kg, with limits between 5076 and 7781 kg milk.

Regarding the character of the percentage of fat in milk, it was found that the Manson bull family had the highest average production, of 4.25 ± 0.017% with limits between 4.12% and 4.25%.

Regarding the amount of fat in milk, the highest values were in the Janther gold family, with a production of 330.00 ± 11.19 kg of fat, while the lowest average amount of fat was identified in the Jecko Embriotransfer bull family, with a production of 277.20 ± 23.54 kg.

The highest average milk protein content was identified as belonging to the River, Janther and Alidio bull families, with an average production of 3.47% and an average standard deviation of ± 0.14 to ± 0.18, with variation limits between 3, 39% and 3.55%.

For the amount of milk protein, the Janther bull family was identified as having the highest average production, of 276.80 ± 8.42kg, while the Jecko Embriotransfer bull family had an average protein quantity of 228.40 ± 19.05kg.

The bull with the most bitter influence on the offspring is the Janther bull, having the highest average yields for the amount of milk, the amount of milk fat, the percentage of milk protein and the amount of milk protein.

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