INFLUENCE OF THE CALVING SEASON ON THE MILK YIELD GIVEN BY A FRIESIAN POPULATION, IMPORTED FROM THE NETHERLANDS

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Abstract

The individual milk production at cows is influenced by several factors, which taken by their nature, may be genetic factors and environmental factors. The calving season has an influence on the milk production per lactation, through ratio structure and nutrition level and by climatic factors, as well. In this study the research was focused on the influence of the specified factor on the milk production in Frisian cows from Netherlands exploited in the eastern parts of Romania. The ascendance of cows was valuable, including mothers who had an average production of 7,923.4 kg milk, 4.23% fat and 287.97 kilograms pure fat. Paternal grandmother have achieved more superior yields then maternal mothers with average values of 8960.29 kg milk, 4.37% fat and 371.25 kilograms pure fat. The best milk production from the descendants was registered during winter season, 7,798.51 ± 204.07 kg of milk per total lactation and 7,379.31 ± 132.79 Kg of milk per normal lactation, the differences between seasons being statistically significant p> 0.05.

Key words: Frisian, cows, milk production, calving season, influenced

MATERIAL AND METHODS

The research was done on 340 Dutch Frisian cows, exploited at Badeana Pharm, Vaslui county. Due to the valuable production features and a markedly capacity of adaptation this breed spread all over the world and in Romania and Moldova area.

More aspects were analyzed on this population: ascendance value, productive performances during the exploitation, the reproduction main coefficients, body development and the influence of calving season on the milk production. The primary date was taken from the files of The Bureau of Improving and Reproduction in Animal Husbandry in Vaslui (O.A.R.Z.). Once systemized, the data were processed and interpreted through specific methods (arithmetic mean, average error, standard deviation, variability coefficient, Fisher and Tukey tests, and others) using the statistics program, the analysis of variation and co-variation (S.A.V.C.) proposed by V. Maciuc in 2002-2003 at U.S.A.M.V. Iasi Ro.

RESULTS AND DISCUSIONS

The research on Frisian population from Badeana Farm, Vaslui county shows an valuable ascendance (Table 1) with mothers who had an average production of 7,923.4 kg milk, 4.23 % fat and 287.97 kg pure fat. Paternal grand-mothers (MT) had better production than the mothers (MM) having average values of 8,960.29 kg milk, 4.37 % fat and 371.25 kg pure fat, and variability of milk quantity between 7,568 kg and 10,231 kg milk.

Table 1
Average value and estimation of variability of production features at Frisian breed population ascension, Bădeana Farm, Vaslui County

Specification	U.M.	$\overline{X}$	±s $\overline{x}$	s	V%	Minimum	Maximum
Milk-MT	Kg	8,960.29	36.541	539.214	7.134	7,568	10,231
Fat-MT	%	4.37	0.01	0.172	3.549	4.44	5.1
Fat-MT	Kg	371.25	2.213	38.711	9.427	303	418
Protein -MT	Kg	290.7	1.046	18.297	6.294	265	324
Milk-MM	Kg	7,923.4	40.537	609.1	8.949	7,103	9,233
Fat-MM	%	4.23	0.01	0.183	4.127	4.1	4.93
Fat-MM	Kg	287.97	1.554	27.186	9.44	235	381
Protein-MM	Kg	251.52	0.699	12.234	4.864	230	286

The descendent has an average production of 7,178.49 kg milk in Ist normal lactation which grows in relation with lactation succession, getting in IV normal lactation with 7330.62 kg milk. Per total lactation, the average IVth lactation was 7430.22 kg milk, with variability between 5718 kg and 9880 kg milk. These levels of production reflect a remarkable genetic potential for the population in study. The fat content in milk per the studied lactation was between 4.45% and 4.57%.

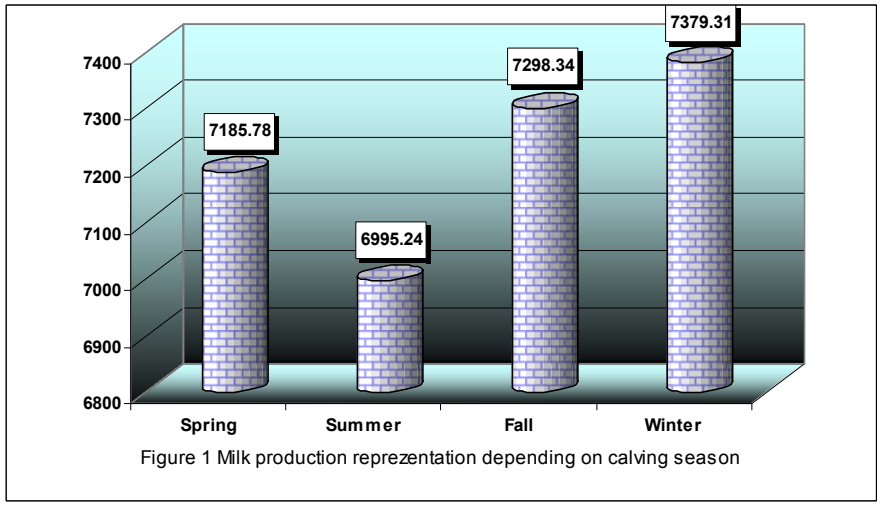

Figure 1 Milk production reprezentation depending on calving season

The results about the reproduction coefficients per the four lactations in our study show an age of 28.53±0.27 for the first calving, thus a good precocity of the imported population, the time in between calving with values between 360.52 and 388.40 days and the period of relaxation between 60.39 and 64.63 days. The main body dimensions show a good development for the primary cows, the body wait was 636.90 kg and the waist 134.53 cm .

Analyzing the descendent production level based on calving season factor (Table 2), there has been noticed important statistic differences at Ist normal lactation for p > 0.05 (Figure 1). During winter 7,379.31 Kg

and in fall 7,298.34 Kg (the biggest milk production). The least production were recorded during spring and summer (7,185.78 respectively 6,995.24 Kg milk). The difference are significant between the quantity of milk in winter and that in summer (Table 3) respectively 384.07 for $F \geq 0.05$ and $p \geq 0.05$. The differences are significant statistically of 18.37 kg $F \geq 0.05$ and $p \geq 0.05$ between winter and summer season because the quantity of milk is positively and strongly correlated with the quantity of fat (Table 4 and Figure 2).

Table 2
Average values and estimations of variability of production features at I normal lactation depending on calving season

Season	Specification	U.M.	$\overline{X}$	±s $\overline{x}$	s	V%	Minimum	Maximum
Spring	Duration of normal lactation	zile	305	0.00	0.00	0.00	305	305
	Milk	Kg	7,185.78	106.754	605.835	12.606	4,850	8,991
	Fat	%	4.58	0.022	0.189	4.138	4.16	5.12
	Fat	Kg	321.72	4.925	41.789	12.989	213	406
	Protein	%	3.48	0.013	0.107	3.065	3.23	3.71
	Protein	Kg	242.63	3.312	28.1	11.582	164	307
Summer	Duration of normal lactation	zile	305	0.00	0.00	0.00	305	305
	Milk	Kg	6,995.24	95.19	687.875	12.693	4,168	8,880
	Fat	%	4.58	0.018	0.164	3.577	4.16	5.05
	Fat	Kg	317.38	4.275	39.877	12.565	189	396
	Protein	%	3.46	0.012	0.109	3.14	3.2	3.77
	Protein	Kg	241.06	3.68	34.328	14.24	144	353
Fall	Duration of normal lactation	zile	305	0.00	0.00	0.00	305	305
	Milk	Kg	7,298.34	107.775	708.125	12.491	5295	9,310
	Fat	%	4.59	0.019	0.161	3.505	4.2	5.02
	Fat	Kg	334.96	4.919	41.45	12.574	237	424
	Protein	%	3.44	0.015	0.128	3.713	3.21	3.74
	Protein	Kg	243.38	3.525	29.705	12.295	173	318
Winter	Duration of normal lactation	zile	305	0.00	0.00	0.00	305	305
	Milk	Kg	7,379.31	132.799	1,095.092	14.982	5,162	9,845
	Fat	%	4.55	0.026	0.211	4.633	4.16	5.18
	Fat	Kg	335.75	5.421	44.704	14.208	235	430
	Protein	%	3.4	0.023	0.19	5.598	3.13	4.46
	Protein	Kg	235.31	4.478	36.924	15.692	177	328

Notice the differences of 303.1 kg in milk quantity and fat 17.58 kg between the cows who calved in fall and those in summer. Although the differences are not statistically significant they get close to $F \geq 0.05$, $p \geq 0.05$ and are relevant for the calving season factor. Hence, we conclude that the calving season influences the milk production on lactation, on feed structure, level of forage as well as climatic factors.

There were no major statistic differences concerning features such as fat% (Figure 3), protein%, and protein kg in the four seasons.

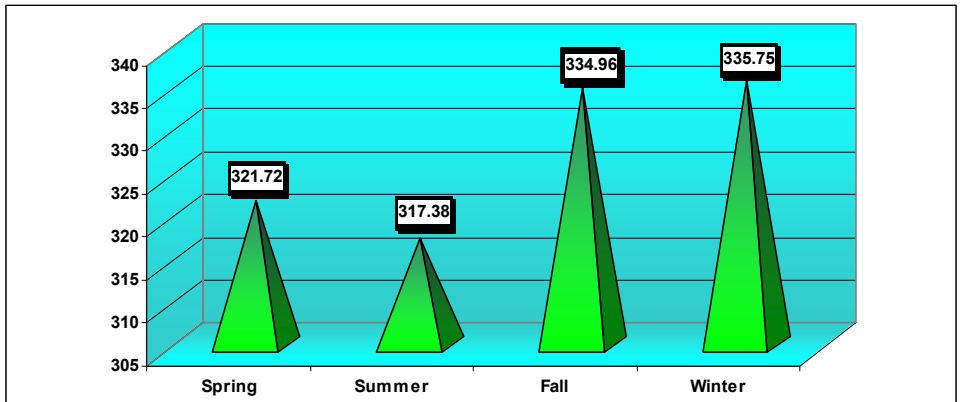

Figure 2 Fat quantity diagrame depending on calving season

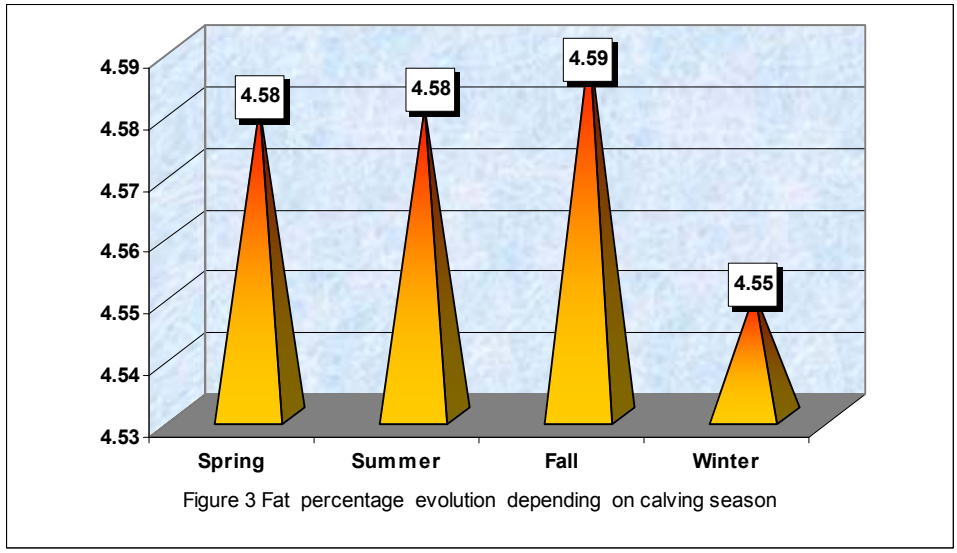

Figure 3 Fat percentage evolution depending on calving season

Table 3
The significance of milk quantity variation based on the season

Fisher Test: 2,8394 (F) > F 0,05 (3;294) 2,60 * significant F≥ 0,05; F ≥ 0,01; F ≥ 0,001								
Tukey Test: p ≥ 0,05 ; p ≥ 0,01								
Feature 1	**Feature 2**	**Average diff.**	**Q1**	**Q2**	**W1**	**W2**	**Significance**	**Borderline**
Milk-spring	Milk-summer	190.54					insignificant	
Milk-spring	Milk-fall	112.56					insignificant	
Milk-spring	Milk-winter	193.53					insignificant	
Milk-winter	Milk-summer	384.07					significant	0.05
Milk-winter	Milk-fall	80.97					insignificant	
Milk-fall	Milk-summer	303.1	3.63	4.4	314.05	483.97	insignificant	

Table 4
Significance of fat quantity variation based on calving season

Fisher Test: 2.6587 (F) < F 0.05 (3 ; 294) 2.60 * significant F≥ 0.05; F ≥ 0.01; F ≥ 0.001								
Tukey Test: p ≥ 0,05 ; p ≥ 0,01								
Feature 1	**Feature 2**	**Average diff.**	**Q1**	**Q2**	**W1**	**W2**	**Significance**	**Borderline**
Milk-spring	Milk-summer	4.34					insignificant	
Milk-spring	Milk-fall	13.24					insignificant	
Milk-spring	Milk-winter	14.03					insignificant	
Milk-winter	Milk-summer	18.37					significant	0.05
Milk-winter	Milk-fall	0.79					insignificant	
Milk-fall	Milk-summer	17.58	3.63	4.4	17.63	21.37	insignificant	

In USA in Middle West, Holstein cows who calved in December produced an additional 600 kg milk per lactation, compared to those who calved in July-August [2, 3], and in Nederland in the primary cows' case, the difference of production based on calving season, fall-spring, was 450 kg. The research made on Romanian Baltata breed, in western Romania, [4, 5], showed that the cows that calved in summer season produced in average with 463 kg less than normal lactation, comparing to those who calved in other seasons.

One of the reasons for a less quantity of milk per lactation for those who calved in summer, compared with fall-winter, is the high temperature of the environment [1, 4, 5, 6] which diminishes the cows appetite and reduces the forage consumption during the ascendant and plateau of lactation's curve.. Also, the type of feeding level influence the milk production both in quality and quantity.

CONCLUSIONS

The following conclusions can be drawn from this study:

The Dutch Frisien population from Moldova area has a valuable ascendance, with mother who had an average production of 7,923.4 kg milk, 4.23 % fat and 287.97 kg pure fat. Grand-mothers on father's side (MT) produced a superior quantity (MM) with average figures of 8,960.29 kg milk, 4.37 % fat and 371.25 kg pure fat, and a variability in milk quantity between 7,568 kg and 10,231 kg milk.

The largest quantity was recorded in winter 7,379.31 Kg and in fall 7,298.34 Kg and the least in summer and spring (7,185.78 respectively 6,995.24 Kg milk). The differences are statistically significant of 384.07 Kg for F≥ 0.05 and p ≥ 0.05.

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