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участников товародвижения, в том числе в целях получения точных характеристик по отгружаемым партиям товаров, усовершенствовать, изменить функциональные обязанности персонала и повысить его квалификацию.

В ряде случаев имеют значение и условия работы участников ВЭД. В частности имеет значение степень покрытия различных регионов средствами связи, поскольку не все регионы и отдельные их территории одинаково оснащены необходимыми коммуникациями.

Важным моментом является и организация международного информационного взаимодействия. Договор ЕАЭС вводит принципиально новое понятие «трансграничное пространство доверия», означающее совокупность правовых, организационных и технических условий, согласованных государствами-членами с целью обеспечения доверия при межгосударственном обмене данными и электронными документами между уполномоченными органами [2]. Информационные электронные системы российских таможенных органов изначально строились с учетом международного опыта, как с точки зрения формирования таможенной технологии электронной обработки данных деклараций, так и с точки зрения использования международных форматов обмена данными. В связи с этим, представляется, что интегрирование с информационными системами, как государств ЕАЭС, так и Европейского союза не имеет непреодолимых технических барьеров.

Существенные изменения в технологии реализации таможенных операций требует совершенствования организации таможенного контроля и информационной системы таможенных органов. Практика разработки программных средств таможенного контроля долгие годы строилась по принципу внесения изменений и наращивания информационной системы. В результате, одной из ощутимых проблем являлась недостаточная интеграция отдельных внутренних сегментов таможенной информационной системы друг с другом. Безусловно, попытки оптимизации системы предпринимались и предпринимаются. Тем не менее, практика внесения достаточно частых изменений в таможенное законодательство, требует соответствующих корректировок и в алгоритмы контроля.

Учитывая кардинальные изменения, осуществляемые в технологии таможенного контроля и иерархии информационной системы, следует постоянно совершенствовать единую автоматизированную информационную систему таможенных органов, как на национальном, так и наднациональном уровне, используя накопленный опыт автоматизации [3, с. 139].

Необходимо также отметить, что внедрение новых технологий неодинаково может отразиться на результатах деятельности различных субъектов, связанных с процессом перемещения товаров через таможенную границу. Так, например, ускорение процесса выпуска товаров может существенным образом сократить потребность в складах временного хранения. В тоже время, развитие транзитных мультимодальных перевозок на территории ЕАЭС, напротив, может увеличить потребность в складировании товаров, находящихся под таможенным контролем в регионах, расположенных на линиях организации мультимодальных транспортных коридоров.

В связи с этим, представляется целесообразным организация проведения мониторинга влияния внедрения новых таможенных технологий на деятельность таможенных органов и других субъектов внешнеэкономической деятельности.

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MILK PRODUCTIVITY OF COWS-MOTHERS AND THEIR DAUGHTERS BY THE FIRST LACTATION TAKING INTO ACCOUNT THE LEVEL OF FEED CONSUMPTION

Kazmiruk L.
Candidate of Agricultural Science, Associate Professor
Vinnytsia National Agrarian University
Ukrainian

МОЛОЧНА ПРОДУКТИВНІСТЬ КОРІВ МАТЕРІВ ТА ЇХ ДОЧОК ЗА ПЕРШОЮ ЛАКТАЦІЄЮ З ВРАХУВАННЯМ РІВНЯ ВИТРАТ КОРМІВ

Казьмірук Л.В.,
кандидат с.-г. наук, доцент
Вінницький національний аграрний університет
Україна

Abstarct:

The research was conducted on the materials of breeding and accounting on the farm of the breeding plant. It was investigated the productivity of mothers of first calving cows in the milking herd of the Ukrainian black-speckled dairy breed, taking into account the feeding conditions and the level of feed consumption.

The productivity of the first calving cows-mothers was determined for 305 days of lactation. The daughters, having had their first lactation in 2016, 2017 and 2018, were chosen among all cows-mothers in 2013, 2014 and 2015. Thus, 10 pairs of mothers-daughters with calving in 2013 and 2016, 2014 and 2017, 2015 and 2018 were formed.

In order to increase the impact of feeding conditions on the milk yield of cows-mothers and their daughters, the feed consumption per head was examined. For mothers it was 5120 feed units in 2013, 5248 feed units in 2014 and 5032 feed units in 2015; while for daughters it was 4985 feed units in 2016, 5313 feed units in 2017 and 5428 feed units in 2018.

Studies on the prediction of daughters' milk yield and the determination of its effect on heredity were defined, taking into account the mother's yield, as well as the ones of mother's mother and father's mother.

The results of the research show that the productivity of mothers of the experimental first calving cows of the Ukrainian black-speckled dairy breed was influenced by the feeding conditions. In 2013 the milk yield was 4128.3 kg at the feed consumption of 5120 feed units for nutrition, while in 2015 it was 3931.4 kg of milk at the feed consumption of 5032 feed units. The efficiency of daughters' heredity was 77.7% in 2016, 81.2% in 2017 and 87.9% in 2018. The feeding conditions had a significant effect on the daughters' predicted milk productivity, where the costs were 4985 feed units in 2016, 5313 feed units in 2017 and 5428 feed units in 2018. It was determined the highest profitability of milk production of 49.2%, while the feed consumption of 21.37% was the lowest.

Анотація:

З метою проведення досліджень за матеріалами племінного та бухгалтерського обліку у господарстві племінного заводу на дійному стаді української чорно-рябої молочної породи було досліджено продуктивність матерів та їх дочок корів-первісток з врахуванням умов годівлі та рівнем витрат кормів.

Продуктивність матерів-первісток визначена за 305 днів лактації і з всіх корів в 2013, 2014 і 2015 років зроблений вибір їх дочок, які мали за першу лактацію у 2016, 2017 і 2018 роках. Таким чином, було сформовано 10 пар матерів-дочок з отелами: 2013 і 2016; 2014 і 2017; 2015 і 2018 роках.

З метою підвищення впливу умов годівлі на надій матерів та дочок дослідили витрати кормів на одну голову: у матерів затрати складали у 2013 році – 5120 корм. од., у 2014 р. – 5248 корм. од., 2015 р. – 5032 корм. од.; у дочок: у 2016 р. – 4985 корм. од., у 2017 р. – 5313 корм. од., у 2018 р. – 5428 корм. од.

Дослідження прогнозування надою дочок та визначення його ефекту спадковості визначали враховуючи надої матері; матері-матері; матері батька.

Результатами досліджень встановлено, що на продуктивність матерів піддослідних корів-первісток української чорно-рябої молочної породи відповідний вплив мали умови годівлі. Так, у 2013 році при витратах кормів за поживність 5120 корм. од. їх надій склав 4128,3кг та у 2015 році відповідно 5032 корм. од. і 3931,4 кг молока. Ефективність спадковості надоїв дочок у 2016 році була на рівні 77,7%, у 2017 році – 81,2%, у 2018 році – 87,9%. Суттєвий вплив на проявлення прогнозованої молочної продуктивності дочок мали умови годівлі, де у 2016 році витрати кормів були на рівні 4985 корм. од., 2017 році – 5313 корм. од., 2018 році – 5428 корм. од. Рівень рентабельності отримання молока встановлений найвищий 49,2% у порівнянні із найменшими витратами кормів на 21,37%.

Keywords: cows-mothers, daughters, first calving cows, feed, efficiency, milk, milk yield

Ключові слова: матері, дочки, корови-первістки, корми, ефективність, молоко, надій

Setting the problem. The dairy productivity of cows is a characteristic that is defined by sex. However, the genes that determine it are in the genotypes of both parents. The dairy productivity depends on many factors: the degree of heredity of characteristics, the animals' breed, genotype and line, the technology of their breeding, keeping and use, the level and quality of feeding, age, exterior and constitution, and others. According to the research of many authors, the results of which have been generalized, the coefficient of heredity (h^2) by milk yield is 0.2-0.3; it is 0.4-0.5 by fat milk and 0.3-0.4 by milk fat production. The selection of cows by their own milk productivity (proband phenotype) is the most accurate. However, this leads to an increase in the generative interval and to a decrease in the selection effect. Therefore, the selection by origin, i.e. by phenotype and genotype of ancestors is widely used in the practice of dairy farming [11].

Raising the first calving cows of the desired type and level of productivity is essential among the measures that increase the productivity of dairy herds. Different feeding conditions in the rearing of young animals can affect their processes of growth and development, body structure, the nature of metabolism and the formation of future milk productivity. Both intensive and low levels of feeding the repair heifers can affect the milk productivity of reared cows [4].

The genetically programmed productivity of animals can be provided only under favorable conditions of their growing, care and use. It was found that the growth rate of heifers of different genotypes is closely related to the level of milk productivity. Reducing the intensity of rearing heifers in the period from 18 months to the first calving does not allow animals to fully realize their genetic potential and milk productivity [10].

The dairy productivity of cattle belongs to the group of characteristics that are classified quantitatively, which change significantly under the influence of living conditions. Hence, the diversity of phenotypes observing in each herd should be considered as the result of a different response of various genotypes to the environmental conditions in which the animals were developed and used [2].

The genetically programmed productivity of animals can be provided only under favorable conditions of their growing, care and use. It was found that the growth rate of heifers of different genotypes is closely related to the level of milk productivity. Reducing the intensity of heifer breeding in the period up to 18 months does not allow animals to fully realize their hereditary potential for milk productivity [9].

Among genotypic factors, both fathers and mothers have a significant influence on the genetic progress of populations [6].

However, according to many scientists, the daughters' milk productivity by 80-90% depends on the breeding value of fathers, while only by 10-20% on the genetic potential of mothers [10].

Animals need energy to maintain the vital functions of their organism and the formation of products. The only source of energy is feed, or rather the organic matter of feed. Therefore, the energy nutrition of feed can be considered as its ability to meet the animal's need for organic matter as a source of available energy.

The study of the efficiency of conversion of feed nutrients into products in cows of different breeds shows that it is different and depends on the breed, the completeness of feeding, physiological condition and genetic characteristics.

The efficiency of feed conversion into products is primarily related to improving the completeness of feeding. The further progress in dairy farming is impossible without strengthening the feed base, improving the norms, types and modes of feeding, the recipes of compound feed and premixes, as well as the feed preparation technology [7].

Studies have shown that the efficiency of cows' selection in the breeding herd depends on many factors: forms of selection (methodological, mass, of genotype expression, indirect, stabilizing and technological), heredity coefficient, recurrence, correlation of characteristics, regression, genetic parameters and environmental conditions [6].

The obtaining of planned indicators of milk productivity is determined by the need for feed, taking into account the recommended optimal and maximum rates of feed consumption per cow per year [3].

The planning of herd reproduction, taking into account the level of productivity of mothers from whom they get daughters is important in the system of breeding [1].

Analysis of recent research and setting the objective. Many studies have shown that the daughters of Ukrainian black-speckled dairy breed probably exceeded their mothers with milk productivity up to 5,000 kg in milk yield and the amount of milk fat for all lactations, while, on the contrary, they were inferior to their mothers with milk productivity over 5,000 kg [11].

The first calving cows born from mothers with different levels of milk yield differ significantly in quantitative characteristics of milk productivity, namely, milk yield, production of milk fat and protein, as well as the relative milk yield. The descendants of highly productive mothers are characterized by the best parameters [4].

The first calving cows are inferior in most characteristics to the parameters of animals of the desired type. The smallest differences with the desired type are observed in the cows obtained from the best mothers [5].

At the same time, insufficient research has been conducted to assess the mothers' feeding conditions in comparison with the level of daughters' feeding. This is because more than three years pass between the mother's and daughter's first lactation. The information about mothers' and daughters' feeding conditions is not always objective, consistent with the actual data, especially in commercial agricultural enterprises.

Based on this, the aim of the study was to establish the efficiency of using feed by first calving cows-mothers and their daughters.

Material and methods of research. According to the materials of breeding and accounting of Ltd "Agrofirma Batkivshchyna" of Vinnytsia district, the productivity of mothers of the first calving cows was studied on the herd of Ukrainian black-speckled dairy breed taking into account the feeding conditions and the feed consumption levels.

The productivity of first calving mothers was determined for 305 days of lactation. Their daughters, who had the first lactation in 2017, 2018 and 2019, were chosen from all cows in 2014, 2015 and 2016. Thus, 10 pairs of mothers-daughters with calving 2014 and 2017; 2015 and 2018; 2016 and 2019 were determined.

In order to increase the impact of feeding conditions on the mothers' and daughters' milk yields, the feed consumption per head was studied: the mothers' consumption was 5120 feed units in 2014, 5248 feed units in 2015 and 5032 feed units in 2016; while in the daughters it was 4985 feed units in 2017, 5313 feed units in 2018 and 5428 feed units in 2019.

The prediction of milk yield and determination of the effect of heredity by milk yield was studied by the formula: (2M + MM + MF):4, where M is the mother's milk yield; MM is the milk yield of mother's mother; MF is the milk yield of father's mother.

The economic efficiency of the manifestation of mothers' and ancestors' milk productivity in the first calving cows was determined by the following indicators: the amount of milk sold, revenue from milk sales, total milk production costs, profit and the level of profitability.

Research results. The efficiency of feed conversion into products depends first of all on the genetic potential of the organism, and then on subjective factors, the main of which is the complete feeding [7].

According to the breeding cards, the search for the mothers of the first calving cows of Ukrainian black-

speckled dairy breed, having calved in 2014, was made. Their milk yield for 305 days of lactation was determined. Their daughters-heifers were selected, as well as their milk yield for 305 days of the first lactation (2017) was determined. Similar studies were conducted in 2015 and 2016 with mothers and in 2018 and 2019 with daughters (Table 1).

Table 1

Productivity and use of feeds by first calving cows-mothers, n=10, $\bar{X} \times S_{\bar{X}}$

Indicator	Year		
	2014	2015	2016
Milk yield for 305 days, kg			
– of all first calving cows	4145.3 ± 78.1	4598.3 ± 83.2	4018.3 ± 75.3
– experimental cows	4128.5 ± 42.5	4524.3 ± 37.4***	3931.4 ± 42.3
Milk fat content, %	3.72 ± 0.03	3.60 ± 0.02**	3.81 ± 0.03
Milk fat, kg	153.6 ± 2.41	162.9 ± 3.12*	149.8 ± 2.35
Use of feeds, feed units			
– in total	5120	5248	5032
– per 1 kg of milk	1.24	1.16	1.28

Note: *P<0.05; **P<0.01; ***P<0.001

Table 1 shows that selected first calving cows-mothers, having calved in 2014, 2015 and 2016, were the closest to the average milk yield of all first calving cows. At the same time, a significant difference in milk yield was determined in 2015 compared to 2014, i.e. the milk productivity increased by 9.6%, with a probable difference of P <0.001, while in 2016, on the contrary, the milk yield decreased by 4.8% (P <0.01).

The main reason for such results is the level of cows' feeding. Thus, in 2014, it was used the feeds with total nutritional value of 5120 feed units per head. The increase of nutritional value of feeds to 5248 feed units or 2.5% had a positive effect on feed consumption per 1 kg of milk; it was less by 6.5% (1.16 feed units).

In 2016, the feed consumption per one first calving cow decreased slightly by 1.7% (5032 feed units), as a result the milk yields also decreased by 4.8%, and the feed consumption per 1 kg of milk increased by 3.2 %.

According to other indicators (increase in milk and milk fat in different years), the feeding conditions also had an impact on the productive characteristics of first calving cows.

The evaluation of daughters from mothers of first calving cows, taking into account the predicted and actual productivity allows establishing the manifestation of hereditary characteristics under the influence of external factors, especially the level of cows' feeding (Table 2).

Table 2

Comparative evaluation of daughters' actual productivity with predicted

Indicator	Productivity of daughters, kg by years					
	2017		2018		2019	
	predicted	actual	predicted	actual	predicted	actual
Milk yield for 305 days, kg	4970.2	3864.6±37.2	5546.9	4502.7±42.8	5417.2	4761.5±87.9
Effect of milk yields manifestation, %	–	77.7	–	81.2	–	87.9

In 2017, the actual milk yields of first calving cows were 3864.6 kg. The mothers' milk yield for the last lactation was at the level of 4128.5 kg (mother's mother – 5149 kg, father's mother – 6475 kg). Moreover, in theory, the milk yield of first calving cows should be 4970.2 kg. The effect of manifestation on heredity by milk yield is 77.7%.

In 2018, the milk yields of first calving cows-mothers increased on average to 4502.7 kg or by 16.51% with the prediction of 5546.9 kg.

Due to mothers and ancestors (mother's mother – 5715 kg and father's mother – 7424 kg) the effect of heredity increased to 81.2%, which is by 3.5% higher compared to the effect of 2017.

In 2019, the actual milk yield of first calving cows continued increasing to 4761.5 kg and it was by 23.2% more with the theoretical daughters' productivity of 5417.2 kg compared to 2016.

Taking into account the milk yields of first calving cows (mother's; mother's mother; father's mother), where the mother's milk yields were 3931.4 kg; those of mother's mothers were 5874 kg and of father's mothers – 7932 kg, the effect of manifestation by heredity of milk yields from mothers and ancestors of the ancestral lineage was 87.9%.

It is noteworthy that in 2017 at the lowest total feed consumption (4985 feed units) compared to 2018 and 2019, the daughters' milk yields and the manifestation of parents' genetic predispositions were not only lower, but also had the lowest level of profitability of obtained and sold milk (14.54%) in the first calving cows of Ukrainian black-speckled dairy breed (Table 3). At the same time, in 2018 the level of profitability of milk production increased to 24.58%, including due to an increase in the level of heredity – by 1.03%.

Accordingly, in 2019, the achievement of hereditary information in the first calving cows reached 87.9%, which was reflected in the level of profitability of 49.22%, and due to a higher selling price by 27.85%.

Table 3

Economic efficiency of manifestation of mothers' and ancestors' milk productivity (per head) by first calving cows

Indicators	Years		
	2017	2018	2019
Feed consumption, feed units, in total	4985	5313	5428
– per 1 kg of milk	1.29	1.18	1,14
Sold milk, kg	3169	3612	3904
Revenue from milk sales, UAH	15052.7	18904.0	22799.4
Total milk production costs, UAH	13141.2	15173.8	15278.5
Profit, UAH	1911.5	3730.2	7520.9
Level of profitability, %	14.54	24.58	49.22
Level of profitability by prices of 2017,%	14.54	15.57	21.37

In 2018 the feed consumption in the first calving cows increased by 6.6% and in 2019 – by 8.9%, compared to 2017 that had a positive effect on the increase in the milk yield by 16.5 and 23.2%.

Conclusions: 1. Feeding conditions had a corresponding influence on the productivity of the experimental first calving cows' mothers of Ukrainian black-speckled dairy breed. Thus, in 2014 their milk yield was 4128.3 kg at the feed consumption with nutritional value of 5120 feed units; and in 2016 it was 3931.4 kg of milk and 5032 feed units, respectively.

2. The efficiency of heredity of daughters' milk yields was at the level of 77.7% in 2017, 81.2% in 2018 and 87.9% in 2019.

3. The feeding conditions had a significant influence on the manifestation of the daughters' predicted milk productivity, where the feed consumption was at the level of 4985 feed units in 2017, 5313 feed units in 2018 and 5428 feed units in 2019.

4. It was determined the highest level of profitability of milk production of 49.2% compared to the lowest feed consumption by 21.37%.

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РАСЧЕТ ОБЛАСТИ ΔVEUL С ИСПОЛЬЗОВАНИЕМ 2D-ГРАФИКОВ И ПЕРЕМЕННОЙ X4

Пиль Э.А.
Академик РАЕ, профессор, доктор технических наук,
ГУАП, г. Санкт-Петербург, Россия

CALCULATION DOMAIN ΔVEUL USING 2D FIGURES AND VARIABLE X4

Pil E.
Academician of the RANH, professor, d.t.s
SUAI, Saint-Petersburg, Russia