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ECONOMIC EFFICIENCY OF HOLSTEIN COWS OF DIFFERENT LINES

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The paper presents the economic efficiency of milk production in the Northern region of Kazakhstan. The directions of increasing the profitability of dairy cattle breeding are formed. Studies have shown that cows in three lactations of three genetic lines: Reflex Sovering, Wis Beck Aidual and Osborndale Ivanhoe had the best milk yield and milk fat in Wis Beck Aidual cows. Their average milk yield in the first three lactations was 7557 kg, which was 251 kg (3.32%) higher than that of the Reflex Sovering cows. Consequently, the farm is most effective in using breeders belonging to the Vis Beck Aidual line. The main indicator in assessing the reproductive performance of animals is the reproductive rate. It was highest in animals of Wis Beck Aidual line, with the age of the first fruitful insemination of heifers at 16-17 months. During the first three lactations the reproductive ability coefficient was in a range of 1.0 -1.01. The best reproductive longevity, 3.57 lactations, was observed in cows which were first inseminated at 16-17 months of age. Consequently, to increase milk production on the farm, it is advisable to focus on the Vis Aidual line, as it is more highly milked and has better economic indicators.

Keywords: dairy farming, cattle breeding, profitability.

**ЭКОНОМИЧЕСКАЯ ЭФФЕКТИВНОСТЬ ИСПОЛЬЗОВАНИЯ
КОРОВ ГОЛШТИНСКОЙ ПОРОДЫ РАЗНЫХ ЛИНИЙ**

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В работе представлена экономическая эффективность производства молока в Северном регионе Казахстана. Сформированы направления повышения рентабельности молочного животноводства. Изучена молочная продуктивность коров по трём лактациям трех генетических линий: Рефлекшн Соверинг, Вис Бек Айдиал и Осборндейл Айвенго наилучшие показатели по удою, молочному жиру были у коров линии Вис Бек Айдиал. Их удои в среднем по трем первым лактациям составил 7557 кг, что на 251 кг (3,32%) больше, чем у коров линии Рефлекшн Соверинг. Следовательно, в хозяйстве наиболее эффективно использовать племенных производителей, принадлежащих к линии Вис Бек Айдиал. Основным показателем при оценке воспроизводительных качеств

животных является коэффициент воспроизводительной способности. Наиболее высоким он был у животных линии Вис Бек Айдиал, с возрастом первого плодотворного осеменения телок в 16-17 месяцев. На протяжении первых трех лактаций коэффициент воспроизводительной способности находился в диапазоне 1,0 -1,01. Лучшие показатели продуктивного долголетия - 3,57 лактации отмечены у коров, возраст первого осеменения которых пришелся на 16-17 месяцев. Следовательно, для увеличения производства молока в хозяйстве целесообразно делать упор на линию Вис Айдиал, так как она является более высокомолочной и имеет лучшие экономические показатели.

Ключевые слова: молочное скотоводство, животноводство, рентабельность.

ӘР ТҮРЛІ ГЕНЕТИКАЛЫҚ ЖЕЛІДЕГІ ГОЛШТИН ТҰҚЫМДЫ СИЫРЛАРДЫҢ ЭКОНОМИКАЛЫҚ ТИІМДІЛІГІ

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Жұмыста Қазақстанның солтүстік өңіріндегі сүт өндірісінің экономикалық тиімділігі көрсетілген. Сүтті мал шаруашылығының рентабельділігін арттыру бағыттары қалыптастырылды. Зерттеулер сиырлардың сүт өнімділігін үш генетикалық желінің үш лактациясы бойынша сипаттайтындығын көрсетті: рефлекс Соверинг, Вис Бек Айдиал және Осборндейл Айвенго сүт шығымдылығы бойынша ең жақсы көрсеткіштер, сүт майы Вис Бек Айдиал сиырларында болды. Алғашқы үш лактация бойынша олардың сүт шығымы 7557 кг құрады, бұл рефлекті сауу желісіндегі Сиырларға қарағанда 251 кг (3,32%) көп. Демек, шаруашылықта Вис Бек Айдиал желісіне жататын асыл тұқымды өндірушілерді пайдалану неғұрлым тиімді. Жануарлардың репродуктивті қасиеттерін бағалаудағы негізгі көрсеткіш-репродуктивті қабілет коэффициенті. Ол Вис Бек Айдиал желісінің жануарларында, 16-17 айда алғашқы жемісті ұрықтандыру жасына байланысты ең жоғары болды. Алғашқы үш лактация кезінде репродуктивті қабілет коэффициенті 1,0 -1,01 аралығында болды. Өнімді ұзақ өмір сүрудің ең жақсы көрсеткіштері-сиырларда 3,57 лактация байқалды, олардың алғашқы ұрықтандыру жасы 16-17 айға сәйкес келді. Демек, фермадағы сүт өндірісін ұлғайту үшін, Вис Бек Айдиал желісіне назар аударған жөн, өйткені сүт өнімділігі жоғары және экономикалық көрсеткіштері жақсы.

Түйінді сөздер: сүтті мал шаруашылығы, мал шаруашылығы, рентабельділік.

INTRODUCTION

In order to obtain highly productive offspring in LLP "Bek +" artificial insemination is used. The coverage is 100%. The average live weight of heifers at the first insemination was 380 kg. The age of cows at first calving is 775 days, or 24.3 months, which indicates an appropriate level of selection and breeding work on the farm [1-2].

The experiments were carried out on Holstein cows in LLP "Bek +" the village of Lesnoye of Fedorovskiy district of Kostanay region, the number of breeding stock of which is 1048 heads.

Milk productivity of cows is determined by many factors, but the greatest influence is exerted by genetic factors: breed, genealogical affiliation. Purposeful breeding work is the basis for obtaining high quality breeding material [3-6]. In addition, paratypic factors also have a great influence [7, c.115].

MATERIALS AND METHODS

The study of the issues of productive longevity of cows was carried out using the data of the primary zootechnical and pedigree registration of the farm. The necessary digital material for processing was obtained from the database of the IAS (Information and Analytical System) program and Dairy Plan. Linearity of cows (Vis Beck IDial, Reflection Sovering, Osborndale Ivanhoe) .confirmed by the data of the international bull rating system DairyBulls.com.

Milk productivity was recorded by conducting control milking using additional measuring equipment of the Dairy Plan 21 milking complex. The following indicators were taken into account: milk yield per full lactation (kg), milk yield per 305 days of lactation (kg), fat content (%), amount of fat (kg), protein content (%), amount of protein (kg), duration of lactation (days). Sampling and preparation for analysis were carried out in accordance with The State Standard № 13928-84 "Milk and cream procured. Acceptance rules, sampling methods and their preparation for analysis".

The milkiness coefficient was calculated using the formula proposed by D.I. Startsev (1966): $KM = \text{milk yield} * 100 / W$, where KM is milk yield (%), W is live weight (kg).

Milk fat was calculated using the formula: $MF = Y * F / 100$, where F is the mass fraction of fat (%), Y is the milk yield for 305 days of lactation.

The study of the qualitative composition of milk was carried out in the second month of lactation (stall period). The selection was carried out in accordance with the accepted methods. In the studied milk samples, the following indicators were determined: the content of fat and protein on the device "Milkoscan FT-120".

The obtained results of scientific research were processed by the method of variation statistics described by E.K. (1983) and Plokhinsky N.A. using the standard package of statistical analysis Microsoft Excel 2007 on a personal computer [8-9]. The reliability of the results obtained was assessed using the Student's test.

RESULTS

The use of an optimal system and method of livestock management, a correctly selected herd structure, effective use of technical means are of great importance for the successful management of dairy farming, which ultimately determines the efficiency of the industry.

A number of problems are currently observed in the livestock enterprises of the Northern region of Kazakhstan: a low level of selection and breeding work, veterinary and sanitary services for livestock are fragmentary, work on the preparation of feed and their preparation for feeding is poorly organized; not at the proper level of material and technical support.

In this respect, LLP "Bek +" has some advantages over other farms in the region. There is an approved plan of breeding work, a centralized procurement of feed is organized, which is fed to animals in processed or canned form.

Table 1 - Annual feed consumption in LLP "Bek +" for cows with live weight of 550 kg and with an average daily milk yield of 20-25 kg of milk

Feedtype	2019 y	2020 y
	Feed cost per 1 head of cattle / year, tenge	Feed cost per 1 head of cattle / year, tenge
Hay, tons	85790	85790
Cornsilage, tons	58800	58800
Herbhaylage, tons	140300	140300
Grainfodder, tons	42500	42500
Beergrain, tons	4000	4000
Defluorinatedphosphate, kg	5526	5526
Tablesalt, kg	4630	4630
Total	324 136	341 546

Analyzing the data in Table 1, we note that in 2020, in LLP "Bek +", the share of feed from the total costs accounted for 47%, the other, respectively, 53% (Figure 1). There was an increase in feed costs per cow in 2020 by 17,410 tenge or 5.1% for other costs by 11,771 tenge or 3.1% compared to the previous year. It should be noted that the cost of keeping cows in all farms in the region slightly increased compared to the previous year.

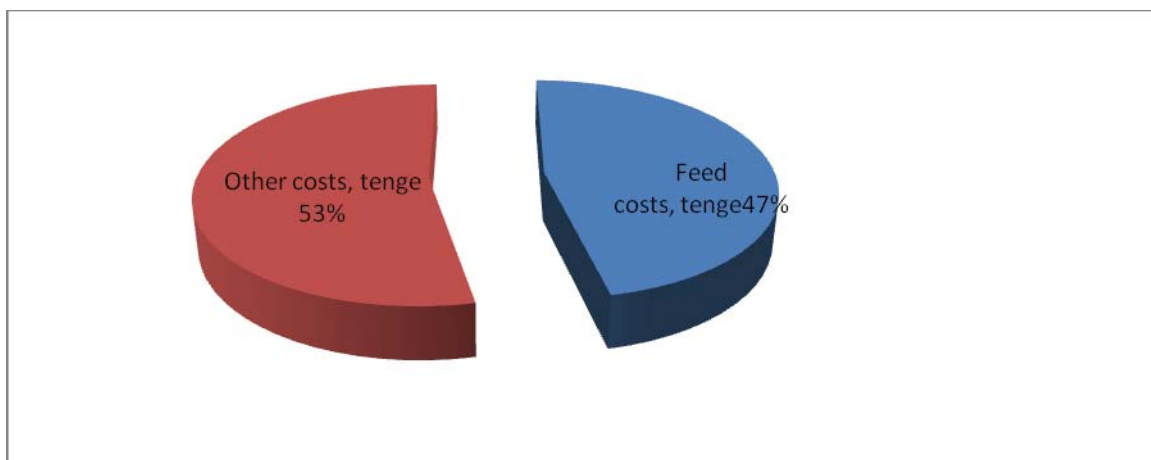


Figure 1 - Annual costs for 1 cow in "Bek +" LLP

Due to the commissioning of the Karusel installation, as well as certain expenses for the treatment of diseases of the udder of cows and the purchase of veterinary drugs, there is an increase in other costs. In general, the profitability of milk production in 2020 at BEK + LLP is 50%, which is primarily due to the high productivity of dairy cows.

When analyzing the influence of the linear belonging of cows on their lifelong productivity, and as a result, an increase in the level of profitability of milk production with an increase in the period of economic use of cows, it turned out that the greatest profit was given by dairy cows from the Vis Bek Aydial line.

The quality of milk had a significant impact on increasing the profitability of milk production in the herd of Bek + LLP.

It is known that the main source of increasing milk production is an increase in the productivity of cows, based on the directed rearing of the dairy type of animals with a strong constitution, the elimination of losses in the livestock population, their rational exploitation using modern technology of high-grade feeding and ensuring appropriate conditions, maintenance, as well as targeted breeding breeding work to increase their milk production, maintain the reproductive functions of the broodstock in a healthy state.

Taking into account the importance of the listed conditions, we set a specific task of determining the economic efficiency of using Holstein cows of different linearity and different age of heifers during the first insemination, taking into account the level of milk productivity.

Table 2 - Economic indicators of milk production from cows, depending on the age of the first insemination and on the linear affiliation in LLP "Bek +"

Index	Group								
	Reflection Sovering			Vis Beck Aydial			Osborndale Ivanhoe		
Timing of insemination, month	13-15	16-17	18-20	13-15	16-17	18-20	13-15	16-17	18-20
Milk yield for 3 lactations, kg	21222	21001	17022	22891	23821	22860	18028	19009	18056
Fat, %	3,4	3,61	3,51	3,48	3,66	3,44	3,21	3,28	3,41
Milk yield for 3 lactations in terms of basic fat content, kg	21222	22298	17573	23430	25643	23129	17021	18338	18109
Cost of 1 kg of milk with basic fat content (3.4%), tenge.	155	155	155	155	155	155	155	155	155
Gross production cost, tenge	3289410	3456209	2723770	3631590	3974604	3584986	2638186	2842405	2806911
The prime cost of 1 kg of milk with natural fat content, tenge.	127	130	127	131,2	134	131,2	127,2	127,2	128
Cost of gross production, tenge.	2780082	2898756	2231734	3073965	3436109	3034517	2165014	2332606	2317966
Profit, tenge.	509328	557453	492036	557625	538495	550469	473171	509799	488945,9
Profitability level, %	81,7	80,8	78,0	81,9	84,3	81,9	78,1	78,1	78,9

The analysis of the results obtained in Table 2 indicates that the maximum profit for the first three lactations was shown by cows with an age of the first insemination of 16-17 months from the Vis Bek Aydial line, the level of profitability showed -84.3%. The profit from the sale of milk obtained from the cows of the Osborndale Ivanhoe and Reflection Sovering lines was less by 28696 tenge (5.3%) and 18 958 tenge (3.4%). It was also found that when rearing young animals with later dates of insemination on the complex, additional livestock places are required, which leads to certain material and labor costs.

According to the data of studies in LLP "Bek +", the best payback of the produced products was revealed in teloxes at the age of the first insemination at 16-17 months.

An increase in the amount of milk produced by cows belonging to the Vis Beck Aydial line, their sale allowed to receive a profit of 81,375 tenge (5.73%) more than from the sale of milk received from cows of the Reflection Sovering line, and from cows from the Osborndale Ivanhoe lines, respectively, by 178,405 tenge or 8.0%.

Thus, when planning selection and breeding work, it is necessary to take into account the linearity of cows, since this directly affects their milk productivity and the financial well-being of the farm.

The duration of productive longevity of cows, as well as the previous analyzed factors, had a great influence on milk production. The greatest profit in terms of lifetime productivity was obtained from cows by inseminating heifers at the age of 16-17 months. It amounted to 3,974,604 tenge per head, which is 518,395 and 1,132,199 tenge more than from cows of the first and third groups, or, respectively, by 13% and 28.5%.

When analyzing the influence of the linearity of cows on their lifelong productivity, and as a result, an increase in the level of profitability of milk production with an increase in the period of economic use of animals, it turned out that the greatest profit is given by cows belonging to the Vis Bek Aydial line.

CONCLUSIONS: Consequently, in order to increase milk production on the farm, it is advisable to focus on the Vis Bek Aydial line, since it is higher in milk and has better economic indicators.

The milk productivity of cows in the context of the linear affiliation showed that the highest milk yield of the studied animals was observed in the Vis Bek Aydial cows - 23891 kg of milk, with a fat and protein content of 3.66 and 3.26%, respectively, which is 2820 higher than analogues of the Reflection Sovering line. kg, with a fat content of 3.61%; peers of the Osborndale Ivanhoe line for 4812 kg of milk, with a fat content of 3.28%.

As the analysis of the herd of the Bek + LLP showed, the most numerous lines are Reflection Sovering - 62%, Vis Beck Aydial - 35.1%, Osborndale Ivanhoe - 2.9% of the total broodstock. However, the offspring of the Vis Bek Aydial line turned out to be more highly productive and more responsive to improved feeding conditions.

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