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ТҮЙІН

Мақалада қара шұбар тұқымды (I топ) таза тұқымды қашарлардың ұшасының, оның бірінші буындағы (1/2 голштин х 1/2 қара ала-II топ) және екінші буындағы (3/4 голштин х 1/4 қара ала-III топ) таза тұқымды қашарлардың ұшаларының морфологиялық көрсеткіштерін анықтау нәтижелері келтіріледі. Тұқым қуалаудың сыналған нұсқасының ет өнімділігінің деңгейіне оң әсері анықталды. Бұл ретте I топтағы таза тұқымды қашарлар союдың алдындағы тірі салмағы бойынша тиісінше 17,9 кг және 28,0 кг – ға, жұптасқан ұшаның салмағы бойынша – 11,6 кг және 18,1, оның шығымы – 0,4% және 0,6% – ға, сойыс салмағы бойынша-14,2 кг және 21,6 кг-ға, сойыс шығымы бойынша-1,0% - ға кеміген және 1,4%.

Ұшаның морфометриялық көрсеткіштері бойынша топтар арасындағы айырмашылықтарды талдау кезінде жас жануарлардың жетекші орны анықталды. Сонымен, II және III топтағы крест тәрізді қашарлар қара түсті тұқымды 2 топтағы таза тұқымды құрдастарынан денесінің ұзындығы бойынша 2,93% және 4,12%, жамбас ұзындығы 1,48% және 2,83%, қаңқаның ұзындығы 2,31% және 3,57%, жамбас шеңбері 3,19% және 5,64% жоғары болды. Осыған ұқсас үлгі ұшаның толық түсініктілігі (K1) және санның орындылығы (K2) коэффициенттерінің шамасы бойынша да байқалды. Осылайша, I топтағы таза тұқымды сиырлар II және III топтағы құрдастарынан бірінші көрсеткіш деңгейі бойынша сәйкесінше 3,43% және 5,32%, екіншісі – 1,95% және 3,16% төмен болды. Бұл ретте барлық көрсеткіштер бойынша III топтағы голштиндер бойынша екінші буындағы аралас қашарлардың артықшылығы болды.

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THE EFFECT OF LIVE WEIGHT OF COWS ON THEIR MILK PRODUCTIVITY

ANNOTATION

Dairy productivity of cows depends on many factors: breed, live weight, feeding, age, well-being of cattle, environmental factors, etc. The paper presents data on dairy productivity of cows of breeding farms of Aktobe region «Esbol» and «Anisan». The average dairy productivity of cows for 305 days was 3898 kg in the Esbol farm, 3575 kg in the Anisan farm. Indicators of the mass fraction of fat and protein in milk were higher in Simmental cows compared to black-and-white cows. The influence of live weight of cows on the value of their milk productivity has been established. The highest milk yields and the amount of milk fat were characterized by animals that had a live weight above 500 kg. Cows with a low live weight of up to 450 kg had the lowest milk yield among the studied groups of animals.

Key words: *Simmental breed, black-white breed, productivity indicators, milk yield indicators, live weight, milk fat content*

Introduction. The Republic of Kazakhstan is a promising region in Central Asia with high potential in the field of dairy farming. Dairy cattle breeding is a field of animal husbandry that has unrealized resources. It is impossible to realize these resources without systematic intensification and increasing the efficiency of dairy cattle breeding [1,2].

An increase in milk production can be achieved by using animals with high productivity, or by increasing the number of cattle. The best solution to this problem is to use animals with high genetic productivity potential.

The profitability of milk production can be ensured by realizing the genetic potential of dairy cattle. To this end, most farms are switching to an intensive method of dairy cattle breeding. One of the main tasks of our days facing zoo technical science is the qualitative transformation of animal husbandry of the republic, the creation of highly productive herds of cattle.

One of the problems of modern dairy cattle breeding is the lack of a competent approach to the control and planning of the technological process of keeping and using animals. Non-compliance with these requirements is one of the main reasons that do not allow achieving high economic indicators in animal husbandry [3].

Increasing the productivity of cows does not lead to an adequate increase in the economic efficiency of dairy cattle breeding; therefore, scientists are conducting additional studies on the impact of the increase in milk yield on the profit and profitability of its production. Farms are sufficiently differentiated by the technologies used for keeping, feeding and milking, and without taking into account these differences, it is difficult to identify patterns of the impact of cow productivity on the economic efficiency of dairy farming. The desire to increase the productivity of cows in any way is not always economically justified. The marginal, economically justified productivity of cows for each dairy specialization farm is individual, when determining which it is necessary to take into account a complex of technological, genetic, organizational, personnel and other factors [4,5,6].

Economic indicators, such as profit, the level of production efficiency, allow us to assess the effectiveness of the agricultural sector in a market economy. The ultimate goal of introducing new information technologies is to improve these indicators [7,8].

The development of intensive and efficient agricultural production in the developed countries of the world today is ensured both through the introduction of new technological production processes and by improving the information technology fund for managing these processes. As a rule, modern information technologies are the main factor of agricultural production efficiency. The main elements of new information technologies are the introduction of computerization in breeding farms [9, 10].

Currently, methods, hardware and software products are being improved in order to collect, process and analyze data necessary for the management of technological operations, processes and production in general, as well as their automated and standardized reception and transmission. The growth rate of production does not mean that the industry has moved to the stage of intensive development. One of the reasons for this is the high proportion of households in the structure of milk production. The gross volume of milk production is formed mainly at the expense of households with insufficient reserves for the intensification of dairy cattle breeding and a low level of marketability of raw milk. The marketability of milk from agricultural organizations is low and many processing enterprises prefer to have business ties with large milk suppliers. In this regard, optimization of the general production process on dairy farms is more important today than ever [11,12,13].

In order to achieve high efficiency of dairy farming in the republic, qualitatively new production technologies should be provided, which contribute to obtaining competitive products. Carrying out high-quality feeding depending on the physiological state and the level of productivity of livestock, high productivity and quality of products, reduction of production costs - should become the basis for the intensification of the industry based on industrial technologies, regardless of the size of the farm. When carrying out breeding work with cattle, it is very important to take into account the live weight, which gives the breeding farm information about the physical condition, development, as well as the health of the animal. Live weight as an indicator always positively correlates with such an important breed property as milk productivity, which, in turn, determines the level of milk productivity of both individual cattle and the herd as a whole [14,15,16].

In the above issues, it has a direct impact on improving the productivity of farm animals, including dairy cattle.

Total milk productivity is the amount of milk received from a cow for a certain period of time (day, month, milking season). Dairy productivity of cattle depends on many factors: breed, live weight, feed, age, well-being of cattle, environmental factors and even the shape of the line [17,18].

Scientific and practical experience shows that the yield of dairy products prepared from milk and their quality are determined by the properties of milk and depend on the breed, feeding conditions and keeping of animals.

Milk and dairy products are socially significant because they remain sufficiently accessible to the majority of the population, including those with low incomes, and are necessary for people of any age and health condition. Their nutritional and biological value is explained by the chemical composition containing all the substances necessary for a person in such a ratio that allows almost completely ensuring his vital activity and efficiency.

During the years of agricultural reform, there have been significant changes in the structure of the agro-industrial complex and in animal husbandry in particular. The number of cattle has decreased, the flow of imported food is not decreasing, and dependence on it is increasing. In this regard, the main factor in the production of livestock products, namely milk, is the development of dairy cattle breeding.

The dairy productivity of livestock is directly affected by its live weight. Milk yield of cows increases with an increase in their live weight, which is due to the fact that cows eat more feed and process it into milk due to the large volume of internal organs. That is why dairy cows are considered the most productive and useful. However, milk productivity increases to a certain live weight, after which the opposite effect is observed. Dairy breeds of cows with every 100 kilograms of live weight give 800-950 kilograms of milk per year [19,20].

In addition, it is important to remember that each breed has its own standard of live weight, that is, farm animals can maximize the genetic potential of milk production while maintaining their health and factory conditions when they reach a certain standard weight. If the breed standard is exceeded by live weight, an inverse correlation may occur, instead of increasing productivity, it decreases, cattle have a predisposition to obesity. In this regard, it is very important to control the live weight of dairy cows, thereby monitoring their well-being, endurance and high milk yield. To obtain animals with a high level of dairy productivity, it is necessary to have such a live mass of cows so that they can more fully realize their genetic potential [21,22,23].

In recent years, the requirements for the quality of milk coming for processing have also increased, since this allows us to obtain dairy products that meet high standards, which allows it to successfully compete in the markets of the country and abroad. The range of products depends largely on the quality of raw milk, which is largely determined by its technological properties.

The issues of studying the current state of the breed and its breeding value, searching for genetic reserves for qualitative improvement and increasing the competitiveness of breeds in conditions of intensive technologies are very relevant.

Based on the above, the relevance of these studies is beyond doubt. Since our research is aimed at studying the milk productivity of cows depending on various factors, including live weight, as well as their chemical composition and the content of somatic cells in milk. It is assumed that the results of the research will be of great benefit in the development of dairy cattle breeding in the region.

Objects and methods of research. Research work was carried out in the breeding farms «Esbol» and «Anisan» of the Aktobe region. Based on the data obtained from monthly control milking and zootechnical documentation of the farm, the indicators of dairy productivity of dairy cows were studied. 88 heads of the Simmental breed «Esbol» farm and 56 heads of the black-and-white breed «Anisan» farm were used as the object of the study (Fig.1.)

The main indicators studied were indicators of milk productivity for the period under review (live weight, kg; milk productivity, kg; indicators of fat and protein in milk, lactose, %, number of somatic cells, thousand/ml). When analyzing and calculating all the data obtained, the following selection and genetic parameters were used: arithmetic mean (M), arithmetic mean error ($\pm m$), σ , C_v , %. the live weight was determined by weighing the animals.



Figure1 – Research objects (left - «Esbol» farm, right - «Anisan» farm)

The chemical composition of milk was determined on mobile equipment Expert milk analyzer (Fig.2 – left), the number of somatic cells in milk was determined on the equipment somatic cell analyzer Ecomilk Scan (Fig.2 – right).



Fig.2 – Expert milk analyzer (Fig.2 – left) and somatic cell analyzer Ecomilk Scan (Fig.2 – right)

Research results. Farms «Esbol» and «Anisan» are located in Aktobe region. In the farm «Esbol» cattle of the Simmental breed are bred, in the farm «Anisan» - of the black-and-white breed. The monitoring of the basic farms «Esbol» and «Anisan» was carried out. Cow productivity indicators are presented in Table 1.

Table 1 – Productivity of cows of breeding farms «Esbol» and «Anisan»

Indicators	«Esbol» farm, n=88			«Anisan» farm, n=56		
	M±m	σ	Cv, %	M±m	σ	Cv, %
Milk yield, kg	3897,5±156,5	146,6	12,8	3574,5±110,2	117,3	11,2
Fat, %	3,96±0,01	0,03	0,88	3,49±0,02	0,04	0,76
Protein, %	3,00±0,03	0,05	1,62	2,92±0,01	0,04	1,34
Lactose, %	3,92±0,01	0,03	1,63	3,93±0,03	0,03	1,59
Somatic cells, thousand/ml	265,0±34,5	25,7	36,4	376,0±37,8	28,7	27,5

According to the data presented in Table 1, the average dairy productivity of cows for 305 days was 3898 kg in the «Esbol» farm, 3575 kg in the «Anisan» farm. Indicators of the mass fraction of fat and protein in milk were higher in Simmental cows compared to black-and-white cows. Thus, in terms of fat and protein content, Simmental cows outperformed black-and-white cows by 0,47 and 0,08%, respectively. There are no differences in lactose content between cows. The number of somatic cells in the studied milk of cows was 265,0 thousand/ml in the «Esbol» farm and 376,0 thousand/ml in the «Anisan» farm. From the data on the number of somatic cells, it follows that in the «Anisan» farm, the incidence of mastitis occurs in some cows. These cows were taken under the control of a veterinarian and were treated by our specialists.

Indicators of the chemical composition of milk in farms are clearly presented in diagram 1.

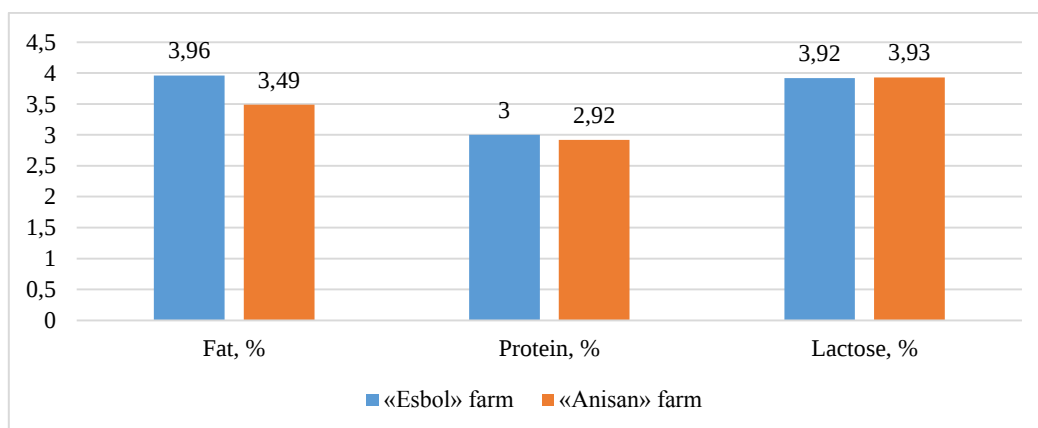


Fig.3 – Indicators of the chemical composition of milk

The effect of live weight of cows on the value of their milk productivity is shown in Table 2. Cows were divided into 3 groups: up to 450 kg, 450-500 kg and above 500 kg.

Table 2 – The effect of live weight of cows on their milk productivity

Показатели	Live weight, kg		
	<450 kg	450-500 kg	> 500 kg
«Esbol» farm, n=88			
Number of cows, heads	37	40	11
Milk yield, kg	3351±114,1	4160±182,2	4182±135,8
Fat, %	3,79±0,08	4,02±0,04	3,91±0,02
Protein, %	3,02±0,13	3,21±0,01	2,98±0,10
«Anisan» farm, n=56			
Number of cows, heads	26	22	8
Milk yield, kg	3244±149,3	3691±177,8	3790±164,1
Fat, %	3,41±0,11	3,57±0,09	3,51±0,10
Protein, %	2,98±0,03	2,88±0,07	2,91±0,03

From the analysis of the data in Table 2, it follows that with an increase in the live weight of cows, their milk productivity increases. Thus, cows in the «Esbol» farm with a live weight of up to 450 kg produced 809 and 831 kg less than cows with a live weight of 450-500 kg and above 500 kg. The highest milk productivity was observed in cows with a live weight above 500 kg – 4182 kg. An increase in the fat content of milk was noticed. The fat content of milk from cows with a live weight of up to 450 kg was less than the other groups by 0,23 and 0,12%, respectively. The highest fat content in milk was in cows with a live weight of 450-500 kg – 4,02%. The lowest protein content in milk was observed in cows with a live weight above 500 kg – 2,98%. This indicator is less than the indicator of the other groups by 0,04 and 0,23%, respectively, which is explained by the inverse correlation of fat and protein indicators in milk.

«Anisan» farm also had the lowest milk yield for 305 days for cows with a live weight of up to 450 kg – 3244 kg, which is less than the productivity of cows with a live weight of 450-500 kg and above 500 kg by 447 and 546 kg, respectively. The highest fat content in milk was in cows with a live weight of 450-500 kg – 3,57%, which is higher than other cows by 0,16 and 0,06%. The lowest protein content in milk was also observed in cows with a live weight above 500 kg – 2,91%. This indicator is less than the indicators of other groups by 0,03 and 0,07%, respectively.

Thus, the influence of the live weight of cows on the value of their milk productivity has been established. The highest milk yields and the amount of milk fat were characterized by animals that had a live weight above 500 kg. Cows with a low live weight – up to 450 kg had the lowest milk yield among the studied groups of animals.

Conclusion. To increase the level of profitability of the farm, it is recommended to choose the most productive dairy cows, taking into account the relationship between the characteristics. In the future, it is necessary to pay attention to the effectiveness of breeding animals, taking into account their live weight.

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ТҮЙІН

Сиырлардың сүт өнімділігі көптеген факторларға байланысты: тұқымы, тірілей салмағы, азықтандыру, жасы, малдың көңіл-күйі, сыртқы орта факторлары және т.б. Зерттеу жұмыстарында Ақтөбе облысының «Есбол» және «Анисан» асыл тұқымды шаруашылықтарындағы сиырлардың сүт өнімділігі бойынша деректер ұсынылған. 305 күн сауын маусымындағы сиырлардың орташа сүт өнімділігі «Есбол» ШҚ-да 3898 кг, «Анисан» ШҚ-да 3575 кг құрады. Шаруашылықтағы сиырлардың тірілей салмағының олардың сүт өнімділігіне әсері анықталды. Тірілей салмағы 500 кг-нан асатын сиырлар ең жоғары сүт шығымдылығымен және сүт майының мөлшері жоғары болуымен сипатталды. Тірілей салмағы 450 кг-ға дейінгі сиырларда сүт өнімділігі де, оның майлылығы да төмен болды.

РЕЗЮМЕ

Молочная продуктивность коров зависит от многих факторов: породы, живой массы, кормления, возраста, самочувствия скота, факторов внешней среды и др. В работе представлены данные по молочной продуктивности коров племенных хозяйств Актюбинской области «Есбол» и «Анисан». Средняя молочная продуктивность коров за 305 дней составила в КХ «Есбол» 3898 кг, в КХ «Анисан» – 3575 кг. Показатели массовой доли жира и белка в молоке оказались выше у симментальских коров по сравнению с черно-пестрыми коровами. Установлено влияние живой массы коров на величину их молочной продуктивности. Наивысшими удоями и количеством молочного жира характеризовались животные, которые имели живую массу выше 500 кг. У коров с низкой живой массой – до 450 кг были самые минимальные показатели по удою среди исследуемых групп животных.

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