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Dependence of milk productivity of cows from the height in kholka

Shcherbatiuk N.V.[1], **Shuplyk V.V.**[2]

[1] candidate of agricultural sciences,
Associate Professor of the Department of Technology of Production
and Processing of Animal Husbandry Products;
Institution of higher education «Podilskyi State University»; Ukraine

[2] candidate of agricultural sciences,
head of the department of technology of production and processing
of animal husbandry products;
Institution of higher education «Podilskyi State University»; Ukraine

Abstract. The results of research on the selection evaluation of the breeding qualities of Ukrainian black-spotted dairy cows are presented, the analysis of the relationship between the milk productivity of first-born cows and the height at the withers, based on an economic evaluation, is presented. In recent decades, the global gene pool of the best breeds of cattle has been intensively used in Ukraine to improve the productive qualities of animals. In particular, when improving dairy cattle, the gene pool of the Holstein breed is most intensively used, with the level of milk productivity no other breed in the world can compete with. In the process of creating the Ukrainian black and spotted dairy breed, the use of Holsteins made it possible to improve the breeding and productive qualities of animals, and also contributed to the growth of genetic heterogeneity of cattle herds according to the heritability of the improving breed. The creation of new genotypes led to constant control over the external characteristics of animals and the nature of their connection with productive traits. For the successful use of animals in the conditions of intensive technologies, dairy cows should be distinguished by a strong body structure, a developed trunk, strong legs and correct arrangement of limbs, excellent morphological qualities of the udder. Animals that combine these traits, as a rule, are distinguished by higher milk yield and have better adaptability to breeding conditions. The object of research were: cow, Ukrainian black and spotted dairy breed. The subject of the study was: live weight, body measurements, milk yield, reproductive capacity. Research was carried out in the conditions of FG "MOLNYTSKE" of Chernivtsi region, Hertsaiv district, in the village of Molnytsia. The main activity of the farm is: "Breeding of dairy cattle". A group of first-born cows of the black and spotted breed was formed for the purpose of research. The exterior type of dairy cows is the most important component of their constitution, its external manifestation, it is related to the productive qualities of animals. We have established that there is a certain relationship between the measurements of the body sexes of cows and their milk productivity. As a result of the research, it was found that cows with a height at the withers of 134.1- had the highest milk productivity 137,0 см. A further increase in this indicator led to a decrease in milk yields and the amount of milk fat. The efficiency of dairy farming largely depends on the intensity of reproduction of the herd, which significantly affects both milk production and the rate of genetic progress of breeding traits and determines the profitability of the industry by 15-20%. It is common knowledge that the higher the genetic potential of cattle and the higher their productivity, the more problems with

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reproductive functions in cows.
Keywords: *Ukrainian black-spotted dairy breed, first-born cows, milk productivity, economic efficiency.*

Introduction. Today, the Holstein breed is the undisputed leader among all dairy breeds in terms of productivity, adaptability to machine milking, harmonious body structure, and the range of its distribution in the world (Khmelnychyi, 2018; Shuplyk, 2013).

The author (Burkat, 2005) notes that the use of the gene pool of the Holstein breed at the local Ukrainian black-spotted dairy contributed to a significant improvement in indicators of milk productivity, exterior and constitution, adaptation to the conditions of modern dairy complexes. However, complete Holsteinization of local breeds is often accompanied by a deterioration of their reproductive capacity, a decrease in lifetime performance indicators and duration of economic use.

Research materials and methods. The study of the exterior type of animals attracts more and more attention of scientists from all over the world, which is due to the positive practice of improving the productive qualities of dairy cattle through intensive selection according to the type of body structure and also contributes to the more intensive use of these cattle over a long period (Hladii she in., 2018; Didkivskyi, 2009; Shcherbatiuk, 2017).

The purpose of our research was to carry out a selective evaluation of the breeding qualities of cows of the Ukrainian black and spotted dairy breed, to make an analysis of the relationship between the milk productivity of first-born cows and the height at the withers, based on an economic evaluation.

In recent decades, the global gene pool of the best breeds of cattle has been intensively used in Ukraine to improve the productive qualities of animals. In particular, when improving dairy cattle, the gene pool of the Holstein breed is most intensively used, with the level of milk productivity no other breed in the world can compete with. In the process of creating the Ukrainian black and spotted dairy breed, the use of Holsteins made it possible to improve the breeding and productive qualities of animals, and also contributed to the growth of genetic heterogeneity of livestock herds according

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to the heritability of the improving breed (Bondarenko, 2003).

The creation of new genotypes led to constant control over the external characteristics of animals and the nature of their connection with productive traits. For the successful use of animals in the conditions of intensive technologies, dairy cows should be distinguished by a strong body structure, a developed trunk, strong legs and correct arrangement of limbs, excellent morphological qualities of the udder. Animals that combine these characteristics, as a rule, are distinguished by higher milk yield and have better adaptability to breeding conditions (Bohdanov, 2009; Bondarenko, 2003).

In solving the problem of the competitiveness of the dairy industry, breeding and breeding work, which is responsible for the further improvement and realization of the genetic potential of animals, plays a significant role. One of the directions of breeding work can be to increase the productivity of animals due to the better development of those parts of the body that directly or indirectly affect milk productivity, and to eliminate a certain defect in the appearance that affects various economically useful characteristics of animals (Kovalenko, 2008; Fedorovych, 2015; Iashchuk, 2002).

In view of the above, the purpose of our research was to study the dependence of the milk productivity of cows of the Ukrainian black and spotted dairy breed on their measurements of the sexes of the body during the first lactation.

The object of research were: cow, Ukrainian black and spotted dairy breed.

The subject of the study was: live weight, body measurements, milk yield, reproductive capacity.

The method of taking measurements is the most objective method of evaluating the exterior. It is known that cows in the herd are selected based on the appearance of the firstborns and breeding bulls are evaluated based on the type of body structure of the daughters.

Research was carried out in the conditions of FG "MOLNYTSKE" of Chernivtsi region, Hertsaiv district, in the village of Molnytsia. The main activity of the farm is: "Breeding of dairy cattle"

A group of first-born cows of the black and spotted breed was formed for the purpose of research.

The main important factor that determines the realization of the programmed level of milk productivity is the quality

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of feeding.

In FG "MOLNYTSKE" cows are fed according to the rations, which are based on the feeding norms from the fodder available on the farm. Rations are rationed only according to basic indicators.

Dairy cattle breeding is a priority branch of animal husbandry in many countries of the world, as it provides one of the main food products for the vast majority of the world's population. Increasing the volume of milk production over the years does not lose its relevance, but on the contrary, it is gaining more and more importance, because the population in the world is growing, and the need for milk is correspondingly greater. In addition, urbanization and the growth of average per capita income, even in non-traditional regions for milk consumption, encourage volume growth (Prut, 2022; Prut, 2023).

The special properties of milk and its processing products make it necessary to provide the population with these products, guarantee the supply of milk raw materials to processing enterprises, and meet the country's export needs for dairy products. The main components of milk (fats, proteins, carbohydrates, vitamins, minerals, etc.) are almost completely absorbed by the human body and have medicinal properties. The daily need for protein of animal origin for an adult with average labor intensity is almost half satisfied by consuming one liter of milk (Prut, 2022; Prut, 2023).

Milk productivity is determined by many factors, both hereditary and non-hereditary. These include breed, origin and individual characteristics of animals, age and physiological state, feeding and maintenance, season of the year (Pryima, 2021; Prut, 2022; Stavetska, 2022).

The main economically useful feature of dairy cattle is milk productivity. According to the results of the conducted research, it was established that the level of milk productivity of cows depends on the breed and the direction of productivity.

Table 1

Milk productivity of first-born cows

Indicator	n	M±m
Hope, kg	120	5016 ±108.76
Fat content, %	120	3.83 ±0.02
Milk fat, kg	120	192.1 ±4.29

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From the analysis of Table 1, it can be seen that the performance indicators of first-born cows on the farm are high, they amount to 5016 kg of milk with an average fat content of 3.83%.

The growth of the dairy cattle population and the search for new, more productive individuals leads to the appearance of cows that are uncharacteristic for our latitudes. However, despite their many differences, the lactation period of cows is approximately equal to 305 days per year (Hladii, 2018; Informatsiino-analitychnyi portal, 2023; Polupan, 2022).

The quality and quantity of milk depend not only on the breed, but many factors affect the production process. In order to understand the essence of the nature of milk production, it is necessary to understand the processes of lactation in cattle (Hladii, 2018; Polupan, 2022).

The lactation period of each cow depends on its weight, age and breed, but on average it is 10 months. Literally a century ago, the cessation of lactation was a significant problem, but at the moment, technologies, feed and specialized drugs have not only been able to reduce the period of absence of milk to 1 month, but also to predict the present time so that the farmer has time to thoroughly prepare for it (Klopenko, 2015; Kostiuk, 2010; Mamchak, 2003).

Table 2

Lactation characteristics of first-born cows

Duration of lactation, days	Higher daily hope, kg	Coefficient of lactation constancy, %
311±1.35	25.1	64.3

Analyzing Table 2, it can be seen that the first-born cows of the farm had a long period of lactation, it was 311 days with a higher daily yield of 25.1 kg, and a coefficient of lactation constancy of 64.3.

Live weight of dairy cows is an important selection feature. Animals of different breeds, depending on the economic and economic conditions, have their own optimal live weight. Deviation from it both in the direction of decrease and increase indicates violations that are associated with adaptation to specific conditions of existence (Mazur, 2018; Pidpala, 2007) .

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Table 3

Dynamics of live weight and height at the withers of the first-born cows of the herd during their cultivation

Age of animals, months	n	Live weight M±m, kg	Height at the withers, M±m , cm
3	15	78.4 ± 0.77	85.7 ± 0.49
6	15	144.9 ± 1.17	96.8 ± 0.42
10	15	219.1 ± 1.62	105.5 ± 0.60
12	15	286.3±1.68	112.9 ± 1.06
15	15	362.5±1.89	117.3 ± 0.80
18	15	446.3±2.46	120, 1 ± 0.60

The set of measurements allows judging the structure of the animal's body, and the corresponding calculation of the results of the measurements of individual articles characterizes their exterior features (Pelekhatyi, 2016; Polupan, 2022).

Table 4

Live weight by periods of lactation in cows of the herd

Age of animals, months	n	live mass, M±m , kg
I lactation	120	499.3±16.65
II lactation	148	577.0±15.09
III lactation	112	636.8±21.05

From the results of Table 4, it can be seen that the cows of the herd had high indicators of live weight. Thus, the first-born cows had a live weight of 499.3 kg, animals of the second lactation 577 kg, and the third, respectively, 636.8 kg.

In recent decades, the emphasis of selection work in dairy cattle breeding has been shifted from increasing milk productivity towards the balance of selection traits, in particular, more and more attention is paid to the exterior of animals (Pelekhatyi , 2016; Fedorovych, 2015; Iashchuk, 2002). The exterior type of dairy cows is the most important component of their constitution, its external manifestation, it is related to the productive qualities of animals.

We established that there is a certain relationship between the measurements of the body sexes of cows and their milk productivity (Table 5).

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Table 5

Dependence of milk productivity of first-born cows from the height at the withers

Height at the withers, cm	Lactation	n-120	Milk productivity, M±m		
			hope, kg	fat, %	milk fat, kg
Up to 125.0	I	21	4865.8±95.87	3.80±0.02	184.9±3.79
125.1-128.0	I	11	4864.1±111.63	3.83±0.02	186.3±4.29
128.1-131.0	I	8	4986.1±79.69	3.80±0.03	189.5±3.40
131.1-134.0	I	31	5038.2±108.60	3.84±0.03	193.5±4.33
134.1-137.0	I	35	5247.3±107.74	3.85±0.02	202.0±4.23
137.1 and more	I	14	5097.0±111.58	3.84±0.02	195.7±4.41

Thus, the difference in milk yield and the amount of milk fat in milk between animals with a height at the withers up to 125,0 смand 134.1- 137,0 смfor the first lactation was 381.5 and 17.1. The difference in milk yield and the amount of milk fat in milk between cows with a height at the withers of 125.1-128.0 and 134.1- 137,0 смduring the first lactation was 383.2 and 15.7, Animals with a height at the withers of 134.1-137, 0 cm prevailed in individuals with a height at the withers of 128.1-131.0 cm in milk yield of the first lactation by 261.2, and in the amount of milk fat - by 12.5. The difference in milk yield and the amount of milk fat between cows with a height at the withers of 131.1-134.0 and 134.1-137,0 смfor the first lactation was 209.1 and 8.5, and between cows with a height at the withers of 137.1 and more and 134.1 137,0 см- 150.3 and 6.3; between cows with a height at the withers of 137.1 and more and 131.1-134.0 cm - 58.8 and 2.2; between cows with a height at the withers of 137.1 and more and 128.1-131.0 cm - 110.9 and 6.2 and between cows with a height at the withers of 137.1 and more and 125.1-128.0 cm - 232, 9 kg, 9.4 kg, respectively.

Therefore, cows with a height at the withers of 134.1- were noted for the highest milk productivity 137,0 см. A further increase in this indicator led to a decrease in milk yields and the amount of milk fat.

The efficiency of dairy farming largely depends on the

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intensity of reproduction of the herd, which significantly affects both milk production and the rate of genetic progress of breeding traits and determines the profitability of the industry by 15-20%. It is well known that the higher the genetic potential of cattle and the higher their productivity, the more problems with reproductive functions in cows (Stavetska , 2011).

Reproduction of dairy cattle is a breeding process that combines biological, breeding, technological, and organizational and economic factors. Obtaining the maximum possible profit by the farm and rational management of dairy farming to a certain extent depends on knowledge of the laws of connection of indicators of milk productivity with indicators of reproductive capacity and determination of the optimal duration of the service period (Stavetska , 2012).

The reproductive capacity of cows plays a key role in herd repair and is an important element of selection and breeding work. Therefore, we investigated the influence of the breed of cows on indicators of their reproductive capacity (Prut, 2023).

In order to assess the reproductive capacity of cows, as an important element of obtaining profit by ensuring maximum milk yield of cows, we determined the indicators of the length of the body, service, intercalving and dry periods and the coefficient of reproductive capacity (Table 6).

Table 6

Indicators of reproductive capacity of first-born cows

Indicator	n=120
	M±m
Duration of the inter-hotel period, days	375±2.34
Service period	87±1.25
Duration of pregnancy, days	288±1.08
Coefficient of reproducibility, %	0.973±0.02

The main indicators of the economic efficiency of cattle breeding are the level of labor productivity, the cost of milk and meat production, and their profitability. The level of labor productivity depends on the amount of time spent per head and its productivity. On average, 6 man-hours are spent on the production of 1 t of milk, and about 36 man-hours are spent on 1 t of live weight gain. The cost of a hundredweight of milk and the growth of cattle is constantly increasing,

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which is due to the increase in the cost of feed, the cost of maintaining fixed assets and the increase in the price of energy carriers. The most important indicator of the efficiency of livestock production (milk and meat) is profitability. It is directly or indirectly influenced by a number of factors. The main ones are the quality and cost of products, sales channels, sales price (Bashchenko, 2017; Bohdanov, 2009).

The main factors that ensure the increase in the profitability of the production of livestock products at the enterprise of any form of ownership are the increase in the productivity of farm animals, the reduction of material and monetary costs per head. Of all the factors of the external environment that affect the level of productivity of animals, their feeding is the most important, the level of influence of which is 50-60%. Sufficient and complete feeding of animals is the basis of stability and productivity growth. The solution of this task is possible on the basis of the achievements of scientific and technical progress, the introduction of progressive technologies of fodder production and rational forms of labor organization. The feeding system, its completeness, requires not only a sufficient amount of feed and a balanced diet in terms of nutrients, but also an economic rationale for the types of feeding (Pidpala, 2007).

Determining the economic efficiency of milk production from first-born cows makes it possible to substantiate the expediency of animal selection taking into account genealogy.

Economical efficiency animal husbandry means obtaining maximum quantity products from one heads livestock at the smallest expenses labor and funds on production units products. The analysis of our data shows that the largest amount of milk of basic fat content was obtained from first-born cows with a height at the withers of 134.1-137.0 cm 5941 kg, the advantage over analogues with a height at the withers of up to 125.0 cm and 137.1 cm and more was, respectively 503 and 184 kg.

Realization of the produced milk under such conditions allows to increase the monetary income by 6036 and 2208 thousand UAH, and to reduce the total cost of 1 ct of milk by 17 and 9 UAH. Accordingly, the net profit will be greater for cows with a height at the withers of 134.1-137.0 cm by 2005.91 and 913.73 UAH. from cows with a height at the withers up to 125.0 and 137.1 and more cm.

The profitability of milk production in cows with a height

at the withers of 134.1-137.0 cm is greater by 2.07% and 1.11% than in cows with a height at the withers of up to 125.0 and 137.1 and more cm.

Conclusions. Therefore, the most economically profitable is the use of first-born cows with a height at the withers of 134.1-137.0 cm in the "Molnitske" farm.

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