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Research Article

THE INFLUENCE OF MATERNAL AGE AND LIVE WEIGHT OF HEIFERS AT BIRTH ON THE REPRODUCTIVE ABILITY AND MILK PRODUCTION OF COWS OF THE YAROSLAVL BREED Y.A. Yuldashbaev³, O.K. Gogaev^{1,2}, T.A. Kadieva¹,

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Abstract:

One of the leading places in the sectors of agriculture belongs to the dairy cattle. The importance of this industry is determined not only by the high share of gross production, but also by the great influence on the economy of agriculture and the level of food supply to the population.

Within the framework of the State Program of development of agriculture and regulation of markets of agricultural products, raw materials and food for 2013-2020, it is of paramount importance to increase the proportion of milk and dairy products to 85.3%. Specific indicators of the effective development of dairy cattle are:

- the term of productive use of cows;

- the reproductive qualities;

- the terms of cultivation of repair young growth and their quality increasing efficiency of cattle breeding.

The work contains the research on the influence of individual factors on milk productivity and reproductive quality of cows. The age of their mothers and the live weight of heifers at birth are taken into account.

It was found that the best indicators of reproductive ability had cows received from mothers of the II-nd calving, whose level of milk yield was 4218 kg.

In addition, the analysis of the data showed that the heifers have a positive relation between the live weight at birth and subsequent milk production. So with the increase in fetal weight at birth, there is an increase in the level of milk yield from 3448 to 4341 kg of milk.

Key words: cow, milk productivity, lactation, reproductive qualities, breeding, economic use, age of mothers, live weight at birth.

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INTRODUCTION:

The selection and breeding work in dairy cattle husbandry should be aimed at improving such basic economic and useful features as milk productivity and reproductive ability.

The correct definition of the terms of the first insemination and live weight determine the efficiency of reproduction of the herd. This largely depends on the identification of features of growth and formation of the reproductive function of heifers, which improves the efficiency of their use in the reproduction process [1,2,3].

One of the factors influencing the development of economically useful features of cows is the age of their mothers. It is known that calves with low live weight are usually born from heifers, they develop more slowly and later reach the highest yield. This leads to a shortage of milk and calves for the period of their economic use, especially when early insemination of heifers with insufficient live weight is carried out [4,5].

The Aim of the Research is to study the influence of the mothers' age and the live weight of calves at birth on the indicators of milk productivity and reproductive ability of cows.

OBJECTS AND METHODS OF RESEARCH:

The analysis of dairy cattle farms was held on the basis of primary zootechnical documentation to study the intensity of the usage of dairy cows of Yaroslavl breed at the agricultural production cooperative "ART" situated on the Right Bank district of RSO-Alania. The following indicators were studied: the productivity of cows of black-and-white breed; age at the first fertilization, days; fertility at the first insemination, %; index of insemination of heifers; duration of service period, dry and intercalving periods, days.; FAC; the connection of the abovementioned indicators with milk productivity of cows.

For total studying we subjected 107 heads of cows. We formed three groups of cows, which were received from mothers of different age: the 1-st – from heifers (28 heads); the 2-nd group – from cows of the second calving (16 heads); the 3-rd group – from cows of the third calving (14 heads).

To determine the effect of live weight of calves at birth on their subsequent indicators of milk productivity and reproductive ability, 3 groups of animals were formed depending on their live weight at birth: the I-st group - with a live weight of up to 30 kg; the II-nd group – from 31 to 35 kg; the III group with a live weight of more than 36 kg.

The resulting material was digitally processed by Mercureva E. K.

THE RESULTS AND THEIR DISCUSSION:

In practice of dairy cattle breeding a lot of authors [6,7,8,9] prove that it is economically most expedient to use heifers for reproduction from 15-18 months of age.

However, analyzing the scientific literature it should be noted that age is not the main indicator of the possibility of the first insemination, which should be considered in connection with the overall development and live weight.

Table 1 presents the data on the milk productivity of cows received from mothers of different ages, bred at the agricultural production cooperative "ART".

Indicators	Group			On average
	Ι	II	III	(in all)
Number of Heads	28	16	14	58
Milk Yield for 305 Days of the 1st Lactation	3834±64,3	4218±83,7	4365±52,4	4139±79,4
Fat Content, %	4,12±0,04	4,14±0,06	4,13±0,04	4,13±0,05
The Amount of Milk Fat, kg	158,0±2,2	174,4±0,9	180,3±0,7	170,9±1,3
The Age of the First Insemination, Months.	18,0	17,0	17,3	17,4
The Duration of the Service Period, Days.	119±4,1	98±2,8	104±3,2	107±3,4
Intercalving Period, days	399±4,3	378±8,2	384±2,9	387±5,1
Live Weight at the First Insemination, kg	387,5±5,8	394,7±6,9	397,0±7,2	395,4±6,6
Fertility at the First Insemination, %	68,5	67,8	63,2	66,5
The Coefficient of Reproductive Ability	0,91	0,97	0,95	0,94
The Output of Calves per 100 Cows	78,6	77,5	78,4	78,2

 Table 1 – The Milk Productivity and Reproductive Capacity of Cows

From the data in table 1, it can be seen that the age raising of mothers to the 3-rd lactation increases the milk yield of their daughters. The highest milk yield for 305 days of the 1-st lactation was at the daughters received from the cows of the 3-rd calving. The average milk yield of cows in this group is by 12.16% more (P<0.001) compared to the milk yield of cows born from heifers and by 3.37% more milk yield from the daughters of cows of the II calving. According to the content of fat in milk, there was no fundamental difference between the groups, but the total yield of milk fat in the III-rd group was maximum and amounted 180.3 kg. The Difference was from 3.27% (5.9 kg) to 12.37% (22.3 kg). The amount of the average yield of the herd was 4139 kg.

The analysis of the reproductive ability of cows showed that the age of mothers had a certain influence on the period of the first insemination of their daughters. The most precocious are animals of the II-nd group. The heifers, received from the mothers of the second calving, at the age of 17 months had a living mass sufficient to use them in reproduction. A heifer of this group was slightly inferior to its peers, received from mothers of the third calving, with a difference of 0.3 months, but they also had a slight advantage in their live weight. Animals of the II-nd and III-rd groups had the best age for the first insemination compared with the I-st group at 0.7-1 month.

In addition, the calving age of mothers affected the amount of milk yield for 305 days of lactation. Heifers obtained from mothers of the III-rd calving differed in higher levels of milk production.

Such indicators as service period, dry period, intercalving period, coefficient of reproductive ability are indicators characterizing the reproductive quality of cows [10,11].

A pregnant dry period is considered to be the most responsible period, affecting the reproductive function of cows, the passage of which largely depends on the production of viable offspring. Both the long and the short pregnant dry periods have a negative impact on the milk production. In animals with high milk production, milk synthesis can occur till the very calving, so a competent timely launch of the cow is necessary to prepare her body for a new lactation and a new period of pregnancy, in order to obtain a healthy offspring. Otherwise, there is a decrease in milk production and the resulting offspring will be weak, painful and underdeveloped.

An important indicator in dairy cattle breeding is the duration of the service period, that is, from the period of calving to fertilization, which is an indicator of the readiness of the cow's body to the next formation of the fetus. The optimal service period is that of 60 to 80 days.

A number of authors [10,11, 13-17] indicate that with the extension of the service period reduces the yield of milk per day of the intercalving period and reproduction rates also reduce. Consequently, the reduction of this period is a reserve for increasing milk production and cow reproduction.

However, there is no consensus on the timing of the first insemination. Some authors, for example V. S. Shipilov, believes that cows with normal maintenance, feeding and organization of reproduction can come to hunt and successfully fertilized in the first weeks after birth [12].

Recent studies have shown that insemination of cows in the first month after calving is impractical. The optimal duration of the service period is 60-80, which allows receiving one calf per year from one cow. By the second hunt, a healthy cow has fully restored the reproductive organs of the cow after calving, that is, the optimal is the insemination of the cow in the second hunt. Postpartum complications are the cause of lengthening the duration of the service period, which in turn lengthens the lactation and interbody period, contributing to an increase in the cost of insemination and veterinary care. The optimal duration of the service period is an indicator of the health and good physiological condition of the cow.

As it can be seen from table 2, the best indicators of reproductive function differed animals of the II-nd group, i.e. obtained from mothers of the II-nd calving: the duration of the service period - 98 days, the duration of the interbody period - 378 days and the coefficient of reproductive ability - 0.97. The animals of the first group had higher fertility at the first insemination. The difference was 0.7-5.3%. On the output of calves per 100 cows there was no fundamental difference between the groups. The average level for the herd was 78.2%.

Indicator	Liv	On average		
	до 30	31-35	36 and more	(in all)
Number of Heads	10	17	22	49
Milk Yield for 305 Days of 1st Lactation	3448±68,3	4188±62,9	4341±52,6	3992±61,3
Fat Content, %	4,11±0,02	4,11±0,01	4,12±0,01	4,11±0,01
Amount of Milk Fat, kg	141,7±3,8	172,1±1,2	178,8±2,8	164,1±2,6
Age of the First Calving, Months.	25±0,1	27±0,1	29±0,2	28±0,2
The Duration of the Service Period, days.	103±3,1	117±1,5	126±3,7	115±2,8
Intercalving Period, Days	378±2,4	392±6,1	401±3,6	390±4,0
Live Weight at the First Insemination, kg	392,3±3,2	405,2±2,7	411,0±6,4	402,8±4,1
The Coefficient of Reproductive Ability	0,97	0,93	0,91	0,94
The Output of Calves per 100 Cows	76,2	74,8	73,3	74,8

 Table 2 - Milk Production and Reproductive Capacity of Cows

Thus, it can be noted that the best indicators of reproductive ability belong to cows, received from mothers of the II-nd calving, whose level of milk yield was 4218 kg (on average the yield was 4139 kg); the duration of the service period - 98 days (average duration of 107 days); the duration of the interbody period - 378 days (387 days); the coefficient of reproductive ability - 0.97 (0.94) and calves per 100 cows 77.5% (78.2%).

Under the same conditions of feeding and keeping, those calves with higher live weight develop more intensively, as a result of which they reach physiological maturity earlier than their peers, with low live weight at birth. However, it should be noted that excessively large calves lead to severe childbirth and death of cows-mothers [16;17].

As for the heifers (table. 2) there is a positive relationship between their live weight at birth and subsequent milk production. So in the studies we established that the heifers with a higher body weight at birth had higher rates of milk production. So from first-calf heifers of the first group, which had the lowest live weight at birth, the milk yield was on average 3448 kg, whereas from their peers of the third group, who had a live weight at birth more than 36 kg, more milk was obtained by 25.9% (P<0.001),

there are no significant differences in fat content between groups, and in the output of milk fat advantage on the side of animals of the third group, due to the fact that they have higher milk yield compared to the other groups.

In addition, the indicators of the reproductive ability of cows depending on their live weight at birth were also studied. The analysis showed that as the live weight of calves increases at birth, there is also an increase in the age of the first calving, the duration of the service period and, accordingly, the intercalving period.

The duration of the service period according to an increase in live weight at birth also increases from 103 days in the I-st group to 126 days in the III-rd group, which leads to an increase in the intercalving period (from 378 days in group I to 401 days in group III) and a decrease in the coefficient of reproductive ability (from 0.97 to 0.91), therefore it follows that the yield of calves is reduced by 100 heads (from 76.2 to 73.3%).

Thus, as can be seen from the research data, indicators of reproductive capacity of cows, such as service period, intercalving period, the coefficient of reproductive ability and output of calves per 100 cows, primarily depend on the level of milk yield of heifers or the age of the first calving than on the live weight at birth. The analyzed economy conditions of cultivation of repair heifers are at quite high level. Live weight at the first insemination averaged 402 kg, which amounted to 75% of the live weight of first-calf cows and 68% of the weight of full-aged cows, and the average daily growth ranged from 700 to 750 g.

In our studies, deviations from the physiological norm in the duration of the fruiting period in heifers were not established. The relative weight of calves to a live weight of mother animals was 6.0%, the ratio of weight of the fetus and the mother secured the passage of childbirth without any complications.

CONCLUSION:

As a result of the study of milk production and reproductive abilities, depending on the age of mothers and the live weight of calves at birth, we made the following conclusions:

1. The best indicators of reproductive ability had the cows received from mothers of the II-nd calving, whose level of milk yield was 4218 kg (average milk yield of 4139 kg); the duration of the service period - 98 days; the duration of the intercalving period - 378; the coefficient of reproductive ability - 0.97 and the yield of calves per 100 cows 77.5%.

2. A mass of more than 36 kg. should be considered as the most expedient live weight of heifers at birth, which had the highest milk productivity -4341 kg with milk fat yield of 178.8 kg.

3. Live weight at birth makes great influence on the indicators of cows' reproduction, their age of the first calving, the duration of the service – period and the coefficient of reproductive ability, and, accordingly, on the yield of calves.

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