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ВЕСТНИК

НАЦИОНАЛЬНОЙ АКАДЕМИИ НАУК
РЕСПУБЛИКИ КАЗАХСТАН

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NAS RK is pleased to announce that Bulletin of NAS RK scientific journal has been accepted for indexing in the Emerging Sources Citation Index, a new edition of Web of Science. Content in this index is under consideration by Clarivate Analytics to be accepted in the Science Citation Index Expanded, the Social Sciences Citation Index, and the Arts & Humanities Citation Index. The quality and depth of content Web of Science offers to researchers, authors, publishers, and institutions sets it apart from other research databases. The inclusion of Bulletin of NAS RK in the Emerging Sources Citation Index demonstrates our dedication to providing the most relevant and influential multidiscipline content to our community.

Қазақстан Республикасы Ұлттық ғылым академиясы "ҚР ҰҒА Хабаршысы" ғылыми журналының Web of Science-тің жаңаланған нұсқасы Emerging Sources Citation Index-те индекстелуге қабылданғанын хабарлайды. Бұл индекстелу барысында Clarivate Analytics компаниясы журналды одан әрі the Science Citation Index Expanded, the Social Sciences Citation Index және the Arts & Humanities Citation Index-ке қабылдау мәселесін қарастыруда. Web of Science зерттеушілер, авторлар, баспашылар мен мекемелерге контент тереңдігі мен сапасын ұсынады. ҚР ҰҒА Хабаршысының Emerging Sources Citation Index-ке енуі біздің қоғамдастық үшін ең өзекті және беделді мультидисциплинарлы контентке адалдығымызды білдіреді.

НАН РК сообщает, что научный журнал «Вестник НАН РК» был принят для индексирования в Emerging Sources Citation Index, обновленной версии Web of Science. Содержание в этом индексировании находится в стадии рассмотрения компанией Clarivate Analytics для дальнейшего принятия журнала в the Science Citation Index Expanded, the Social Sciences Citation Index и the Arts & Humanities Citation Index. Web of Science предлагает качество и глубину контента для исследователей, авторов, издателей и учреждений. Включение Вестника НАН РК в Emerging Sources Citation Index демонстрирует нашу приверженность к наиболее актуальному и влиятельному мультидисциплинарному контенту для нашего сообщества.

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ADJUSTMENT OF THE FEEDING LEVEL OF MEAT-TYPE COWS WITH DIFFERENT LIVE WEIGHT AND FATNESS

Abstract. For the first time, on the basis of comprehensive research, it was scientifically substantiated and experimentally proved the feasibility of changing the feeding level of cows of specialized meat-type breeds that have a different score of fatness when using the regression coefficient between fatness and live weight.

For efficient production of high-quality beef, it is not enough to have specialized beef breeds with high genetic potential and high-quality feed. Of great importance is the management of technology for feeding, rational use of forage and animals. Currently, standards for feeding meat-type cows are recommended, calculated depending on their live weight. This is an insufficiently substantiated approach, as in a group, animals can have the same live weight, different fatness,and energy need.The rates of cow feeding should be adjusted not only taking into account their live weight, but also the fatness of animals. In this case, the formation of groups, depending on the fatness, becomes an obligatory technique in the technological chain of beef production that will save feed, since in the cost structure of beef a large proportion of the costs fall on feed (60% or more), as well as increase the profitability of the industry.

Keywords: beef cattle; fatness; live weight; scoring of fatness; correlation; regression; feeding level.

Introduction. Food security is in the focus of attention of international organizations and intergovernmental bodies where Russia is a member state. The work of the UN FAO is aimed at reducing the problem of poverty and hunger in the world by promoting the development of agriculture, improving nutrition and solving the problem of food security.

In accordance with the Doctrine, the strategic goal of food security in Russia is to provide the population of the country with safe agricultural products, fish and other products from aquatic biological resources and food. That is, food security - according to the Doctrine - exists when the population of the country is provided with safe agricultural products and other food.

In 2015 Russia exceeded the threshold indicators of the food security doctrine. The "meat safety" indicator in 2015 reached the recommended level. In fact, the pre-reform level of consumption has been reached, which corresponds to the rational norms recommended by the Ministry of Health of the Russian Federation. Full satisfaction of the need for meat and meat products is provided at maintaining a significant imbalance in certain types of meat.

At first sight, beef production technology is simple. As it were, it is enough to have animals with high genetic potential of meat productivity, to receive from the cow every year the offspring, to create the necessary feeding conditions, satisfying their nutrient needs, and comfortable housing conditions. However, for the successful production, it is not enough.An element is needed that combines the main technological processes and stages that form the production foundation, i.e. herd management, determining the sequence of individual stages and procedures, ensuring the cohesiveness of the entire technology, determining the economic efficiency and profitability of beef production [1-4].

Shortcomings and mistakes in the herd management lead to underperformance of the activities and profits. To take competent management actions, we need a tool that allows us to quickly and accurately determine the energy reserves in the body of animals and the need for nutrients since, in this case, it is necessary to form livestock groups timely and make positive adjustments to the feeding.It is known that an indicator of the availability of energy resources in the body and their quantity, as well as the general condition of animals, can be shown by the live weight and fatness of beef cattle, which, in turn, is strongly affected by the level of animal feeding [5-7].

Cows in a herd with the same live weight may have different fatness and, vice versa, cows with the same fatness may have different live weight indicators since the live weight varies within sufficient broad limits depending on the contents of the gastrointestinal tract, as well as on the stage of pregnancy. In this regard, the live weight of animals cannot serve as the main indicator for determining the organism's energy reserves. Studies by many scientists have established that the energy reserves indicator of the body is the fatness of animals [8-10].

The fatness of animals is the amount of energy reserves in the body, deposited in the muscle fibers in the form of fat and partially protein.

For a numerical expression of energy reserves, a score of cattle fatness was adopted. In zootechnic science and experience, various scoring systems for fatness of livestock are used, for example, Canada and Europe have adopted a score for fatness on 1-5 points scale, in the USA - on 1-9 scale, in Russia staff of Federal Science Center for Animal Husbandry have proposed a 1-9 points scale system for assessing fatness of beef cattle [11-14].

A calf is the only product derived from a meat-type cow, so you need to pay great attention to reproduction issues. It is known that a cow should bring a calf every year, for this it should be fertilized within 80-90 days after calving, provided that the duration of pregnancy of cows is 272-280 days (depending on the breed and foetal gender).Our studies conducted earlier on meat-type cows have shown that the pregnancy duration of the early-ripening Angus breed was 272-273 days, and of the Limousin one, as more long-growing, the period of intrauterine development was 278-280 days [15].

The duration of a period between calvings also depends on the length of the service period. According to the research of many scholars, the duration of the service period stands on the state of cow fatness. For example, according to Dan E. Eversoul and others, only 46% of cows with a less than 3 points fatness are bulling within 60 days after calving, while 61% of cows with 4 points fatness and 91% of cows with 5 points fatness are bulling within 2 months after calving [16].

In this regard, many of the most essential reproductive qualities depend on the state of fatness of meat-type cows: the fertilization after the first insemination, the duration of the service period, the duration of estrus and the estrous cycle, the interval between calvings and the milking capacity of the cows. When cows have low fatness (below 4 points), their immunity decreases, which, in turn, leads to a depression of reproductive functions [17, 18].

In farms throughout the year, on average, the fatness score of most healthy cows is within 3-7 points. Before calving, it is desirable that the state of fatness of cows be 5-7 points. Depending on the physiological state, a cow during a breeding season or after calving can lose fatness since a part of the energy reserves in the form of fat deposits is spent on the formation of milk. Subsequently, with a balanced feeding, it is able to recover its live weight, by the end of pregnancy comes in good condition, and sufficient fatness ensures normal growth and development of the fetus [19, 20].

Many livestock breeders, estimating the level of feeding, make a mistake, focusing only on the live weight of animals. Live weight of meat-type cows should not be the only indicator of the level of feeding. In a herd, cows differ in age, in linear dimensions, in terms of pregnancy, in health, in quantity and quality of consumed feed (in terms of the fullness of the gastrointestinal tract).Determining the level and balance

of feeding only by live weight could lead to a distortion of the results of assessing the quality of animals feeding. Definition of the fatness is a more reliable and accurate tool for determining the level of feeding of animals.

In attenuate animals, there is a lack of the estrous cycle or inadequate cycles, which makes it difficult to identify the periods of estrus, reduces the results of fertilization of dams after the first insemination.

In cows with 8–9 points of fatness, a depression in reproductive functions is also observed, a decrease in motor activity leads to a multiplication of severe calving cases. Overnutrition of cows leads to an increase in feed cost, which is reflected in the underperformance of production since the feed cost is the main article of the production cost. In beef cattle breeding, feed costs reach up to 60-65% of the total production costs. In addition, well-fed cows locating near the feed cribs always crowd out the weaker cows and often leave them hungry.

Thus, the study of the relationship of the state of fatness with live weight of cows, in order to adjust feeding programs, is of great economic value. Some researchers recommend how many kilograms it is necessary to increase the live weight of cows in order to increase fatness by 1 point without indicating changes in the feeding level [10, 20, 21]. Our studies are valid by the determination and application of the correlation and regression coefficients between live weight and the state of fatness in points, they allow to accurately determine the necessary changes in the feeding programs of cows in EFU (energetic feed unit), depending not only on the live weight, but also on the state of fatness. Using this technique, each researcher or producer engaged in beef production can calculate the regression value between live weight and fatness, with a scoring system of fatness, to make adjustments to the program for cows feeding, as well as of an individual herd.

The aim of this work is to identify the parameters that make it possible to adjust the level of feeding depending on the live weight and the scoring of the fatness of cows 90-100 days before calving, to save feed and ensure the profitability of the enterprise in the beef production.

Materials and methods of research – the objects of the research were cows of specialized meat-type breeds, Hereford and Kazakh white-headed, 100 heads in each group. Studies were conducted in Polyanskoe and Volgar farms in 2016 commissioned by the Ministry of Agriculture of the Russian Federation from the federal budget.In the course of the work, there were used scoring method for fatness of animals, methods of correlation-regression and statistical analyses. The correlation coefficients between live weight and fatness of cows were determined as the phenotypic correlation coefficient for large samples, and the regression coefficients - according to the formula:

$$R_{x\backslash y} = r \cdot \cdot (\delta_x : \delta_y),$$

where r – correlation coefficient between live weight and fatness, δ_x and δ_y – mean-square deviation from the arithmetic mean of both traits.

The feeding level of cows was determined according to the rates of feeding of meat-type cows developed by a team of authors under the leadership of A. P. Kalashnikov [22].

The digital material obtained in the course of research was processed by the method of variation statistics with the calculation of basic biometric constants.

Research results. Live weight of an animal is the main trait indicating its development, state of nutrition. The determination of the correlation coefficient between live weight and the fatness of animals is an essential element for determining the energy reserves of animal's organism. In the course of our research, the arithmetic mean value and its error of the attribute taken into account (live weight) were defined, the correlation and regression coefficients, the coefficient of variation were calculated (table 1).

Table 1 – Live weight of cows of different breeds and its variability

Indicator	Breed	
	Hereford	Kazakh white-headed
Live weight (M+m), kg	458.2+5.88	465.0+5.13
C_V, %	12.75	13.20
δ	58.3	61.4
*(P<0.95).		

As can be seen from table 1, in live weight, the Kazakh breed cows slightly exceed the Hereford breed cows. The difference is 6.8 kg (P<0.95). The coefficients of variation testify to the heterogeneity of cows of herds in both groups in terms of live weight, which indicates the need for a differentiated approach in the management ofcow feeding, to form groups ranked according to live weight and fatness.

The average fatness of animals in both groups is the same, does not exceed 6 points (table 2).

Table 2 – Fatness of cows of different breeds and its variability

Indicator	Breed	
	Hereford	Kazakh white-headed
Fatness point (M±m),	5.62±0.10	5.79±0.11
C_V, %	19.6	20.0
δ	1.02	1.16

The data in table 2 indicate that the fatness of the Hereford breed is only 0.17 points (3.02%) less than that of the Kazakh white-headed breed, the difference is not significant (P<0.95). However, the representatives of both breeds differed in greater variability of fatness, and the mean-square deviation of the trait in the Kazakh white-headed breed was higher than the similar indicator of Herefords by 0.14, and the coefficient of variability - by 0.4%, which should be considered when forming technological groups.

Currently, the study of correlated variability becomes more relevant due to the need to breed animals suitable for breeding and exploitation in industrial technology. In such animals, high productivity should be combined with the ability for normal development and reproduction in conditions that were not usual for their parents and remote ancestors.

Regression is a biometric parameter that shows a measure of a change in one trait depending on a change in a correlating another trait.

In the case of a straight-line relation, uniform changes in one trait correspond to uniform changes in the second trait with minor deviations. Determination of correlation and regression coefficients showed a high level of correlation between these traits (table 3).

Table 3 – Correlation and regression coefficients between fatness and live weight of cows

Indicator	Breed	
	Hereford	Kazakh white-headed
r	0.93*	0.95*
R	40.42***	48.13***
*P>0.95; ***P>0.999.		

The correlation coefficients in both groups were positive and high from 0.93 to 0.95, which indicates a large dependence of live weight of cattle on fatness. The study of regression coefficients showed that a change in fatness in one point changes the live weight of the Hereford breed on 40.42 kg, and a change in fatness in one point of the Kazakh white-headed breed changes the live weight by 48.13 kg. These data are the foundation for making changes in the feeding level of cows, if necessary, and make adjustments to the feeding program. In all cases, the correlation and regression coefficients were reliable (P>0.95... 0.999).

Changes in live weight and fatness of cows that occur during the production cycle throughout the year should be considered as regular and, virtually, inevitable. This is due to the different physiological condition of the cows. Since the reproductive functions of cows depend on the state of fatness, and the fatness, in turn, depends on the level of feeding, an important first step to improve the state of nutrition and reproductive functions is the management of feeding, taking into account the season of calving. Ensuring 5 points fatness and above, maintaining it throughout the entire production cycle is a prerequisite for efficient beef production. Many enterprises, farms lose part of their profits by feeding additional forage to cows, which are in a normal state of nutrition at the time when only part of the cows need additional energy and feed additives and will respond adequately to an increase in the feeding level.

Keeping the cows in an optimal state of fatness (5-7 points) allows to achieve maximum results in the reproduction of the herd and reduce the feed cost for keeping the breeding stock.

For a farm with good fatness of cows, before winter, less forage will be needed for winter, or the forage may be of poor quality and, as a result, cheaper, which has a positive effect on the economy of the farm. Herewith, the cows will undoubtedly lose in live weight. For herbivorous animals, it is natural to lose weight in the most difficult time of the year. A good state of fatness before the winter period and during lactation is the basis for a successful wintering of livestock and the preservation of high reproductive qualities.

According to some authors, the assessment of the fatness of cows should be conducted three times a year: after weaning calves or in time for the annual livestock bonitation, just before calving, and 30 days before the start of the breeding season.

It is important to make adjustments to the feeding of cows 90-100 days before calving to achieve the optimal level of fatness. In many cases, this period will coincide with the terms of weaning calves. Therefore, it is necessary to regulate the fatness of animals, adjusting feeding, both attenuate cows and animals with an excessively high condition of fatness status. In this regard, it is necessary to form groups of animals depending on the category of fatness [21, 23].

By means of forming technological groups, organizing the feeding and keeping of cows on the basis of the fatness scoring, it is possible to achieve an improvement in the economic performance of an enterprise. Grouping animals according to live weight and state of fatness is a good tool for extracting additional profits and a good management decision.

Depending on health and linear dimensions, each cow gains or loses in live weight by 40.4-48.1 kg when changing the fatness state in 1 point. For example, if a live weight of a cow is 450 kg with fatness of 6 points, then with a decrease in fatness to 5 points it will weigh 410-402 kg. In other words, with a decrease in fatness in 2 points, it will lose 80-96 kg. Therefore, it is necessary to organize the feeding in such a way that an animal can gain 80-96 kg in live weight. It needs more energy and nutrients for 45-48 kg increase in the last three months of pregnancy on the growth of the fetus and placenta.

Recommendations on the change in live weight of cows 90-100 days before to achieve by calving the desired fatness of 5-7 points are given in table 4.

Table 4 – Proposed changes in live weight 90-100 days before calving to achieve optimal 5-7 points of fatness

Fatness point	Desirable fatness point by the calving period	Increase (+), decrease (–) in live weight, kg
1	5	+ 160-192
2	5	+ 135-160
3	5	+ 90-135
4	5	+ 70-90
5	5	+ 45-48*
6	5-7	+ 45-48*
7	5-7	–
8	5-7	– 25-45
9	5-7	– 45-90
*For the growth of fetus and placenta.		

Limited feeding of cows of specialized meat-type breeds, taking into account the period of pregnancy and lactation, live weight and other important factors make it possible to satisfy the body's need for nutrition elements and to rationally use fodder resources.

Dry cows with a live weight of 450-500 kg, while maintaining good nutrition and birth of a healthy calf, 1.73-1.82 EFU, 17-18 MJ of metabolic energy and 1.90-2.20 kg of dry matter are required per 100 kg of live weight. 85–90 kg of digestible protein should fall on 1 EFU of the diet [2].

In our opinion, from there, it is possible to calculate the change in the rates of feeding the cows depending on the live weight, taking into account the state of fatness, and to make changes in the diets of (table 5, 6).

Table 5 – Nutritional value of diets depending on the fatness of cows (live weight – 450 kg)

Fatness point	Desirable fatness point by the calving period	Increase (decrease) of the rates of feeding (RF)*, EFU
1	5	+ 3.02
2	5	+ 2.55-3.02
3	5	+ 1.70-2.55
4	5	+ 1.32-1.70
5	5-7	+ 0.85-0.91
6	5-7	+0.85-0.91
7	5-7	НК*
8	5-7	–0.47-0.85
9	5-7	– 0.85-1.70

Table 6 – Nutritional value of rations depending on the fatness of cows with different live weight

Fatnesspoint	Desirable fatness point	Changes in rates of feeding (RF), EFU			
		Live weight			
		400	450	550	600
1	5	+ 3.16	+ 3.02	+ 2.82	+ 2.77
2	5	+2.67-3.16	+2.55-3.02	+ 2.46-2.82	+2.34-2.77
3	5	+1.76-2.67	+1.70-2.55	+1.64-2.46	+1.56-2.34
4	5	+1.38-1.76	+1.32-1.70	+1.27-1.64	+1.21-1.56
5	5-7	+ 0.89-0.95	+ 0.85-0.91	+ 0.82-0.87	+ 0.78-0.84
6	5-7	+ 0.89-0.95	+ 0.85-0.91	+ 0.82-0.87	+ 0.78-0.84
7	5-7	НК	НК	НК	НК
8	5-7	– 0.50-0.89	– 0.47-0.85	– 0.46-0.82	– 0.43-0.78
9	5-7	– 0.88-1.78	– 0.85-1.70	– 0.82-1.64	– 0.78-1.56
*RF (rate of feeding).					

According to our calculations, to bring the fatness from 2 to 5 points, the cow will additionally need from 2.5 to 2.9 EFU and 212.5-261.0 g of digestible protein. Accordingly, in order to reduce the fatness of cows from 9 points to the desirable 5-7 points, it is necessary to reduce the nutritional value of the diets by 0.8-1.6 EFU and 68-144 g of digestible protein per day.

Conclusion. As a brief review of available literary sources shows, there are many studies proving the impact of cattle fatness on the live weight and reproductive qualities of cows. Criteria for changing the live weight of animals are given to increase their fatness by 1 point. For example, according to Parsons, in order to increase the fatness of cows from 3 to 5 points, cows should put on weight from 90.7 to 136 kg, and from 1 to 5 points - more than 158.8 kg [21]. According to other authors, to change the fatness in 1 point for small and medium-sized cows, the weight should be increased by 27-36 kg, and for large cows by 45-68 kg [10, 20].But no one researcher gives criteria for increasing the level of feeding. In our studies, to increase the fatness by one point, the cows of the Hereford breed should add 40.4 kg in weight, and the Kazakh white-headed cows - 48.1 kg. Apparently, these values depend on the initial live weight of the cows. Knowing the energy needs of cows, we calculated how much it is necessary to increase the level of feeding of animals. For example, to bring up fatness from 2 to 5 points, cows will additionally need from 2.5 to 2.9 EFU and 212.5-261.0 g of digestible protein, respectively, for Hereford and Kazakh white-headed breed.

The level of cows feeding depends on the state of fatness and a certain period of time is required to change the fatness.

From an economic point of view, the fatness of cows should be increased in the summer pasture period, when the forage is cheap and complete. Much attention should be paid to the use of natural forage lands, which are very important for reducing the cost of animals maintenance. Pastures should have good herbage, sufficient to meet the nutritional needs of animals.

In a herd, animals always have a different state of nutrition. Excessive feeding of cows with high fatness leads to a reduction of profits, at a time when only part of the cows needs additional feeding. Formation of groups of cows based on the state of nutrition and management of feeding, depending on the scoring of fatness, are required techniques for improving the economy of beef production. In terms of the organization of seasonal calving, the best way to make adjustments to the feeding program is 90-100 days before calving.

Our research shows the presence of a high positive correlation between live weight and the fatness state of cows, which allows calculating the regression coefficient between live weight and fatness. Knowing the quantitative change in live weight of animals with a change in fatness at 1 point,it is possible to reduce the cost of cows feeding. This will allow to save on expensive forage, to improve the reproductive quality of the breeding stock and the efficiency of beef production.

Analysis of the obtained data in the course of research indicates that high positive relation has been established between live weight and fatness of cows (r = 0.93 for Hereford and r = 0.95 for Kazakh white-headed breed). This made it possible to calculate the regression coefficients between the considered traits. It has been established that an increase in fatness by 1 point contributes to an increase in live weight of cows of Hereford and Kazakh white-headed breeds by 40.4 and 48.1 kg, respectively that gives reason to adjust the level of feeding 90-100 days before calving upwards: for cows with 1 point of fatness by 3.02 EFU; with 2 points fatness - by 2.67-3.02; 3 points - 1.70-2.55; 4 points - 1.32-1.70; 5-6 points - 0.85-0.91 EFU. For cows with fatness of 8 points, it is necessary to reduce the level of feeding by 0.47-0.85 EFU; with fatness of 9 points - by 0.85-1.70 EFU.

Thus, the timely formation of technological groups, taking into account live weight and fatness, the obligatory adjustment of the feeding level of animals in the "cow-calf" system, are important factors of saving forage, increasing the profitability of the beef productionenterprise.

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ҚОНДЫЛЫҒЫ МЕН ТІРІ САЛМАҒЫТҮРЛІ ЕТТІ ІРІ ҚАРАНЫ АЗЫҚТАНДЫРУ ДЕҢГЕЙІН ТЕҢЕСТІРУ

Аннотация. Кешенді зерттеулер негізінде алғаш рет қондылығымен тірі салмағы арасындағы регрессиялық коэффициентті пайдаланған кезде әртүрлі қондылықбаллдары бар арнайы етті ірі қараның азықтандыру деңгейін өзгертудің ғылыми-негізділігі және эксперименталды түрде дәлелденді.

Жоғары сапалы сиыр етін тиімді өндіру үшін жоғары генетикалық әлеуеті бар ірі қара тұқымдарының және жоғары сапалы азықтың болуы жеткіліксіз.Азықты және жануарларды ұтымды пайдалану технологиясын ұйымдастыру аса маңызды. Қазіргі уақытта ірі қараныазықтандыруға ұсынылған стандарттар, олардың тірі салмағына байланысты есептеледі. Бұл жеткіліксіз дәлелденген әдіс, өйткені топта жануарлардың тірі салмағы, түрлі қондылығымен энергияға деген қажеттілігі болуы мүмкін. Ірі қараның азықтандыру нормалары олардың тірі салмағын ескеріп қана қоймай, сонымен қатар жануарлардың қондылығын да бірге

есептелу қажет. Бұл жағдайда ірі қараның қондылығына байланысты топтардың қалыптасуы ірі қара етін өндірудің технологиялық тізбегіне міндетті түрде қабылданады, бұл жемшөпті үнемдеуге мүмкіндік береді, өйткені ірі қара еті құнының құрылымында азыққа (60% және одан да көп) шығын кетеді, демек саланың кірісін жоғарылату қажет.

Түйін сөздер: ірі қара мал; қондылық; тірі салмақ; қондылық ұпайлары; корреляция; регрессия; азықтандыру деңгейі.

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КОРРЕКЦИЯ УРОВНЯ КОРМЛЕНИЯ МЯСНЫХ КОРОВ РАЗНОЙ ЖИВОЙ МАССЫ И УПИТАННОСТИ

Аннотация. Впервые на основе комплексных исследований научно обоснована и экспериментально доказана целесообразность изменения уровня кормления коров специализированных мясных пород, имеющих различную балльную оценку упитанности при использовании коэффициента регрессии между упитанностью и живой массой.

Для эффективного производства высококачественной говядины недостаточно иметь специализированные мясные породы скота с высоким генетическим потенциалом и качественные корма. Большое значение имеет организация технологии кормления, рационального использования кормов и животных. В настоящее время рекомендованы нормы кормления мясных коров, рассчитанные в зависимости от их живой массы. Это недостаточно обоснованный подход, так как в группе животные могут иметь одинаковую живую массу, различную упитанность и потребность в энергии. Нормы кормления коров должны корректироваться не только с учётом их живой массы, но и упитанности животных. В этом случае формирование групп, в зависимости от упитанности коров, становится обязательным приёмом в технологической цепи производства говядины, что позволит сэкономить корма, так как в структуре себестоимости говядины большая доля затрат приходится на корма (60 % и более), повысить доходность отрасли.

Ключевые слова: мясной скот; упитанность; живая масса; балльная оценка упитанности; корреляция; регрессия; уровень кормления.

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