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#### Авторлар туралы мәліметтер:

*Кравченко Руслан Иванович\** – философия докторы (PhD), Машиналар, тракторлар және автомобильдер кафедрасының қауымдастырылған профессорының м.а., А. Байтұрсынов атындағы Қостанай өңірлік университеті, Қазақстан Республикасы, 110000, Қостанай қ., Абай даңғылы, 28, 3 ғимарат, тел.: 87029298576, e-mail: ruslan\_kravchenko\_15@mail.ru.

*Амантаев Максат Амантайұлы* – философия докторы (PhD), Машиналар, тракторлар және автомобильдер кафедрасының қауымдастырылған профессорының м.а., А. Байтұрсынов атындағы Қостанай өңірлік университеті, Қазақстан Республикасы, 110000, Қостанай қ., Абай даңғылы, 28, 3 ғимарат, тел.: 87751429921, e-mail: amantaevmaxat.kz@mail.ru.

*Золотухин Евгений Александрович* – философия докторы (PhD), Машиналар, тракторлар және автомобильдер кафедрасының қауымдастырылған профессорының м.а., А. Байтұрсынов атындағы Қостанай өңірлік университеті, Қазақстан Республикасы, 110000, Қостанай қ., Абай даңғылы, 28, 3 ғимарат, тел.: 87771390747, e-mail: zolotukhine17@mail.ru.

*Төлеміс Тұрсынай Серікқызы* – А. Байтұрсынов атындағы Қостанай өңірлік университетінің PhD докторанты, 110000, Қостанай қ., Абай даңғылы, 28, 3 ғимарат, тел.: 87475784523, e-mail: tursynay17@mail.ru.

*Кравченко Руслан Иванович\** – доктор философии (PhD), и.о. ассоциированного профессора кафедры машин, тракторов и автомобилей, Костанайский региональный университет имени А.Байтурсынова, Республика Казахстан, 110000, г. Костанай, пр. Абая, 28, корпус 3, тел.: 87029298576, e-mail: ruslan\_kravchenko\_15@mail.ru.

*Амантаев Максат Амантайұлы* – доктор философии (PhD), и.о. ассоциированного профессора кафедры машин, тракторов и автомобилей, Костанайский региональный университет имени А.Байтурсынова, Республика Казахстан, 110000, г. Костанай, пр. Абая, 28, корпус 3, тел.: 87751429921, e-mail: amantaevmaxat.kz@mail.ru.

*Золотухин Евгений Александрович* – доктор философии (PhD), и.о. ассоциированного профессора кафедры машин, тракторов и автомобилей, Костанайский региональный университет имени А.Байтурсынова, Республика Казахстан, 110000, г. Костанай, пр. Абая, 28, корпус 3, тел.: 87771390747, e-mail: zolotukhine17@mail.ru.

*Төлеміс Тұрсынай Серікқызы* – PhD докторант Костанайского регионального университета имени А. Байтурсынова, Республика Казахстан, 110000, г. Костанай, пр. Абая, 28, корпус 3, тел.: 87475784523, e-mail: tursynay17@mail.ru.

*Kravchenko Ruslan Ivanovich\** – PhD, acting Associate Professor of the Department of machines, tractors and vehicles, A. Baitursynov Kostanay Regional University, Republic of Kazakhstan, 110000, Kostanay, 28 Abai Ave., bld. 3, tel.: 87029298576, e-mail: ruslan\_kravchenko\_15@mail.ru.

*Amantayev Maksat Amantaiuly* – PhD, acting Associate Professor of the Department of machines, tractors and vehicles, A. Baitursynov Kostanay Regional University, Republic of Kazakhstan, 110000, Kostanay, 28 Abai Ave., bld. 3, tel.: 87751429921, e-mail: amantaevmaxat.kz@mail.ru.

*Zolotukhin Yevgeniy Aleksandrovich* – PhD, acting Associate Professor of the Department of machines, tractors and vehicles, A. Baitursynov Kostanay Regional University, Republic of Kazakhstan, 110000, Kostanay, 28 Abai Ave., bld. 3, tel.: 87771390747, e-mail: zolotukhine17@mail.ru.

*Tolemis Tursynay Serikkyzy* – PhD student, A. Baitursynov Kostanay Regional University, 110000, Kostanay, 28 Abai Ave., bld. 3, tel.: 87475784523, e-mail: tursynay17@mail.ru.

SRSTI 68.01.11

UDC 68.01.11

[https://doi.org/10.52269/22266070\\_2023\\_3\\_77](https://doi.org/10.52269/22266070_2023_3_77)

#### ROAD TRANSPORT AS A COMPONENT OF AGRICULTURAL CARGO TRANSPORTATION

*Starunova I.N.* – Candidate of Technical Sciences, Associate Professor of the Tractors, Agricultural Machinery and Agriculture Department, FSBEI HE “South Ural State Agrarian University”, Russian Federation.

*The article reviews a vital role played by road transport in meeting the cargo transportation needs of the agricultural sector. It discusses and outlines the distinctive aspects of using road transport to address directly the industry's specific challenges. The role of road transport is to ensure the uninterrupted supply of goods directly from the supplier to the consumer. The article also discusses problematic areas in the field of road freight transport, the criteria for transported goods. The article delves into the specifics of transporting grain crops. It also highlights the use of mobile applications, facilitating enhanced communication among agricultural producers, suppliers, and consumers. This contributes to the enhancement of agricultural logistics, reducing the costs and increasing productivity of agricultural output. In light of the foregoing, the research findings can be described as a reflection of the crucial role of road transportation in agriculture. It became evident that, in order to establish and develop a high-quality modern transportation and logistics system, it is vital to monitor and enhance the efficiency of existing transportation networks and improve the management of road transport utilization, which serves as a pivotal component in agricultural freight operations.*

**Key words:** road transport, agriculture, agricultural products, grain, cargo transportation.

### АУЫЛ ШАРУАШЫЛЫҒЫ САЛАСЫНДАҒЫ ЖҮК ТАСЫМАЛАРДЫҢ ТІЗІМІ РЕТІНДЕГІ АВТОМОБИЛЬ КӨЛІГІ

Старунова И.Н. – техника ғылымдарының кандидаты, «Трактор, ауыл шаруашылығы машиналары және ауыл шаруашылығы» кафедрасының доценті, Оңтүстік Орал мемлекеттік аграрлық университеті, Ресей Федерациясы.

Мақалада ауыл шаруашылығы саласындағы жүктерді тасымалдауды қамтамасыз ету міндеттерін орындаудағы автомобиль көлігінің рөлі талқыланады. Ауыл шаруашылығы саласының алдына қойылған мәселелерді шешу үшін тікелей автомобиль көлігін пайдаланудың сипаттамалық ерекшеліктері қарастырылған және келтірілген. Тауарды тікелей жеткізушіден тұтынушыға үздіксіз жеткізуді қамтамасыз етудегі автомобиль көлігінің рөлі. Мақалада сондай-ақ автомобильмен жүк тасымалы саласындағы проблемалық бағыттар, тасымалданатын жүктердің өлшемдері қарастырылған. Дәнді дақылдарды тасымалдаудың ерекшеліктері толық берілген. Бұл мақалада ауылшаруашылық тауар өндірушілері, жеткізушілер мен тұтынушылар арасындағы байланысты арттыруға көмектесетін мобильді қосымшаларды пайдалануға да назар аударылады. Бұл ауыл шаруашылығы саласын ұлғайтуға және логистикаға септігін тигізіп, бір мезгілде ауыл шаруашылығы өнімдерінің шығындарын азайтуға және тиімділігін арттыруға мүмкіндік береді. Жоғарыда айтылғандарды ескере отырып, жүргізілген талдау ауыл шаруашылығы саласында көлік құралдарын пайдаланудың маңыздылығының нәтижесі ретінде сипатталады. Сапалы заманауи көліктік логистикалық жүйені құруды және дамытуды қамтамасыз ету үшін қолданыстағы көлік желілерінің тиімділігін бақылау және уақтылы жақсарту, автомобиль көлігін пайдалану қарқындылығын басқаруды жақсарту қажет екені белгілі, ауыл шаруашылығы саласындағы жүк тасымалдаудың негізгі буыны болды.

**Түйінді сөздер:** автомобиль көлігі, ауыл шаруашылығы, ауыл шаруашылығы өнімдері, астық, жүк тасымалдау.

### АВТОМОБИЛЬНЫЙ ТРАНСПОРТ КАК ЗВЕНО ГРУЗОПЕРЕВОЗОК В ОБЛАСТИ СЕЛЬСКОГО ХОЗЯЙСТВА

Старунова И.Н. – кандидат технических наук, доцент кафедры «Тракторы, сельскохозяйственные машины и земледелие», ФГБОУ ВО Южно-Уральский государственный аграрный университет, Российская Федерация.

В статье рассматривается роль автомобильного транспорта для выполнения задач обеспечения перевозки грузов в отрасли сельского хозяйства. Рассматриваются и приводятся характерные особенности применения автомобильного транспорта непосредственно для решения задач, ставящихся перед отраслью сельского хозяйства. Роль автотранспорта для обеспечения бесперебойной поставки грузов непосредственно от поставщика к потребителю. Также в статье рассматриваются проблемные направления в области автомобильных грузоперевозок, критерии, предъявляемые к перевозимым грузам. Подробно приведены особенности перевозки зерновых культур. В данной статье также уделяется внимание применению мобильных приложений, что способствует повышению коммуникации между сельскохозяйственными товаропроизводителями, поставщиками и потребителями. Указанное способствует повышению и логистики в области сельского хозяйства, позволяя одновременно снизить издержки и повысить эффективность производимой с/х продукции. В виду вышеуказанного проведенный анализ характеризуется как результат важности применения автотранспорта в области сельского

хозяйства. Становится понятным, что с целью обеспечения создания и развития качественной современной транспортной логистической системы необходимо отслеживать и своевременно повышать эффективность существующих транспортных сетей, улучшению управления интенсивностью использования автомобильного транспорта как ключевого звена для грузоперевозок в области с/х.

**Ключевые слова:** автомобильный транспорт, сельское хозяйство, сельскохозяйственная продукция, зерно, грузоперевозки.

### Introduction

The current scale of production per human weight in developed countries is from 21 to 27 tons, and worldwide about 12 tons per year. At the same time, for every ton of social goods in total, in the sphere of production (not counting technological transport within the enterprise) and in the sphere of circulation, more than 6000 km of transport are required on average [1, p. 134].

The features of road transport include:

- \* high mobility and ability to transport cargo and passengers to almost any hard-to-reach region;
- \* The possibility of guaranteeing the principle of delivery of the cargo, very important for users, directly from the manufacturer's warehouse to the consumer's warehouse ("door to door") without the need for additional recharging;
- \* high transport speed and accurate delivery;
- \* accessibility and relative ease of transport organization.

Road transport is mainly used in the following cases: suburban and interregional transport (relatively short distances); delivery of goods from wholesale and distribution warehouses and logistics bases to consumers, to the retail store network, etc.; Service of remote and hard-to-reach areas; arrangement of technological transport [1, p. 185].

There is currently an upward trend in the average distribution of transport. For example, in 2021, with a transport volume of 3.7 billion tons and a cargo volume of 210 billion metric tons, the average transport distance was about 45-55 km.

However, the system of organizing road freight transport in the Republic needs significant improvement. And in this case, it is necessary to pay attention to such areas as:

- 1) application of advanced transport technologies, including container transportation and terminal logistics systems;
- 2) the use of heavy-tonnage trains equipped with satellite navigation devices on board;
- 3) rational expansion of small-batch shipments;
- 4) optimization of the selection of the type of vehicles and routes, ensuring the loading of trucks in reverse and passing directions;
- 5) greater control of vehicles on the roads and in large transport hubs, taking into account the development of automated weight control;
- 6) establishment of areas of rational use of automobiles and other modes of transportation.

Before you start transporting certain goods, you will need to decide on their typification, that is, what are agricultural products called? These shipments, in turn, are divided according to certain criteria:

1. Physical parameters. The hardness, fluidity or liquid degree of the filler is determined. The potential damage that will be caused to the vehicle structure during the transportation of a certain type of agricultural product is calculated.

2. Time and frequency of delivery. The categories of goods transported significantly affect the degree of priority of transportation. Consequently, it is allowed to send products with a longer shelf life for delivery later than perishable ones.

Currently, five criteria are distinguished for transportation:

- 1) no special conditions are required (bulk cargo, bulk);
- 2) maintaining the specified temperature and climatic parameters (perishables, dairy products, meat);
- 3) products, the transportation of which requires specially equipped vehicles (strong-smelling, harmful substances);
- 4) live weight animals;
- 5) unhygienic products.

Before carrying out the loading and unloading operations, the following points are taken into account:

1. Seasonality. A specific brand of truck is recommended for each type of cargo.
2. Distance from the waypoints (route length, travel time, etc.). The quality of the connecting roads is the main criterion for the delivery time.
3. Harvesting period. The number of crops ripening at about the same time affects the workload and the availability of vehicles, especially their rental.
4. Communication. The presence and control of means of communication between the loading and unloading points simplifies the preparation of documentation. These points clarify and determine the need for

own fleet for the transport of agricultural products.

The above allows us to conclude that it is not profitable for small and medium-sized enterprises to maintain a large fleet of vehicles all year round, so renting a car for such companies involves using the following options:

- 1) transportation required at any time;
- 2) product safety guarantees;
- 3) control of weather conditions, if necessary;
- 4) compliance with the deadlines, etc.

The above factors as a whole make up a picture of the specificity of agricultural cargo transportation, therefore, when organizing the process, it is required to take into account each of them [2, p. 89].

Let's consider in more detail the characteristics of the transport of individual agricultural products (cereals).



Figure 1 – Transportation of grain by Kamaz truck

Thus, for example, the most demanded service during the harvest season in the region is the transportation of grain crops [2, p. 90]. The most common in this case are grain conveyors – cars with a special tank body. Per one trip, a grain carrier can deliver 25... 85 m<sup>3</sup> of grains.

Most often, these grain conveyors are equipped with a loading control system, automatic unloading and a vibration system. No less common is the lifting system of the upper part to pour the grain from the body. Grain trucks are divided into several categories: flatbed trucks are cars with an open upper body, with a load capacity of up to 15-20 tons (KamAZ); road trains, flatbed trucks with trailers. Load capacity exceeding 40 tons, dump trucks, platform cargo vehicles equipped with self-unloading system.

The most common tractor for agricultural enterprises are KamAZ vehicles, which have proven to be the most reliable and adapted to difficult conditions and have a high cross-country capacity.

In addition, there are several additional criteria for the successful delivery of grain crops by grain carriers [2, p. 91]:

- 1) at a humidity of more than 15%, transportation is strictly bulk-free;
- 2) wet grain is not allowed for delivery;
- 3) checking for the presence of pests in the grain is mandatory, infected raw materials are prohibited for transportation.

When transporting grain crops over long distances (before loading and during the voyage), check: the moisture content of raw materials; the presence of mold fungi; absence of odor, mustiness, foreign inclusions and large foreign bodies; uniformity of mass, absence of impurities of vegetable oils, etc.

Quality control of grain during loading and unloading reduces the risk of unforeseen situations or spoilage of raw materials by the time of delivery to the destination.

The analysis of literature shows that road transport in the Republic of Kazakhstan does not fully fulfill the tasks facing it [3, p. 110]. This is largely due to the inconsistency of the economic interests of the industry and the clientele it serves, the poorly developed production base of motor transport enterprises, insufficient state regulation, etc.

It is revealed that the main problems of the effective use of road transport are related to:

- 1) the imperfection of the legislative system;
- 2) poor development of the road network;

- 3) the ever-increasing cost of fuels and lubricants;
- 4) road safety;
- 5) a high level of harmful effects on the environment;
- 6) unavailability of transport services in remote regions;
- 7) low technical level of production and technical base, etc.

Based on the above, the following conclusions can be drawn:

- 1) road freight transportation belongs to the priority sectors of the economy of Kazakhstan;
- 2) the problem of road transport: depreciation of fixed assets, a strong dependence of the profitability of enterprises on the cost of fuels and lubricants;
- 3) road freight transport can have a significant impact on the country's economy and GDP;
- 4) the underdeveloped infrastructure of road cargo transportation is a limitation for the effective development of the studied market and the economy of the country as a whole;
- 5) the demand for road freight transport services has a constant and high relevance;
- 3) road transport is considered a profitable commercial project given the regular state support.

The research purpose is to study ways to improve the efficiency of road transportation of agricultural products and the use of mobile applications to improve the efficiency of road transport in the transport of agricultural products [4, p. 68].

Today, there are a number of problems associated with the transportation of agricultural goods by road in the world:

Insufficient infrastructure

Inefficient use of transportation.

Some roads and traffic conditions may slow down vehicle speeds, resulting in delays and longer delivery times.

Security problems,

Quality control issues.

Unpredictable weather conditions,

Transport restrictions [4, p. 68].

These problems require serious attention and efforts to solve them in order to ensure safe, efficient and high-quality transportation of agricultural products by road. And the use of smart technologies in logistics has become, is and will be one of the most effective ways to increase freight traffic.

Mobile applications for the transport of agricultural goods by road are relatively new technologies, and their history is not yet long enough to talk about how they came about. However, it can be said that the first mobile applications for cargo transportation in general began to appear on the market quite recently

#### **Materials and methods of research.**

The main experimental research material and method include a mobile application developed for vehicles intended for the transportation of agricultural cargo. The research methods are the descriptive method, statistical analysis and data formalization.

#### **Research results.**

Ways to improve the efficiency of road transport. Improving the efficiency of road transport allows to reduce transportation costs and increase the competitiveness of a transport company.

There are several ways to improve the efficiency of road transport when transporting agricultural goods:

1. Route optimization.
2. Modern technologies.
3. Eco-friendly fuels.
4. Load optimization.
5. Modernization of the fleet.
6. Driver training.

Increasing the efficiency of motor transport is influenced by various factors from the brand of cars to government programs implemented in a certain area to ensure food security [6, p. 91].

Road transport used for the transportation of agricultural goods must have the following technical characteristics shown in Table 1.

The use of trucks allows you to solve the problem of freight transportation more cost-effectively. Operators are increasingly focusing on efficiency and the total cost of ownership of vehicles. Customers, in turn, are concerned about the safety of cargo in the transport chain [7, p. 59].

Mobile applications for road transportation of agricultural goods. Mobile applications can help improve the efficiency of road transport.

The most common mobile applications for vehicles: "Freight Go", "Load Master", "Logistics Xpress", "Load Runner" and others.

Table 1 – Technical characteristics of CARGO transportation of agricultural goods

Indicator	Characteristic
Load capacity	the vehicle must have sufficient load capacity
Body	the car body must be specially designed for the transportation of agricultural goods
Axles and suspension	the vehicle must have sufficient axles and reliable suspension
Engine and transmission	the car must have sufficient engine power and torque
Brakes	the braking system must be reliable
Clearance	the car must have sufficient ground clearance
Electronic systems	the car can be equipped with electronic systems
Tires	the tires of the car must be suitable for the transportation of agricultural goods
Depreciation system	the depreciation system must be specially configured for the transportation of agricultural goods

All mobile applications are original and easy to use, which makes it easier for customers to find and interact with the application, in addition to being aimed at its target audience.

**Conclusions.** Agriculture is one of the main sectors of the economy and efficient logistics in the transportation of agricultural products is important to ensure their timely and safe delivery.

This article reveals the importance of mobile applications in the field of transportation of agricultural products. With the constant development of technology and increasing interest in digital transformation in agriculture, the use of mobile applications is becoming more important and relevant. The future of agricultural logistics is closely related to the use of innovative solutions, including mobile applications, which allow agricultural enterprises to increase efficiency, improve management and increase profitability.

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#### Сведения об авторе:

*Starunova Irina Nikolayevna – Candidate of Technical Sciences, Associate Professor of the Tractors, Agricultural Machinery and Agriculture Department, FSBEI HE “South Ural State Agrarian University”, Russian Federation, 454080, Chelyabinsk Region, Chelyabinsk, 75 Lenin Ave., tel.: +7-906-862-03-97, e-mail: irina.starunova.66@mail.ru.*

*Старунова Ирина Николаевна – техника ғылымдарының кандидаты, «Тракторлар, ауыл шаруашылығы машиналары және ауыл шаруашылығы» кафедрасының доценті, Оңтүстік Орал мемлекеттік аграрлық университеті, Ресей Федерациясы, 454080, Челябині облысы, Челябині қ., Ленин даңғылы, 75; тел.: +7-906-862-03-97, e-mail: irina.starunova.66@mail.ru.*

*Старунова Ирина Николаевна – кандидат технических наук, доцент кафедры «Тракторы, сельскохозяйственные машины и земледелие», ФГБОУ ВО Южно-Уральский государственный аграрный университет, 454080, Челябинская область, г. Челябинск, пр. Ленина, 75; тел.: +7-906-862-03-97, e-mail: irina.starunova.66@mail.ru.*

УДК 636.2.034

МРНТИ 68.39.29, 68.39.19

[https://doi.org/10.52269/22266070\\_2023\\_3\\_83](https://doi.org/10.52269/22266070_2023_3_83)

### **ВЗАИМОСВЯЗЬ ОЦЕНКИ КОНДИЦИИ (BCS) И ПОКАЗАТЕЛЕЙ МОЛОЧНОЙ ПРОДУКТИВНОСТИ ДОЙНЫХ КОРОВ В УСЛОВИЯХ ТОО «МОЛОЧНАЯ ФЕРМА «АЙНА»**

Ускенов Р.Б. – кандидат сельскохозяйственных наук, доцент кафедры технологии производства и переработки продуктов животноводства, НАО «Казахский агротехнический исследовательский университет им. С. Сейфуллина», г. Астана, Республика Казахстан.

Бостанова С.К. – кандидат сельскохозяйственных наук, ассоциированный профессор кафедры технологии производства и переработки продуктов животноводства, НАО «Казахский агротехнический исследовательский университет им. С. Сейфуллина», г. Астана, Республика Казахстан.

Айтмуханбетов Д.К. – кандидат сельскохозяйственных наук, специалист по испытаниям Совместной Казахстанско-Китайской лаборатории по биологической безопасности, НАО «Казахский агротехнический исследовательский университет им. С. Сейфуллина», г. Астана, Республика Казахстан.

Бигарина А.Н.\* – магистр сельскохозяйственных наук, лаборант кафедры технологии производства и переработки продуктов животноводства, НАО «Казахский агротехнический исследовательский университет им. С. Сейфуллина», г. Астана, Республика Казахстан.

В данной статье представлены результаты исследований по изучению взаимосвязи между Body Condition Score (оценкой упитанности) и показателями молочной продуктивности (жир, белок, удой, соматические клетки) дойных коров голштинской породы, которые содержатся на базе ТОО «Молочная ферма «Айна». Всего были сформированы 4 группы. Данные отбирались ежемесячно при контрольной дойке, с октября 2022 года по февраль 2023 года. Регулярное проведение оценки кондиции может использоваться как эффективный инструмент в менеджменте дойного стада.

В ходе исследования, установлено, что средняя оценка кондиции (BCS) по стаду составляет 2,97 балла, и показывает, что он находится в пределах нормы. Анализ состава молока показал достаточно высокое содержание жира и белка в молоке, а также превышение допустимого количества соматических клеток.

Результаты исследований, а также корреляционный анализ показали, что между оценкой кондиции (BCS) и молочной продуктивностью существует связь. Низкие показатели BCS не позволяют в полной мере реализовать заложенный генетический потенциал продуктивности, о чем говорит среднесуточный удой по стаду, составляющий около 17 кг.

**Ключевые слова:** Body Condition Score, молочная продуктивность, голштинская порода, содержание жира и белка, соматические клетки.

### **CORRELATION BETWEEN BODY CONDITION SCORE (BCS) AND INDICATORS OF MILK PRODUCTIVITY OF DAIRY COWS IN THE SETTING OF «AINA» DAIRY FARM» LLP**

Uskenov R.B. – Candidate of Agricultural Sciences, Associate Professor of the Department of technology of production and processing of animal products, S.Seifullin Kazakh Agro Technical Research University NCJSC, Astana, Republic of Kazakhstan.

Bostanova S.K. – Candidate of Agricultural Sciences, Associate Professor of the Department of technology of production and processing of animal products, S.Seifullin Kazakh Agro Technical Research University NCJSC, Astana, Republic of Kazakhstan.

Aitmukhanbetov D.K. – Candidate of Agricultural Sciences, testing specialist of the Joint Kazakh-Chinese Laboratory for Biological Safety, S.Seifullin Kazakh Agro Technical Research University NCJSC, Astana, Republic of Kazakhstan.

Bigarina A.N.\* – Master of Agricultural Sciences, laboratory assistant of the Department of technology of production and processing of animal products, S.Seifullin Kazakh Agro Technical Research University NCJSC, Astana, Republic of Kazakhstan.

This article presents the findings of research on the relationship between the Body Condition Score (assessment of fatness) and indicators of milk productivity (fat, protein, milk yield, somatic cells) of dairy Holstein cows managed by Aina Dairy Farm LLP. In total, 4 groups of cows were formed. The data were collected monthly during the control milking, from October 2022 to February 2023. Regular assessment of the body condition can be used as an effective tool in the management of the milking herd.