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# Improving Efficiency of Feeding Cattle.

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**ABSTRACT**

The relevance investigated problem is caused by an increase in the competitiveness of dairy farming with help of latest technologies and equipment, as well as an increase in dairy cow productivity. The article contains constructive scheme and substantiation parameters universal self-feeder taking into account its relationship with the animal and reduce feed wastage. The goal is device that meets requirements of flexibility in relation to both the species and age and sex of cattle, and in relation to basic feed. The article will be useful to scientists involved in forage production, designers who are developing techniques for livestock and professionals involved in the production of livestock products.

Keywords: animal husbandry, food, milk, feed, cow's productivity, self-feeder, feeding zone.

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## INTRODUCTION

Rapid growth of the world population, in comparison with growth of production, is a major factor constant increase in demand for food in the world market. This advance is stable and there over the last few decades.

In Russia, until recently, the main objective of food policy was considering food affordability, which was achieving due to an increase in imports. Foreign farmers thanks to a well-functioning system of state support have won the price competition. Only in early 2010 it adopted a Food Security Doctrine (hereinafter - the doctrine), according to which "the food security of the Russian Federation is one of the main directions the national security of country" [1, 5, 8].

Livestock - a major branch of agriculture, which is the state of food security country, depends. The level development of livestock determines the degree of market saturation of high-calorie foods - meat, dairy and other products [2, 4, 6].

Pastoralism is the first in importance of livestock industry, giving the most valuable high-protein and high-calorie foods. In addition, cattle ranching is a specific economic interest.

In most regions of the country, milk production is had carried out on the extensive technology, a herd of cattle characterized by insufficient genetic potential. The increase in milk production over the last 50 years in the country was carrying out in unpromising direction, namely by increasing the number of livestock herds national, rather than an increase in the productivity of cows [3, 7].

Improve the efficiency and competitiveness of dairy farming is impossible without modernization farms based on the latest technologies and equipment.

As reserves to reduce of labor costs and impact on productivity of cows and young cattle, the process of storage, preparation and distribution feed takes among the other major technological processes on farms cattle particular importance.

The main source of energy, protein and biologically active substances are the feeds in the form of hay, haylage and silage.

Processes associated with the cleaning, transportation and distribution hay significantly reduce its quality due to scattering leaves and flower clusters that have more valuable forage qualities and contain valuable nutrients. In this case, use clean feed with baling and rolls eliminate these losses during transportation and storage. However, there is a problem with the grinding and distribution of food, as this process requires additional equipment and energy costs.

The solution to these problems should be a device that meets the requirements of flexibility both in relation to the species and age and sex of farm animals, and in relation to the main types of feed fed to these animals.

## MATERIALS AND METHODS

The current types of feeders for the feeding of cattle are usually bulky, allows a significant loss of feed and do not provide simultaneous front feeding group of animals according zootechnical requirements. In this connection, it is expedient to feeding animals by feed's table when the animals contents in premises and by self-feeder fattening sites (Fig. 1).

On feedlots of cattle, as well as the content of dairy cows on summer milking sites (free-range yards) for feeding hay (both roll and loose) the most efficient use self-feeder (Fig. 2).

Seklf-feeders have several advantages, the main ones are:

- Reduction of the time of use for dispensing food technology, which leads to reduced SCI and maintenance costs;
- Reduction of operating costs;
- The animals are less prone to contact with the technique, which is very positive impact on their productivity;
- The possibility of irregular feeding.

However, existing self-feeders design used for feeding hay is usually had compressed into rolls, as well as allows a significant loss of feed. Therefore, we set the goal - to develop constructive scheme and to justify the values of universal self-feeder taking into account its relationship with the animal and reduce feed wastage.

In the study of experimental self-feeder, equipped video equipment and large-scale shields (Fig. 3) to determine the angle of rotation neck and head of animal with respect to their axis of rotation.

In experimental studies self-feeder installed on backyard area where animals are kept different age and gender groups.

Terms of research included:

- Description of a place of research;
- Zootechnical characteristics of the animals;
- Technological and zootechnical indicators and feeding animals;
- Weather performance environment finding animals.

The study of animal behavior at the trough provided for:

- Definition of movements of animals in the feeding zone and relatively feeders;
- Define the path of the head and neck of the animal with respect to the feed lattice with periodically varying sizes of tall lattice and lag it by a monolith feed.

Determination of positions occupied by the animals during feeding and parameters that lead to feeding space, carried out by a video camera and sheets coated with scale grid.

Determination of the distribution and the amount of feed losses arising from animals fed by self-feeder was as follows. During the feeding process animals, after a certain time interval (2 ... 3 hours), was distilled off the cattle and along the perimeter with the outer side edge on the ground stacked grid 1250 x 1250 mm, made of wire with a diameter of 0.8 mm mesh size 250 x 250 mm (Fig. 4).

Then from each cells were collected lost feed, summarize by remoteness of areas and weighed on electronic scales. Feed under self-feeder attributed to Zone 1. The data were entering in the book, and then processed.

## RESULTS AND DISCUSSION

Based on studies relationship animals with self-feeder and observing the behavior animals in food consumption, and design parameters dividing grids and biometric sizes of animals, identified kinematic characteristics, that define area which animal is free to consume food, and therefore beyond the reach of zone (Fig. 5).

Observations have shown, that feed, moving on an inclined surface of the bottom wall (Fig. 5) to lower-edged forms a specific layer feed, rests on the edge of the trough and is available to the animal. As weight is reduction, the feed overlying mass of the newly shifted to the edge thus self-feeder ensured constant availability of food in the access area.

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It should also been noted that the lower inclined edge of self-feeder bottom wall located at a distance of 0.3 m from edge of the trough self-feeder. Consequently, the animal will penetrate deeper into self-feeder, which, as previously noted, leads to lower feed losses.

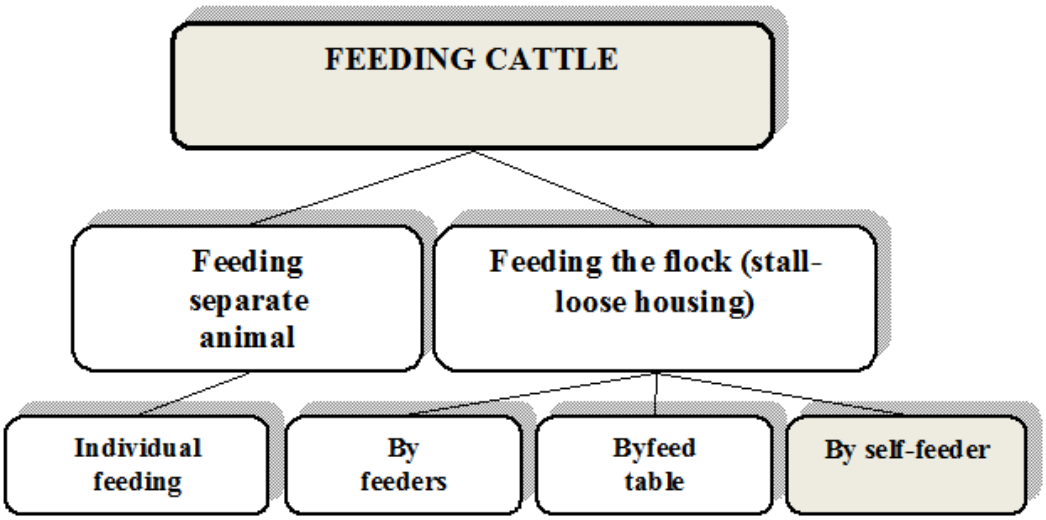


**Figure 1: Methods of feeding cattle**

**Figure 2: Self-feeder for cattle**

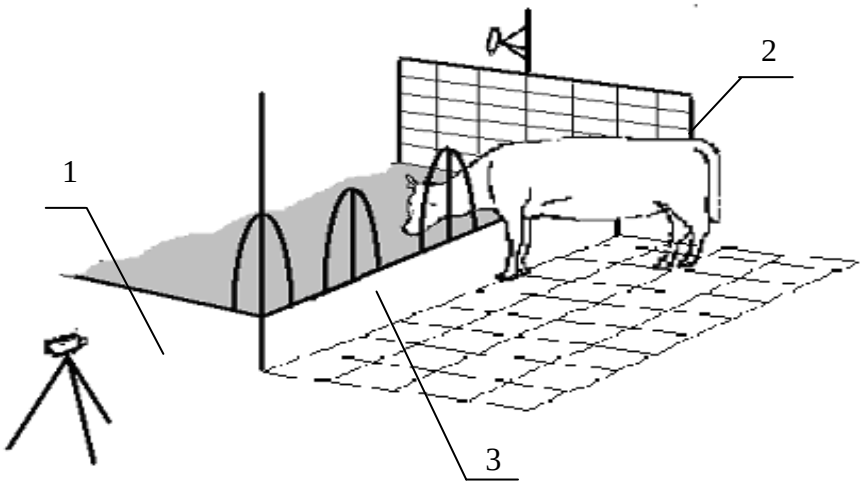


**Figure 3: Schematic of the experimental setup to determine the animal's relationship with self-feeder. 1 - video camera; 2 - large-scale shield; 3 - element of self-feeder.**

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**Figure 4: Definition of food losses**

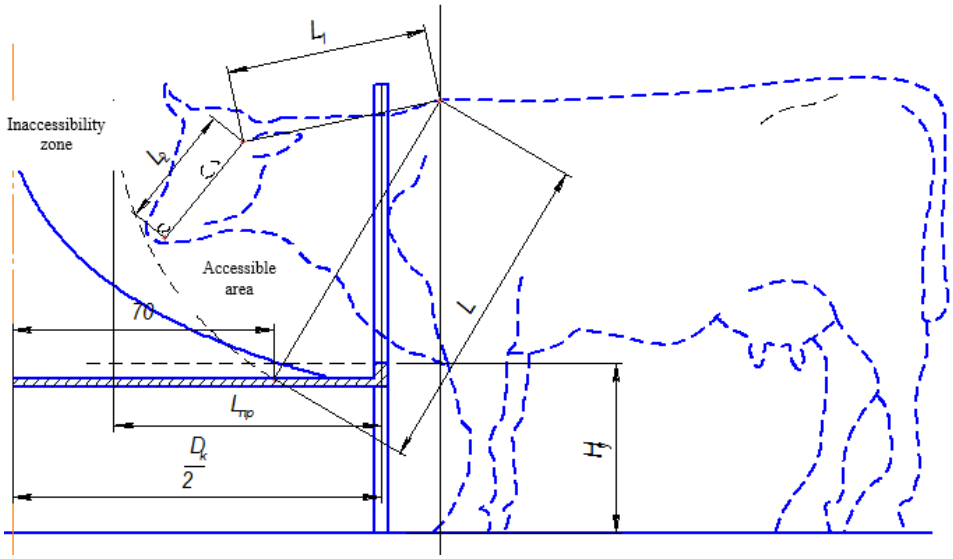


**Figure 5: Border reach, determines the trajectory of movement head**

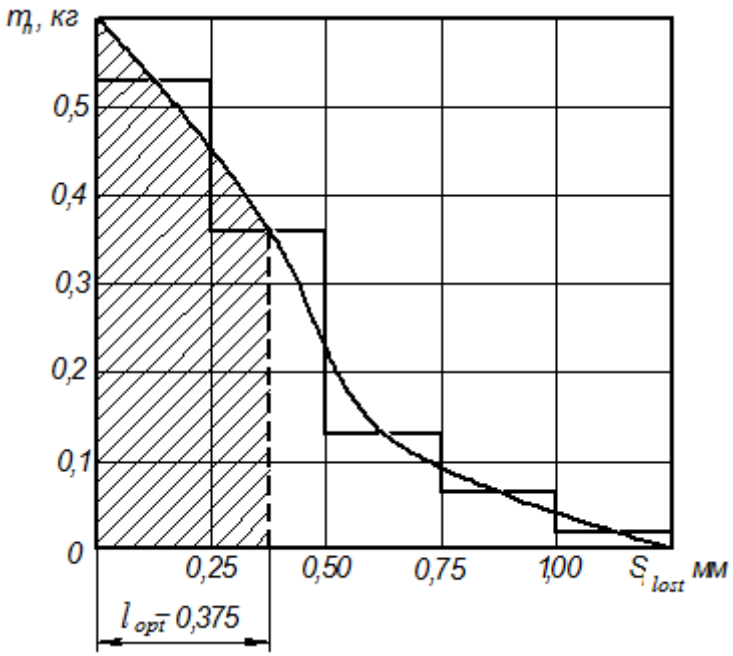


**Figure 6: Distribution of losses depending on the extension edge of self-feeder.**

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## CONCLUSION

From the foregoing, it can be concluded that the construction provides self-feeder:

- The continued availability of the mass of feed accessible to the animal area;
- The lack of food residues;
- Reducing the feed loss.

In conducting studies to determine the loss of feed in the feeding set that the longer the feed particles, the greater the losses. This is due to an increase in connectivity feed, particles with increasing length. Animal, capturing a portion of the feed tends to get out of the feeding area and chew feed. Particles of feed is in mouth carries with adjacent particles, which at displacement during movement lose touch with each other and fall off. This is had manifested mainly in loose hay and straw into a roll, as it is composed of long particles.

Monitor the process of feeding animals by self-feeder was founding that animals lose much of forages on a certain stretch Spot width $S_{lost}$ = 1250 mm from edge of self-feeder (Fig. 6).

The studies determined the distribution of the loss on the perimeter of the front feeding depending on the distance from the edge of self-feeder.

The graph shows that a large part of the loss on a plot of 0...0.5 m from the edge of self-feeder. Therefore, setting the perimeter self-feeder on the outside $l_{opt}$ = 0,375, is possible to reduce the loss by 55...65%.

Based on theoretical and experimental studies designed self-feeder, technical innovation which is protected by a patent for an invention (patent number 2269260 RF MPK7 K5 A01 / 00, A 01 F 25/04 Self-feeder -. Machine / LA Ryzhkov , Igor Kapustin, IN Krasnov (Russian Federation) - number 2002121183; Stated 05.08.2002; 27.06.2004 Bulletin №18-6s Publ: Ill. 2).

Payback self-feeder compared to feeder VNIPTIMESKH less than approximately 2.3 times.

## REFERENCES

[1] Ryzhkov, L. A. Progressive technology of feeding of animals / L. A. Ryzhkov, A. A. ten'ka // Machinery and equipment for the village. – 2003. - №3 (69). – Pp. 7 – 9.

[2] Ryzhkov, A. L. Types of samotorac for animals in the EU / L. A. Ryzhkov, A. A. ten'ka // Sheep, goats, wool business, 2004.- No. 1. – P. 49 – 52.1. Juricek, J. Overovanie funkcie elektromagnetickyh pulzatorov // Polnohospodarstvo. – 1991. – T. 37. – S. 263-268.

[3] Manus sentralpulsering for mjolkestall // Provemelding Norges landbrukshogskole. Inst. for tekn. fag. – Norge, 1992. – Vol. 673. – 5 p.

[4] Patent RF № 95222, MPK8 A 01 J 5/14. Elektropulsator doilnogo apparata / Nikitenko G. V., Kapustin I. V., Grinchenko V. A.; zaiavitel i patentoobladatel Stavrop. gos. agrar. un-t. - № 2010108042/22; zaiavl. 04.03.10; opubl. 27.06.10.

[5] Patent RF № 2370874, MPK8 H 02 K 33/12. Lineinyi dvigatel / Nikitenko G. V., Grinchenko V. A.; zaiavitel i patentoobladatel Stavrop. gos. agrar. un-t. - № 2008112342/09; zaiavl. 31.03.08; opubl. 20.10.09.

[6] Ivan Vasil'evich Kapustin, Vitaly Anatol'evich Grinchenko, Dmitry Ivanovich Gritsay, and Elena Ivanovna Kapustina. Res J Pharm Biol Chem Sci 2016;7(2):338-343.

[7] Boris Alekseevich Doronin, Anatolii Timofeevich Lebedev, Olga Ivanovna Detistova, and Dmitriy Ivanovich Gritsay. Res J Pharm Biol Chem Sci 2016;7(3):1895-1901.

[8] Viktor Ivanovich Marchenko, Dmitry Alekseevich Sidelnikov, Dmitry Ivanovich Gritsay, Eugene Vasilyevich Gerasimov, and Igor Igorevich Shvetsov. Res J Pharm Biol Chem Sci 2016;7(3):1913-1918.