

СЕКЦІЯ 9.

АГРАРНІ НАУКИ ТА ПРОДОВОЛЬСТВО

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SELECTION OF COWS FOR SUITABILITY FOR MILKING BY A MILKING ROBOT VMS BY «DELAVAL»

A promising direction for the modernization of dairy farming is the implementation of herd management programs and the creation of robotic farms equipped with innovative systems for voluntary milking of cows, which ensure the constant performance of a set of technological operations that are repeated in a strictly defined sequence, reduce the stress load on animals, eliminate injuries and inflammation of the udder, reduce the level of morbidity of cows, which allows to increase labor productivity, the quality of products produced and increase productivity [1,4]. In addition, in conditions of intensive production technologies, various technological and climatic stress loads, animal welfare is of great importance [2,3,5-7].

Therefore, research aimed at identifying effective areas for improving milk production technology in leading livestock complexes, which have powerful reserves and can become the basis for the development of the industry in the region, is relevant.

The research was conducted in the conditions of the «Agroservice SG» Private Enterprise, Novovodolazha District, Kharkiv Region, on the Holstein cattle. The experiment was conducted on two groups of dairy cows kept in buildings with different technologies. In the department with the ADM-8A milking system, cows are kept tethered in cowsheds with a four-row arrangement of stalls. The cowshed is designed for 200 heads. In the second building, cows are kept untethered, with milking using DeLaval milking robots. Milking robots are designed for autonomous operation. The principle of their operation is as follows: when an animal comes for milking, the system reads data about it

from the collar and decides whether to let the cow in or not; after the robot lets it in, it gives it compound feed, washes the teats and begins the milking process. According to a pre-programmed scheme, the robotic arm searches for teats, attaches milking cups to them and starts milking. The main advantage of this technology is that the animal is self-service and that it leaves the cow the right to freely choose the time and frequency of visits to the milking box. Our research, as well as observations of farm specialists, have shown that animals quickly get used to milking by a robot and visit the milking box independently. At the same time, the frequency of milking in highly productive cows increases, which has a beneficial effect on the health of the animal's udder and helps to increase productivity by up to 20%.

At the same time, the new technology also requires changes in approaches to organizing the milking process itself, selecting animals and managing the herd. Therefore, one of our tasks was to find out the features of selecting cows for suitability for machine milking when using milking robots. When using an automatic milking system, cowshed designs must take into account that, in accordance with the daily routine and physiological needs, animals make multiple movements around the premises (for milking - up to 5 or more times a day, for feeding - an average of 7 times).

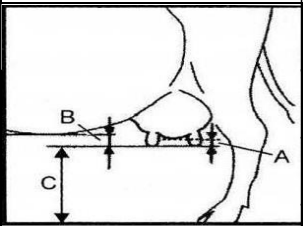
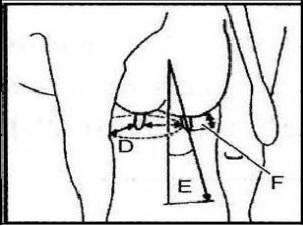
The operation of robots involves compliance with certain requirements. Each animal must produce at least 7000 kg of milk per lactation. With lower productivity of the cows being served, the use of this equipment is economically inexpedient.

In the farm, when forming a herd, they proceed from the general requirements that animals must meet when milking them with a robot: high milk productivity and milk yield; tightly attached udder, teats of the same size, the lower point of which should not be lower than 33 cm from the floor level; the minimum distance between the rear teats is 3 cm, between the front ones - 12.5 cm; the diameter of the teats - in the range from 1.5 to 3.5 cm; the rear teats should be lower than the lowest part of the udder by 3 cm.

A number of manufacturers of milking robots, taking into account the design features and functional capabilities of their machines, develop their own requirements (Table 1) [1,12].

Table 1

Requirements for cows suitable for milking with the DeLaval VMS milking robot

Drawing	Symbols	Parameters	Parameter value, mm	
			min	max
	A	The distance between the bottom of the udder and the tip of the rear nipple	30	-
	B	The distance between the bottom of the belly and the tip of the anterior nipple	30	-
	C	The distance between the tips of the nipples and the floor	270	750
	D	The distance between the rear teat and the cow's leg	15	-
	E	Deviation of the nipples from the vertical		45°
	F	Nipple length	30	70
	-	Nipple diameter	15	50
	-	Distance between nipples	15	-

The main method of improving animal breeds is the selection of further breeding of more productive animals. Only with systematic (from generation to generation) preservation and breeding of offspring from more productive cows does the breed gradually improve. Breed improvement through selection is slow but correct. To conduct selection among dairy cattle, it is necessary to constantly take into account its milk productivity and origin [10]. Also an important feature is manufacturability, that is, resistance to stress load, which determine the suitability of cows for industrial technology [11]. This is important to consider when selecting because the trait of stress resistance is inherited by descendants [8,9].

The amount of milk yield and the composition of milk depend on the speed of milking; when cows are milked quickly, the yield is higher and the milk is fatter than when milked slowly. This is explained by the anatomical structure of the udder and the physiological processes that occur during milking.

Thus, it should be concluded that the herd of cows in the «Agroservice SG» is quite diverse in morphological characteristics and therefore cows with more developed udders can be selected for breeding work.

Morphological traits are quite stably inherited by the offspring. Mother cows with a certain udder shape transmit their udder shape to their daughters in approximately equal proportions (56%), the remaining influence on the udder shape of daughter cows is exerted by breeding bulls. Therefore, when choosing a breeding bull, it is necessary to take into account this level of influence in order to have daughters with the desired udder shape, which most closely meets the requirements for suitability for machine milking.

Referenses:

1. Alekseeva, Y. A., Garmaev, D. T., Khoroshailo, T. A., & Serdyuchenko, I. V. (2021, November). Automated systems application for the advanced cow milking technologies development. In AIP Conference Proceedings (Vol. 2402, No. 1). AIP Publishing.
2. Chernenko, O. M., Prishedko, V. M., Mylostyvyi, R. V., Shulzhenko, N. M., Orishchuk, O. S., Chernenko, O. I., ... & Khmeleva, O. V. (2019). Welfare and sperm quality with a focus on stress resistance of *Bos taurus*. *Ukrainian Journal of Ecology*, 9(4), 493-498.
3. Mylostyvyi, R., Kalinichenko, O., Skliarov, P., Lesnovskay, O., Karlova, L., Begma, N., ... & Izhboldina, O. (2021). The influence of the season on the efficiency of fertilization and the manifestation of postpartum pathology in dairy cows. *Ukrainian Journal of Ecology*, 11(4), 81-86.
4. Mylostyvyi, R., Sejian, V., Souza-Junior, J. B. F., Wrzecińska, M., Za, T., Chernenko, O., ... & Hoffmann, G. (2024). Digitalisation opportunities for livestock welfare monitoring with a focus on heat stress. *Multidisciplinary Reviews*, 7(12), 2024300-2024300.
5. Mylostyvyi, R., Izhboldina, O., Midyk, S., Gutyj, B., Marenkov, O., & Kozyr, V. (2023). The relationship between warm weather and milk yield in holstein cows. *World's Veterinary Journal*, (1), 134-143.
6. Mylostyvyi, R., Lesnovskay, O., Karlova, L., Khmeleva, O., Kalinichenko, O., Orishchuk, O., ... & Izhboldina, O. (2021). Brown Swiss cows are more heat resistant than Holstein cows under hot summer conditions of the continental climate of Ukraine. *Journal of Animal Behaviour and Biometeorology*, 9(4), 0-0.
7. Mylostyvyi, R., Sejian, V., Izhboldina, O., Kalinichenko, O., Karlova, L., Lesnovskay, O., ... & Hoffmann, G. (2021). Changes in the spectrum of free fatty acids in blood serum of dairy cows during a prolonged summer heat wave. *Animals*, 11(12), 3391.
8. Пришедько, В. М. (2014). Економічна ефективність племінного використання бугаїв-плідників різних типів стресостійкості. *Науковий вісник Львівського національного університету ветеринарної медицини та біотехнологій ім. Гжицького*, (16, № 2 (3)), 169-175.
9. Пришедько, В. М. (2010). Спермопродуктивність і якість сперми бугаїв-плідників різного рівня

стресостійкості. Випуск, 1, 113-119.

10. Пришедько, В. М., & Гуляк, А. В. (2018). Залежність молочної продуктивності корів голштинської породи від їх лінійного походження. Молодий вчений, (4 (1)), 193-196.
11. Пришедько В.М. Оцінка бугаїв-плідників за продуктивними та відтворювальними якостями залежно від рівня їх стресостійкості: автореф. дис. на здобуття наук. ступеня канд. с.-г. наук: 06.02.04 "Технологія виробництва продуктів тваринництва" / В.М. Пришедько. – Миколаїв, 2011. – 19 с.
12. Ткачук, Є. М. (2023). Досвід експлуатації роботизованих систем доїння і первинної обробки молока в ТДВ «Терезине» Білоцерківського району Київської області.