Подсекция «Иностранные языки»

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BASIC PRINCIPLES OF PRECISION LIVESTOCK FARMING

Student –	Anishchenko A.A., 21ot, master degree student, ITF;
	Kozlikin D.A., 24mo, 3nd year, FTS
Scientific supervisor –	Dubina L.P., senior teacher

EI «Belarusian State Agrarian Technical University»,
Minsk, the Republic of Belarus

Abstract. This article describes the importance of using precision livestock farming, which is being developed in the dairy sector to facilitate herd monitoring, reduce labor-intensive processes, and ensure process productivity.

Keywords: precision livestock farming (PLF), monitoring, farm performance, information and communication technologies.

Nowadays several issues must be solved in the livestock farming, such as monitoring animal health and welfare, reducing the environmental impact, and assuring the productivity of the process. With increasing herd sizes and decreasing workforce availability, precision livestock farming (PLF) is being developed in the dairy sector to facilitate herd monitoring.

PLF defines as the use of technologies which enable the measurement of physiological, behavioral, and production indicators in animals with the aim of improving herd management strategies and farm performance. PLF is a way of managing a farm through the monitoring and recording of automated, real-time measurements of animal production, breeding, health and well-being [1].

While the concept of PLF is quite recent, tools such as individual electronic milk meters for cows began to be developed in the 1970s.

Scientists draw from the various definitions to propose the following: PLF is the coordinated use of sensors to measure behavioral, physiological and production parameters in animals and the characteristics of the farm environment (temperature, hygrometry, ventilation), and of information and communication technologies (ICT) to exchange, store, transform and restore this information to farmers to support decision-making in conjunction with their own observations.

Robots are sometimes coupled with data transfer technologies, and are generally started, adjusted or driven by the sensors which they contain.

The aim of PLF is to manage individual animals by continuous real-time monitoring of health, welfare, production/reproduction, and environmental impact. The idea of PLF is to provide a real-time warning when something goes wrong so that immediate action can be taken by the farmer to solve the problem.

According to researches, to further develop and introduce such supporting management PLF systems, some basic principles must be respected [2, p. 261].

First, animal-related variables must be measured and analyzed continuously at an appropriate level and frequency with the help of sensors. These variables include live weight, ingested food quantity, feeding behavior (ingestion, mastication, rumination, frequency of mouthfuls), and social behavior. Physiological parameters (body temperature and pH, milk composition and physical-chemical characteristics) can also be measured. Second, a reliable predictive model of animals' reactions to environmental conditions (diet, climate, farming practice) must be used. A comparison between what is expected (as calculated by this mathematical model) and the data provided by the sensors identifies animals which have a problem and require the farmer's particular attention. Finally, the predictive model and measurements taken are integrated into an algorithm to help farmers to take their decisions. Real-time environmental controls via alerts sent to farmers (by smart phone, computer) or robots may even be included, for example for fodder distribution or animal sorting.

Therefore, the accuracy of "precision animal husbandry" depends on the quality and reliability of monitoring each animal in terms of its physiological and behavioral reactions over time to farm conditions.

Different sensors have been developed for dairy production. Many dairy farmers have for a long time used electronic milk meters to precisely measure milk production, pedometers to detect the increased numbers of steps linked to cows in heat, and analyses of milk conductivity to detect mastitis. However, in recent years the equipment available to detect more precisely when cows are in heat, calving, infectious and metabolic disorders, and cows' well-being has expanded considerably.

Sensors have been developed which allow more precise measurements of behavioral parameters (standing/lying down, physical activity in several space dimensions, tail movements, time ruminating). Various milk analysis tools, to identify milk composition (fat, protein, lactose), quality (leukocytes, blood), and the presence of enzymes (lactate dehydrogenase), hormones (progesterone) are now integrated into new models of milking robots. More recently, sensors used in vivo to measure body temperature have been proposed for the early detection of calving and infectious and metabolic disorders. Applied to grazing animals, PLF is mainly based on the recording of three parameters: the location, posture and movements of animals with the use of tools to detect jaw movements (jaw switches, pressure sensors, accelerometers) and to measure grazing intake [3, p. 278].

The development of precision livestock farming (PLF) on dairy farms modifies the duration of work, the content and the nature of the tasks carried out by farmers, their mental workload, and the relationship between farmers and their animals. However, if the tools are not adapted to farmers' needs and skills, labour, PLF can also lead to negative impacts on farmers and animals. It is therefore critical to consider the different dimensions of farmers' work to facilitate their adoption of these new technologies.

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THE IMPORTANCE OF AGRICULTURAL MAINTENANCE

Student –   Zhydovich A.A., 1e, 1st year, APF;
           Zykov N.D., 24mo, 3nd year, FTS
Scientific
supervisor –   Dubina L.P., senior teacher
EI «Belarusian State Agrarian Technical University»,
Minsk, the Republic of Belarus

Abstract. The article describes the importance of farm machinery maintenance activities to avoid delays in vital agricultural processes. It highlights the main aspects of maintenance management to increase work efficiency in your farm facility.

Keywords: maintenance activities, agricultural processes, assets, farming equipment, advance planning.

Agriculture relies heavily on physical assets, including machinery, mobile equipment, and buildings. It's important to keep everything running properly in order to avoid delays in vital agricultural processes. Seeding, harvesting, fertilizing and other processes are bound to strict timelines, and the equipment used to carry them out needs to be ready for operation on time. As such, maintenance plays a vital role in keeping farms going year after year.