

Promising directions for improving the accounting of dairy productivity of cows with an assistant service participation

*S.A. Oleinik**, *D.A. Filatov*, *A.E. Maltsev*, and *M.G. Kokotka*

FSBEI HE Stavropol SAU, Stavropol, Russia

Abstract. The organization of international trade in breeding genetic resources, which include repair young animals, embryos, bovine semen, is extremely relevant for national dairy cattle breeding, since this will significantly improve the financial profit from production activities, improve production culture and increase the reliability of accounting practices. At the same time, there is a significant discrepancy in the methodology for accounting for productive traits in dairy cattle breeding in ICAR member countries and in dairy cattle breeding of the RF. Conducting innovative scientific research on the development of methodological approaches for the introduction of a new type of services for breeding enterprises for the independent accounting of productive characteristics and evaluation of milk quality allowed us to justify the creation in Russia of a new type of breeding subject – an assistant service. The article analyzes the methods of accounting practice for assessing the productive characteristics of dairy cattle in ICAR member countries. Based on the analysis, it is concluded that the heterogeneity of the use of different methods, which to varying degrees involve the participation of an independent assistant service and animal owners when considering the productive characteristics of animals. Methods "A" and "B" are most widely used among the 24 ICAR member countries. In studies conducted with the participation of the assistant service in the Stavropol Territory, with the involvement of almost all breeding farms in the region, we also established the prospects of using the "B" method when taking part in control milking of cows and taking control milk samples. The introduction in Russia of a methodology for accounting in dairy cattle breeding based on the ICAR guidelines, which provide for the further dissemination of assistant services, will contribute to the formation of an export-oriented model for the development of national dairy cattle breeding.

1 Introduction

The development of national dairy cattle breeding is characterized, in general, by positive trends, in the period 2021-2022. There was an increase in the production of raw milk, in general, by six hundred forty-four thousand tons or almost two percent, an increase in the

* Corresponding author: soliynik60@gmail.com

milk yield of cows of the main dairy breeds of Russia, on average, by almost eighteen percent [1]. The limitations for the positive development of dairy farming are the following:

- dependence on imported bull semen supplies (up to 43.6% of demand);
- various methodological approaches for the assessment of phenotypic traits of dairy cows with ICAR regulatory principles (<https://www.icar.org/>) [2, 3];
- the lack of an export-oriented model for the development of national dairy cattle breeding.

To overcome the high dependence of national dairy cattle breeding on the supply of foreign technologies for dairy herd management, genetic materials, it is necessary to harmonize the national regulatory framework in the field of accounting for productive traits with the guidelines adopted in ICAR [2, 3].

The introduction of a milk production accounting system and evaluation of cow phenotypes using a single methodology with ICAR will allow:

- to sell breeding products on interstate trading platforms;
- to form a national rating for the evaluation of breeding bulls and cows, similar to the Interbull system, which will open up the foreign market for trading genetic breeding materials for the best Russian companies doing business in dairy cattle breeding.



Fig. 1. Screenshot of the ICAR web page (2015).

A center with competencies for assessing phenotypes and genotypes of livestock has been established in Stavropol State Agrarian University, considering the ICAR methodology (Fig. 1). The tasks assigned to the center in the process of carrying out research work have been successfully completed.

Laboratory units for the study of phenotypes (milk, exterior) and genotypes are equipped with modern equipment, as part of the implementation of the federal program "Priority 2030". The partners of these divisions are almost all dairy breeding farms of the Stavropol Territory.

Together with ANO Innopraktika and the SRC Kurchatov Institute, these laboratories are participating in a federal project to improve the genetics of dairy cows in the Stavropol Territory.

2 Materials and Methods of Research

The research work was carried out in leading breeding farms for dairy cattle of Jersey, Holstein, and Ayrshire breeds using standard zootechnical methods to account for the productive characteristics of animals.

The results of the research work carried out on the instructions of the Ministry of Agriculture of the Russian Federation were presented at scientific and practical events held on the basis of All-Russian Research Institute of Breeding, All-Russian Research Institute of Animal Husbandry, "Golden Autumn (city of Moscow)" and other events with the participation of the NCO Holstein Association of Cattle Producers. The approbation of the results of the work was widely supported by the scientific community and production workers [4, 5].

3 Research results and Discussion

The research results formed the basis for the justification of the assistant service as a new type of breeding farm, which will increase the reliability of collecting accounting data in livestock breeding and contribute to the progressive movement towards harmonization of the Russian regulatory framework with the ICAR methodology and the formation of export-oriented dairy cattle breeding [6-8].

The assistant service of the Stavropol State Agrarian University has received an official status as a type of breeding farm, which allows the provision of services in the field of accounting, control, assessment of productivity and product quality, assessment of the breeding value of animals in breeding and commodity agricultural organizations, as well as in peasant farms and farms of individual entrepreneurs (IE).

At the request of the Ministry of Agriculture of the Russian Federation, a draft Regulation for the work of the assistant service was developed:

The rules of the assistant service work. Abstract. The rules of work of the assistant service characterize the main purpose of this type of breeding in livestock breeding, as the provision of services to the subjects of breeding business.

1. Labor functions of the assistant service. The activities of the assistant service include participation in the breeding of dairy and meat cattle, yaks, horses, camels, sheep and goats, pigs, poultry, rabbits and deer.

The assistant service participates in the formation of breeds, types, and lines of animals, as well as other activities provided for by the existing regulatory framework of Russia.

There are also sections in the project: 2. Organization of the assistant service; 3. Staffing of the assistant service; 4. The principle and procedure for registration of the list of services provided by the assistant service of the region; 5. The procedure for reporting on the activities of the assistant service within the framework of the implementation of regional measures for conducting breeding work.

The draft Regulations for the work of the assistant service, after revision, was posted for professional discussion on the Internet resource "Livestock breeding" [9].

The organization of milk productivity accounting and milk sampling during control milking in ICAR member countries, according to the ICAR Guidelines, is carried out in accordance with three main methods: A,B,C [3].

ICAR provides accounting organizations of the member countries with the opportunity to choose accounting methods. At the same time, for Official Reports, ICAR has approved an observation system that should be maintained and regularly documented data checked to ensure accounting authentication. In turn, ICAR members must ensure that any of their associations of accounting organizations fully comply with ICAR-approved methods and instructions for accounting for productive traits in animals.

According to the results of studying the accounting documentation of ICAR member countries posted on the official ICAR website [3], out of 24 countries, only three countries (Finland, France, Hungary) use Method C as accounting, which covers 1.7 – 9.0% of the controlled cow population. In this case, accounting is carried out in automated milking parlors, with automatic sampling of control milk samples (Table 1).

Table 1. Distribution of accounting methods and coverage of cow population (%) in some ICAR member countries.

No.	ICAR member country	Methods of accounting for dairy productivity of cows		
		A	B	C
1	Switzerland	96.0	4.0	-
2	Austria	100.0	-	-
3	Belgium	84.1	15.9	-
4	Chile	99.9	0.1	-
5	Croatia	58.7	41.3	-
6	Czech Republic	100.0	-	-
7	Denmark	10.0	90.0	-
8	Estonia	-	100.0	-
9	Finland	3.9	94.2	1.9
10	France	76.6	21.3	2.1
11	Hungary	93.0	-	7.0
12	Iceland	-	100.0	-
13	Israel	59.0	41.0	-
14	Italy	100.0	-	-
15	Luxembourg	81.9	18.1	-
16	Netherlands	30.0	70.0	-
17	Poland	100.0	-	-
18	Serbia	100.0	-	-
19	Slovakia	100.0	-	-
20	Spain	100.0	-	-
21	Sweden	-	100.0	-
22	Taiwan	100.0	-	-
23	Tunisia	24.5	75.5	-
24	UK (England)	53.0	44.0	9.0

Method B is used in other countries: Switzerland, Austria, Belgium, Chile, Croatia, Czech Republic, Denmark, Estonia, Iceland, Israel, Italy, Luxembourg, Netherlands, Poland, Serbia, Slovakia, etc., which is 70-74.2% of the controlled cow population.

Method A is used as the main accounting method with full coverage of the number of cows (100%). It is used in the following countries: Austria, Czech Republic, Italy, Poland, Serbia, Slovakia, Spain, Taiwan.

In general, Method A is the dominant accounting method among the represented ICAR member countries, at the same time, ICAR provides countries with some freedom in choosing accounting methods. The reliability of accounting and validation of accounting methods should be ensured by conducting an independent accounting of milk productivity, taking control samples of milk.

Method B provides that all measures for carrying out control milking of cows and milk sampling are carried out by specialists of the assistant service of the Stavropol State Agrarian University together with veterinary specialists of breeding farms. This practice justifies itself, thanks to the coordinated actions of specialists from breeding farms and the relevant departments of the Stavropol State Agrarian University.

Based on the conducted research, Method B is recognized as the most acceptable for evaluating the productive qualities of dairy cattle [9].

Conducting an independent accounting of the productive characteristics of dairy cattle will make it possible to form reliable information databases, develop methodological approaches for entering international markets and achieve the necessary level of milk production for the implementation of the national Food Security Doctrine [10].

4 Conclusions

1. The organization of the assistant service allows to conclude that a new approach is promising in the practice of conducting breeding work in national livestock breeding, since a new form of providing independent accounting of milk productivity and milk quality assessment has proved to be in demand among modern milk production enterprises.
2. The method of accounting for dairy productivity, regulated by ICAR as "method B", turned out to be the most popular and acceptable for modern dairy cattle breeding, since it helps to increase the reliability of accounting for dairy productivity of cows.

References

1. *Yearbook on breeding work in dairy cattle breeding in the farms of the Russian Federation (2021)*, Materials for publication prepared under the guidance of the acting Director of the Federal State Budgetary Educational Institution All-Russian Research Institute of Breeding, Doctor of Agricultural Sciences, Professor G.I. Shichkin, Director of the Department of Animal Husbandry and Breeding of the Ministry of Agriculture of the Russian Federation D.V. Butusova (FSBEI All-Russian Research Institute of Breeding Publishing House, 2022) 263.
2. International Committee for the Registration of Animals (ICAR) URL: <https://www.icar.org/>
3. Z. Liu, R. Reents, F. Reinhardt and K. Kuwan, J. Dairy Sci., **83**, 2672-2682 (2000)
4. S. Oleinik, V. Skripkin, A. Ershov [et al.], Online Journal of Animal and Feed Research, **12 (4)**, 232-239 (2022) DOI 10.51227/ojafr.2022.31. – EDN QVGGWIG.
5. V. I. Trukhachev, N. Z. Zlydnev, S. A. Oleynik, V. Y. Morozov, Research Journal of Pharmaceutical, Biological and Chemical Sciences, **7 (3)**, 2358-2359 (2016) EDN WVAWJP.
6. Federal Law No. 123- FZ of August 3, 1995 "On Livestock Breeding" (as amended, as revised on 06.12.2021).
7. Professional standard "Breeder of livestock breeding", approved by Order of the Ministry of Labor and Social Protection of the Russian Federation No. 1034n dated 12/21/2015.
8. Order of the Ministry of Agriculture of the Russian Federation No. 336 "On approval of requirements for types of breeding farms", dated June 2, 2022.
9. Professional Internet resource "Breeding livestock" URL: <https://t.me/c/1530787417/5357>
10. The Doctrine of food security of the Russian Federation / Decree of the President of the Russian Federation dated January 21, 2020 No. 20 "On the approval of the Doctrine of food security of the Russian Federation", Information legal support "Garant". URL: <https://base.garant.ru/73438425/>