



MILK PRODUCTIVITY AND CERTAIN BIOLOGICAL CHARACTERISTICS OF SIMMENTAL AND BLACK-AND-WHITE COWS

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Abstract. This article presents the results of a comparative study of milk productivity and certain biological characteristics of Simmental and Black-and-White cows under farm conditions in Sherobod District, Surkhandarya Region, Uzbekistan, during 2025–2026. The study involved 24 first-calving cows, including 12 purebred Black-and-White cows and 12 Simmental cows. Milk productivity, milk fat and protein content, lactation duration, reproductive characteristics, and adaptability were investigated.

Introduction. Livestock farming is one of the important sectors of agriculture in Uzbekistan. The growing demand for food products, particularly milk and dairy products, requires the further development of this sector, the efficient utilization of the productive potential of cattle, and improvements in production efficiency. In dairy farming, alongside breeding highly productive animals, their adaptation to local conditions and the improvement of feeding and housing technologies are also important priorities.

Keeping livestock and obtaining high productivity under the climatic conditions of Surkhandarya Region have their own specific characteristics. In particular, high temperatures during the summer months may affect the physiological condition of animals, feed intake, and, consequently, milk productivity. Therefore, studying the biological characteristics and productivity levels of different cattle breeds raised in this region is of considerable practical importance.

In this study, the advantages of Black-and-White and Simmental cows were identified by comparing their productivity under the same farm and feeding conditions. Such comparative studies help determine which breeds are most suitable for particular purposes in future livestock production.

Literature Review. 1. Polgár et al. (2023) investigated growth performance, muscularity, and carcass yield in Hungarian Simmental cattle. The researchers emphasized that, despite belonging to a dual-purpose dairy-beef breed, Simmental cattle also possess considerable potential for meat production. This characteristic increases the suitability of the breed for combined production purposes.

2. Abdurahmonov A.A. (2018) analyzed selection and breeding practices in livestock production and demonstrated the importance of appropriate animal



selection and crossbreeding systems in improving cattle productivity. According to the author, both genetic factors and feeding conditions, housing practices, and age-related characteristics must be considered in breed improvement programs.

3.Khudoyberdiyev Sh.X. (2019) studied the breeding of Simmental cattle and their productivity indicators under the conditions of Uzbekistan, emphasizing the breed's ability to adapt to the local climate. The author reported satisfactory development of growth rate, live weight, milk productivity, and meat production characteristics in Simmental cattle.

4.Karimov O.R. (2020) investigated the productive characteristics of Black-and-White cattle and highlighted the breed's high genetic potential for dairy production. Black-and-White cows are distinguished by their large body size, well-developed mammary glands, and high milk-producing capacity.

5.Ismoilov D.A. (2021) studied the growth performance of crossbred offspring obtained by mating Simmental bulls with Black-and-White cows. The study found that certain performance indicators of first-generation (F1) crossbreds could exceed those of their purebred counterparts. This phenomenon was explained by the effect of heterosis.

6.Nortasheva M. and Narbayeva M.K. (2025) examined the productive characteristics of the Simmental breed and emphasized its importance in dual-purpose dairy and beef production. Asrayev U.N. (2022), in turn, highlighted opportunities to improve the productivity of young Simmental cattle in Uzbekistan through intensive production technologies.

Materials and Methods.The study was conducted during 2025–2026 at the livestock farm of Jo‘raniyoz Toshpo‘latov in Sherobod District, Surkhandarya Region, Uzbekistan.

The research subjects were Black-and-White and Simmental cattle kept on the farm. The research material consisted of milk obtained from first-calving cows, its quantity, and its principal quality indicators.

Two groups of animals were formed for the experiment. The first group consisted of 12 purebred Black-and-White cows, while the second group included 12 Simmental cows. A total of 24 first-calving cows participated in the experiment.

The feeding conditions of the experimental animals were maintained as similar as possible. The diets included skim milk, alfalfa herbage, green maize, fodder beet, haylage, maize silage, alfalfa hay, natural grass hay, cottonseed hulls, cottonseed meal, and compound feed.

Table 1. Feed quantities provided per animal during the experimental period

Feed type	Black-and-White	Simmental
Skim milk, kg	120	120
Alfalfa herbage, kg	3,720	3,745
Green maize, kg	1,250	1,240
Fodder beet, kg	350	345
Haylage, kg	766	750
Maize silage, kg	1,030	1,008



Feed type	Black-and-White	Simmental
Alfalfa hay, kg	550	552
Natural grass hay, kg	646	665
Cottonseed hulls, kg	1,300	1,295
Cottonseed meal, kg	30	30
Compound feed, kg	1,157	1,157
Common salt, kg	19.4	19.4
Feed units	3,584.4	3,581.5
Digestible protein, kg	444.0	444.7
Dry matter, kg	5,005.0	5,013.2
Metabolizable energy, MJ	41,158.5	41,505.7

The data presented in Table 1 show that the quantities of feed provided to the experimental groups and the nutritional value of their diets were similar. The feed-unit value was 3,584.4 in the Black-and-White group and 3,581.5 in the Simmental group. The amounts of digestible protein were 444.0 kg and 444.7 kg, respectively.

These conditions provided a suitable basis for comparing the productivity of the two breeds. Therefore, the differences in productivity may be associated primarily with breed characteristics rather than substantial differences in feeding, although other factors cannot be completely excluded.

Green and succulent feeds accounted for the largest proportion of the diets. Their share was 44.2% in the Black-and-White group and 44.0% in the Simmental group. Roughage accounted for 25.6–25.8%, while compound feed constituted 29.8% of the diet in both groups.

Results and Discussion. One of the main objectives of the study was to compare the milk productivity of Black-and-White and Simmental cows. Milk productivity is one of the principal economically valuable traits of dairy cattle. Its quantity and quality depend on the genetic characteristics of the breed, feeding, housing conditions, and physiological status of the animals.

Table 2. Milk productivity and biological characteristics of Simmental and Black-and-White cows

Indicator	Simmental	Black-and-White
Lactation duration, days	305	305
Average milk yield, kg per lactation	3,600–3,800	4,300–4,500
Milk fat content, %	3.8–4.2	3.5–3.8
Milk protein content, %	3.3–3.6	3.0–3.3
Physiological stress level	Low	High

According to Table 2, lactation duration was 305 days in both breeds. However, differences were observed in the amount of milk produced during lactation.



The average milk yield of Black-and-White cows ranged from 4,300 to 4,500 kg per lactation, whereas Simmental cows produced approximately 3,600–3,800 kg per lactation. These figures indicate a higher potential for milk production in the Black-and-White breed.

The high milk yield of Black-and-White cows is associated with the selection characteristics developed through specialized dairy breeding. Cows of this breed generally have well-developed mammary glands, supporting a high capacity for milk synthesis.

Although Simmental cows produced less milk than Black-and-White cows, evaluating this breed solely on the basis of milk yield would be inappropriate. Simmental cattle are a dual-purpose dairy-beef breed with considerable biological potential for both milk and meat production.

Milk Productivity During the First 90 Days of Lactation

Milk productivity during the first 90 days of lactation in first-calving cows is an important indicator for assessing their subsequent milk-producing potential. During early lactation, physiological processes in the cow's body become particularly intensive, and the demand for nutrients increases.

According to the study results, the quantity of milk produced during the first 90 days of lactation by Black-and-White cows was 149 kg, or 16.6%, greater than that produced by Simmental cows.

This result supports the higher milk-producing capacity of Black-and-White cows. However, increased milk production may also place a greater physiological burden on the animal.

High-yielding cows require substantial amounts of energy and nutrients for milk synthesis. Therefore, Black-and-White cows must be provided with an adequate and balanced diet, particularly during early lactation.

Although Simmental cows produced relatively less milk, their milk may contain higher concentrations of certain components. This can increase the nutritional and processing value of the product.

Housing Conditions and Adaptability. Housing conditions also have a substantial influence on animal productivity. Throughout the experiment, all animals were kept under the same housing conditions. Cleanliness of the barns, availability of exercise yards, and sufficient feeding space were maintained.

The livestock facilities were located away from residential areas and major roads, in an area with relatively clean air. Such conditions help maintain the normal physiological status of the animals.

Adaptability to climatic conditions was considered one of the important advantages of the Simmental breed. In contrast, the high milk productivity of Black-and-White cows may result in greater nutritional and management requirements.

Therefore, when selecting cattle breeds for livestock farms, it is necessary to consider the farm's feed resources, housing technology, veterinary services, and local climatic conditions.

Discussion. The results of the study revealed certain differences in the productive performance and biological characteristics of Simmental and Black-and-White cows. Since feeding and housing conditions were maintained as similar as possible, the

observed differences may be partly associated with the genetic characteristics of the breeds. Nevertheless, the contribution of other factors cannot be ruled out completely.

According to the findings, the lactation milk yield of Black-and-White cows ranged from 4,300 to 4,500 kg, exceeding the 3,600–3,800 kg recorded for Simmental cows. This difference can be explained by the specialization of the Black-and-White breed for dairy production and its high milk-producing capacity. In particular, the finding that milk production during the first 90 days of lactation was 149 kg, or 16.6%, higher in Black-and-White cows than in Simmental cows indicates the greater milk-producing potential of the former breed.

At the same time, a higher milk yield does not necessarily mean that all milk quality indicators are superior. The milk fat content of Simmental cows ranged from 3.8% to 4.2%, compared with 3.5–3.8% in Black-and-White cows. Similarly, milk protein content ranged from 3.3% to 3.6% in Simmental cows and from 3.0% to 3.3% in Black-and-White cows.

Thus, although Simmental cows produced less milk, their milk had higher fat and protein concentrations. This finding is consistent with the biological and breeding characteristics of the Simmental breed as a dual-purpose dairy-beef breed.

Conclusions.Based on the results of the study, the following conclusions were drawn regarding the milk productivity and certain biological characteristics of Simmental and Black-and-White cows:

1. Simmental and Black-and-White cows kept under the conditions of Sherobod District, Surkhandarya Region, differed in their productive performance.
2. During the first 90 days of lactation, first-calving Black-and-White cows produced 149 kg, or 16.6%, more milk than Simmental cows.
3. Milk fat content ranged from 3.8% to 4.2% in Simmental cows and from 3.5% to 3.8% in Black-and-White cows.
4. Milk protein content ranged from 3.3% to 3.6% in Simmental cows and from 3.0% to 3.3% in Black-and-White cows.
5. When developing a cattle herd, it is necessary to consider not only milk yield but also milk fat and protein content, live weight, reproductive characteristics, udder development, and biological adaptability.

Recommendations.Based on the study findings, the following practical recommendations are proposed for livestock farms:

Provide Black-and-White cows with high-quality, balanced diets to support their high milk-producing capacity.

Comply with sanitary and hygienic requirements in livestock housing facilities.

Select breeds that are adapted to local climatic conditions and can efficiently utilize the farm's available feed resources.

References.Resolution No. PQ-120 of the President of the Republic of Uzbekistan, “On Approval of the Programme for the Development of Livestock Farming and Its Sub-Sectors in the Republic of Uzbekistan for 2022–2026.” Tashkent, 8 February 2022.

Abdurahmonov, A.A. *The Main Directions of Selection and Breeding in Livestock Farming*. Study guide. Navro‘z Publishing House, Tashkent, 2018.



1. Khudoyberdiyev, Sh.X. *Breeding Simmental Cattle and Their Productivity Indicators under the Conditions of Uzbekistan*. 2019.
2. Karimov, O.R. *Productive Characteristics of Black-and-White Cattle*. Monograph. Publishing institution to be verified, Tashkent, 2020.
3. Ismoilov, D.A. *Growth Performance of Crossbred Offspring Obtained by Mating Simmental Bulls with Black-and-White Cows*. 2021.
4. Qosimov, E. *The Economic Efficiency of Using High-Quality Feed*. Article in the proceedings of a scientific and practical conference. Nasaf Publishing House, Qarshi, 2021.
5. Ro'ziboyev, A. *The Effect of Fat Supplements on Energy Supply*. Scientific article. Fan Publishing House, Tashkent, 2019.