

FIVE-YEAR OVERVIEW OF THE SIMMENTAL CATTLE POPULATION IN CENTRAL SERBIA

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Abstract: Serbia has a high potential for livestock production, which is suitable for breeding dual-purpose Simmental cows, both for milk and meat production. High quality animals with strong breeding potential registered in the main herd book are monitored for their production performance, reflecting the national authorities' commitment to the cattle sector. According to the reports of the Institute for Animal Husbandry and the results of the implementation of the main breeding programme in the past five-year period (2024–2029), not only the number of cows, but also the total number of all categories of Simmental cattle in the main herd has decreased in the territory of Central Serbia. Selection process in milk production is carried out through continuous cooperation between farmers-breeders of high-quality breeding cattle - and local breeding organisations, both at local and regional level. In central Serbia, there are over 150 registered local breeding organisations that take on the tasks of recording/registering and selecting the cattle in the herds. In this study, data from the main breeding organisation for livestock farming for the area of central Serbia, the Institute for Animal Husbandry in Zemun, and its annual reports were used. The tabular analysis and the five-year trend of animal numbers are presented according to the number of registered animals, the number of linearly evaluated cows after the first calving and the achieved lactation yield of milk, milk fat and milk protein (standardised to 305 days). Based on the analysed and discussed results of the selection work on Simmental cows, it can be concluded that there has been some progress in milk production, but also a reduction in the number of individuals. It is important to emphasise that these results have an impact on the overall productivity of the cattle population in central Serbia.

Key words: Simmental breed, herd book cows, milk lactation production, Central Serbia

Introduction

Livestock farming is one of the most important branches of agriculture in the Republic of Serbia, alongside arable farming. Since ancient times, livestock farming has had a long tradition in Serbia, most of which was more extensive than it is today. Geographically, the area of central Serbia (the Republic of Serbia excluding the provinces of Vojvodina and Kosovo), characterised by moderate hills, fertile farmland and natural pastures, is suitable for this type of agricultural production. The Republic of Serbia is a country where the Simmental cattle breed is well adapted and has been the predominant breed for over a century. It has been used for crossbreeding with indigenous cattle breeds, which resulted in a large part of the former domestic cattle population being replaced by the Simmental breed. The breed expanded primarily through the importation of heifers, breeding bulls, and semen from Switzerland, Austria, and Germany. Today, it represents the most numerous cattle breed in the Republic of Serbia, comprising over 75% of the total cattle population. The herd book in Serbia was established in 1935 and is currently maintained at the Institute for Animal Husbandry in Zemun, Belgrade (GOP, 2019).

The Law on Animal Husbandry of the Republic of Serbia defines the primary breeding objectives as increasing the productivity of domestic animals, improving the breed composition and preventing a decline in animal numbers. In 2024, the Institute for Animal Husbandry in Zemun published the main breeding programme for cattle, specifically for the Simmental breed, which covers the period 2025–2029. Based on the current situation in Simmental cattle breeding, the organisational, technical and economic capacities of cattle production and in accordance with the basic principles of genetics, the breeding goals for the controlled population of Simmental cattle-with a maximum of 25% genes of dairy breeds (RHF and Mb) in central Serbia are aimed at to establish a Simmental population whose animals are profitable, highly productive, dual-purpose (milk-meat), with high daily gain, good health and fertility and an increase in the size of the main herd (GOP, 2024).

Materials and Methods

The study presents data from the Reports of the main breeding organisation for the area of central Serbia – the Institute for Animal Husbandry in Zemun. The reports for the past five years (2020–2024), which contain the results of the implementation of the Main breeding programme, define the basic selection

measures, procedures and methods of selection and the way they are implemented and controlled for the Simmental breed. The three main selection measures presented in this study are: the number of animals in the selection trial, i.e. the number of animals under control; the number of linearly evaluated first-calving heifers as newly registered cows; and the number of completed lactations per cow per year (Reports, 2020; 2021; 2022; 2023; 2024). In the structural organisation of the Main breeding programme of the Republic of Serbia, a pyramidal system is used for selection work. At the base of this system are the breeders of high-quality breeding cows, followed by the assistants who carry out direct measurements and sampling of the animals in the so-called primary organisations, then the regional organisations at the level of the administrative districts into which Serbia is divided, up to the highest main organisation, which analyses all the results and data obtained from the lower levels of the pyramid system.

The main organisation prepares the final report each year, which is then submitted to the competent Ministry of Agriculture, which is at the top of the pyramid system mentioned above. The methodology for monitoring the number of animals, their productivity and other performance indicators is in accordance with the provisions of the Law on Animal Husbandry of the Republic of Serbia (Law on Animal Husbandry, 2009, 2012, 2016) and the rules of the International Committee for Animal Recording (ICAR). The Main Register – Herd Book (HB) for the population of the Simmental breed contains data on the total number of registered animals controlled by the implementation of the Main breeding programme, including their productivity and known pedigree, as well as the proportion of newly registered versus previously registered animals in relation to the total population. It also includes data on registered bulls used for the widespread breeding of cows. Checking the productivity of cows registered in the main herd book includes the results for milk yield, milk fat and milk protein as well as the linear evaluation of the first-calving Simmental cows.

Results and Discussion

Based on the five-year overview of the number of registered Simmental cows, Table 1 shows the absolute values of cows under the control of the Main breeding programme for the area of central Serbia (the Republic of Serbia without the provinces of Vojvodina and Kosovo). There is a clear downward trend in the number of cows, from a maximum of 169,378 in 2020 to a minimum of 138,432 in 2023.

Table 1. Number of registered animals of Simmental breed in a five-year period (2020-2024)

| Breed | Number of registered animals | | | | |
|-----------|------------------------------|--------|--------|--------|--------|
| | 2020 | 2021 | 2022 | 2023 | 2024 |
| Simmental | 169378 | 163183 | 151538 | 138432 | 143160 |

A similar trend as in the previous table, namely a decline in the number of newly registered first-calving cows, can also be observed in Table 2. The number of young cows, which are primarily used for herd renewal, declined from 23,269 in 2020 to a minimum of 18,221 in 2023. After 2024, an increase in the number of cows is expected due to more favourable agricultural policy measures and the subsidisation of breeding animals.

Table 2. Number of first calving females of Simmental breed with linear assessment scores in the five-year period (2020-2024)

| Breed | Number of first calving females with linear assessment scores | | | | |
|-----------|---|-------|-------|-------|-------|
| | 2020 | 2021 | 2022 | 2023 | 2024 |
| Simmental | 23269 | 22430 | 20310 | 18221 | 19321 |

Considering the production indicators- milk yield, milk fat and milk protein, Table 3 shows the number of completed lactations of first-calving cows, which increased slightly in 2024 compared to the previous year. The trend of increasing lactation milk yield on an annual basis (305-day lactations) is consistent, although the number of cows has not increased. Milk fat yield is developing slightly better than protein yield. Quality, genetic potential and selection progress are therefore evident, even though the number of lactations and cows has decreased. In addition, there is a trend towards farm consolidation in the Republic of Serbia, where small farms with 1–2 cows are being phased out, while farms with several dozen cows are expanding into larger herds. The decline in the number of producers keeping 1–3 dairy cows has also been reported by other authors (Perišić et al., 2012; Pantelić et al., 2021). Nikšić et al. (2011) reported that the average milk yield of Simmental cows was 4,348 kg with 3.93% milk fat. Stanojević et al. (2022) reported an average milk yield of 5,052 kg with 3.92% milk fat. Stepić et al. (2018) found that cows produced an average of 6,659.9 kg of milk with 4.09% milk fat and 3.40% protein in a standard lactation. In their previous study, Mičić et al. (2022) reported an average daily milk fat content of 4.04% and a protein content of 3.23% for the cow population in central Serbia.

Table 3. Production of milk, milk fat and protein of Simmental breed in the five-year period (2020-2024)

| Year | Breed | Number of completed lactations | Milk yield (kg) | Milk fat content (%) | Milk fat yield (kg) | Protein content (%) | Protein yield (kg) |
|------|-------|--------------------------------|-----------------|----------------------|---------------------|---------------------|--------------------|
| 2020 | | 99483 | 4977 | 3.98 | 199.77 | 3.21 | 158.47 |
| 2021 | | 99718 | 5045 | 3.99 | 202.51 | 3.23 | 162.16 |
| 2022 | SIM | 94347 | 5060 | 3.98 | 203.64 | 3.23 | 158.75 |
| 2023 | | 87029 | 5092 | 4.01 | 204.09 | 3.21 | 163.64 |
| 2024 | | 91772 | 5159 | 4.03 | 207.98 | 3.22 | 166.07 |

Conclusion

The number of registered cows in central Serbia registered in the main herd book increased slightly in 2024 compared to 2023, although the total number of cattle of all categories in the country decreased. Based on the analysis of the results of the selection work over the past five-year period, it can be concluded that some progress has been made in the milk production of the registered Simmental population in terms of yield and milk quality. However, looking at the breeding goal set for the registered Simmental population in central Serbia, these goals have not yet been achieved (an average of over 6,500 kg in 305 days, with 4.10% milk fat and 3.60% milk protein).

Although considerable efforts have been made in selection to improve the genetic potential of the animals, optimal results also require improvements in environmental conditions-microclimate, balanced feeding according to the needs and categories of cows, housing conditions and health care which are not easy to achieve under the current socio-economic conditions of the country. However, as milk production is a strategically important sector of agriculture in the Republic of Serbia, the proper implementation of the defined goals of the breeding programme must continue in the coming period. An important feature of the new breeding goals for 2025–2029 is the inclusion of important non-productive traits such as health, fertility, life expectancy and longevity as well as temperament.

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Conflict of interest

The authors declare no conflicts of interest.

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