DETERMINING THE OPTIMAL PERIOD OF GROWTH PERFORMANCE IN YOUNG SHEEP OF THE NEW "ROKARN POPĂUȚI" BIOLOGICAL CREATION IN RELATION TO ECONOMIC PROFITABILITY

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Abstract

The new biological creation, "ROKARN Popăuți," currently undergoing official recognition as a specialized meat-producing breed, is based on genetic material derived from the Karakul of Botoșani breed and the Palas Meat Line. Both parental populations exhibit excellent adaptability to the pedoclimatic conditions of Romania, with the Karakul being native to the Moldavia region, while the Palas Meat Line originates from the arid steppe regions of southern Romania. The development of this new breed directly addresses the economic interests of farmers in the Moldavia region, particularly traditional Karakul of Botoșani breeders, who are currently facing a marked decline in the market for lamb pelts. Due to labor shortages, depletion of feed resources, and the need for rapid capital turnover to support farm development, the majority of domestic farmers are compelled to market their young sheep at an early age, between 3 and 6 months. Within this socioeconomic context, the "ROKARN Popăuți" line is distinguished by a higher average daily gain compared with the Karakul of Botoșani breed, while simultaneously preserving phenotypic characteristic traits from Karakul of Botoșani breed.

Key words: *(Botoșani Karakul, average daily gain, genetic improvement, body weight dynamics, young sheep)*

INTRODUCTION

Currently, the "ROKARN Popăuți" breed is undergoing a comprehensive process of consolidation and multiplication within the Moldavian region. This initiative highlights the importance of continuity in domestic livestock research, which is oriented toward developing new breeds characterized by a high degree of climatic adaptability [1]. The primary objectives of these breeding programs focus on optimizing meat production and fixing specific phenotypic traits, such as the unique chromatic variety of the specimens.

Within contemporary animal husbandry, sheep farming represents a strategically important economic activity, the efficiency of which directly depends on the qualitative and quantitative optimization of meat production. In this regard, the implementation of crossbreeding programs involving local breeds-recognized for their hardiness and adaptability-with breeds specialized in meat production constitutes the optimal solution for improving carcass conformation and yield [2]. This hybridization strategy leads to a significant improvement in the productive indices of young sheep, ensuring superior carcass quality and, consequently, maximizing profitability and economic efficiency within specialized holdings [1, 2].

In the current context, sheep production in Romania must imperatively align with

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the demands of European and global markets through the implementation of sustainable and environmentally friendly production systems. This transition requires the modernization of technological workflows for rearing and fattening young sheep, closely correlated with the intensification of genetic improvement programs aimed at creating new lines and breeds with superior meat production aptitudes capable of delivering high-quality carcasses. All these measures for productive optimization and ecosystem protection must be strictly based on respecting the biological characteristics, hardiness, and climatic adaptation capacity specific to the sheep breeds exploited within domestic livestock basins.

MATERIAL AND METHOD

The research was conducted at the Popăuți – Botoșani Research and Development Station for Sheep and Goat Breeding (S.C.D.C.O.C. Popăuți – Botoșani) during the 2024/2025 season, involving two experimental groups of 15 animals each:

- Group 1: 15 young females of the Karakul de Botoșani breed.
- Group 2: 15 young crossbred females of the "ROKARN Popăuți" biological creation.

The two groups were selected as follows: the first group comprised sheep of the Karakul de Botoșani breed, while the second consisted of individuals belonging to the new biological creation, "ROKARN Popăuți," aiming to observe the differences between the two populations and highlight the outcomes achieved with the new biological development. Both groups consisted of animals of similar ages, born within a margin of ± 4 days, and in good health. Each group was housed separately in distinct pens. Data were collected throughout the first year of growth and development of both cohorts, during which the animals received identical feeding and management conditions. Over the course of the first year of growth, ten weighings were performed for each individual to collect the necessary data for determining growth rates and identifying the optimal development period for the young sheep. To minimize variations associated with feed intake, all weighings were carried out following a 12-hour fasting period [3, 4].

From parturition to weaning, the nutritional regime applied to both experimental groups was identical, based on maternal milk combined with the gradual introduction of forage. Consequently, the young sheep had ad libitum access to alfalfa hay, oat–vetch forage, and pasture hay, as well as a concentrated feed mixture consisting of corn, sunflower, oats, barley, and bran [5].

This ad libitum feeding approach ensured the necessary nutritional conditions to stimulate the development of gastric compartments and to achieve an optimal growth rate during the first stage of life.

RESULTS

The comparative analysis of body weight dynamics and average daily gain demonstrates the clear productive superiority and high degree of performance consolidation of the new "ROKARN Popăuți" biological creation compared to the Karakul group. In the initial phase (February 2024), the differences between the groups were statistically insignificant (ns), with the new "ROKARN Popăuți" biological creation recording an average of 5.29 ± 0.73 kg, within limits ranging from a minimum weight of 3.8 kg to a maximum of 6.2 kg. Starting in July 2024, the weight advantage of the new development became statistically significant (*, $p < 0.05$), reaching an average of 40.37 ± 4.80 kg (Min 34 kg – Max 51 kg), compared to the Karakul group, which recorded 34.60 ± 3.33 kg (Min 30 kg – Max 41 kg). From September 2024 until the end of the experiment in February 2025, the

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differences favoring the new "ROKARN Popăuți" biological creation became highly significant (****, $p < 0.0001$). At the end of the monitoring period (February 2025), the new "ROKARN Popăuți" biological creation achieved a remarkable average weight of 68.00 ± 5.86 kg, with individual variability ranging between a minimum of 62 kg and a maximum of 80 kg, outperforming the Karakul group, which reached only 57.00 ± 8.81 kg, with much wider and lower limits, specifically Min 41 kg – Max 77 kg (Table 1).

Table 1. Comparative analysis of body weight (kg) between the Rokarn Popăuți and Karakul groups during the experimental period

Date	Rokarn Popăuți Group N=15				Karakul Group N=15				Significance
	Mean (Kg)	Min	Max	*CV* %	Mean (Kg)	Min	Max	*CV* %	
FEBRUARY 2024	5.29 ± 0.73	3.8	6.2	13.76	5.48 ± 0.90	3.6	7.2	16.44	ns
JUNE 2024	33.33 ± 4.09	27	41	12.26	30.07 ± 3.50	24	37.5	11.67	ns
JULY 2024	40.37 ± 4.80	34	51	11.88	34.60 ± 3.33	30	41	9.64	*
AUGUST 2024	46.97 ± 4.96	40	58	10.55	41.23 ± 3.98	34.5	48.5	9.65	*
SEPTEMBER 2024	56.07 ± 4.88	49	67	8.70	46.80 ± 5.35	37	59.5	11.44	****
OCTOBER 2024	59.58 ± 5.51	51.5	72.5	9.36	49.67 ± 5.85	39	63.5	11.84	****
NOVEMBER 2024	63.10 ± 6.27	54	77.5	9.93	52.53 ± 6.45	41.5	68	12.29	****
DECEMBER 2024	64.87 ± 6.17	57.5	78.50	9.51	53.93 ± 6.69	42.5	70.5	12.40	****
JANUARY 2025	66.58 ± 6.21	59	79	9.32	55.37 ± 6.85	44	73	12.38	****
FEBRUARY 2025	68.00 ± 5.86	62	80	8.61	57.00 ± 8.81	41	77	15.45	****

Legend: N = number of animals; ± = standard deviation; Min = minimum values; Max = maximum values; CV % = coefficient of variation; ns = statistically non-significant difference ($p \geq 0.05$); * = ($p < 0.05$); **** = ($p < 0.0001$).

This evolution is directly supported by the dynamics of the average daily weight gain presented in Figure 1. Although both groups follow a normal downward curve as the animals advance in age, the new "ROKARN Popăuți" biological creation maintains a distinctly superior level of growth intensity throughout the entire interval. In June 2024, the new "ROKARN Popăuți" biological creation began with a higher daily gain of 0.253 kg/day compared to 0.222 kg/day for the Karakul group. This constant difference in favor of the new development was maintained month after month (exemplified by values of 0.225 kg/day versus 0.183 kg/day in October 2024), with the experimental interval concluding in February 2025 with a gain of 0.168 kg/day for the new "ROKARN Popăuți" biological creation, compared to only 0.138 kg/day recorded for the Karakul group [6].

Complementing the body weight dynamics, the analysis of the coefficient of variation (V%) highlights a superior degree of uniformity and phenotypic consolidation within the new "ROKARN Popăuți" biological creation compared to the control group. While individual body variability was relatively similar between the two groups in the first stage of life in February 2024 (13.76% for the new development versus 16.44% for the Karakul group), a pronounced stabilization of dispersion indices was observed in the new "ROKARN Popăuți" biological creation as the animals aged. The value of the coefficient (V%) for the new development steadily decreased below the 10% threshold starting in September 2024 (8.70%), reaching its lowest level in February 2025 (8.61%), which indicates a highly homogeneous animal population regarding body weight development.

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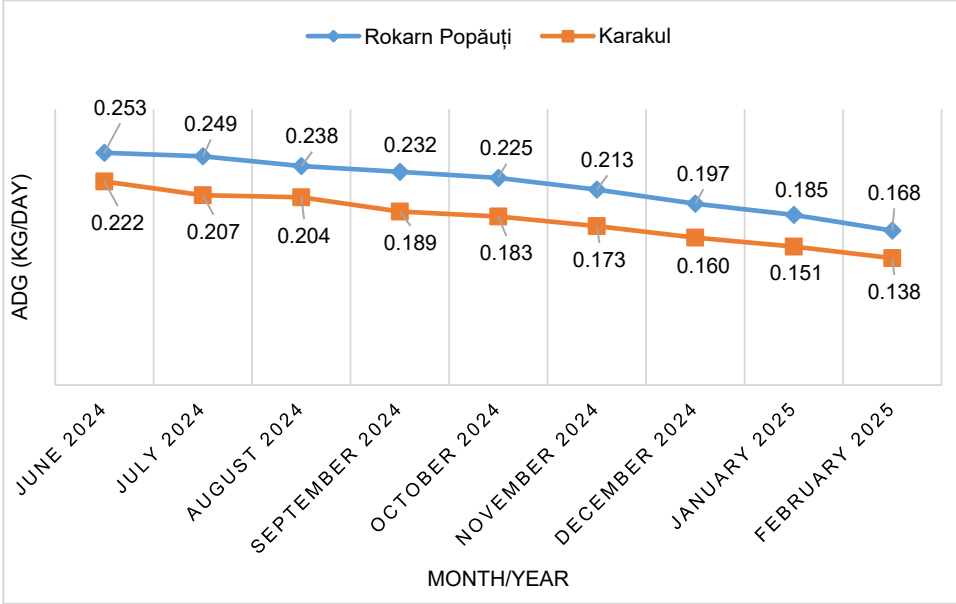


Figure 1. Dynamics of average daily weight gain (kg) during the experimental period (February 2024 – February 2025) in the new breed type "ROKARN Popăuți" compared to the Karakul group

In contrast, the Karakul de Botoșani group maintained higher and fluctuating variability throughout the entire experiment, with values exceeding approximately 11–12% (reaching 15.45% in February 2025), reflecting greater individual dispersion and poorer group uniformity. From the perspective of the growth rate across monitoring phases, it is noteworthy that the major weight gain achieved by the new "ROKARN Popăuți" biological creation intensified and consolidated during the summer-autumn period (June–October 2024), an interval during which the absolute differences between the group means increased from 3.26 kg in June to 9.91 kg in October, definitively establishing the productive superiority of the new development until the conclusion of the experimental program.

DISCUSSIONS

The results indicate higher body weights and average daily gains in the ROKARN Popăuți group than in the Karakul group throughout the monitored growth period. The largest recorded average daily gain for ROKARN Popăuți was 0.253 kg/day in June 2024, followed by a gradual decline to 0.168 kg/day in February 2025 [6]. These findings suggest that marketing animals at an earlier age may be advantageous where feed costs and capital turnover are important considerations. However, the economically optimal marketing or slaughter age cannot be established conclusively from growth data alone. A detailed economic assessment incorporating feed consumption, production costs, selling prices, carcass yield, and meat quality is needed to determine the most profitable marketing period.

Regarding its breeding and distribution area, the new "ROKARN Popăuți" biological creation was established in the North-East region of Romania, with Botoșani County serving as its primary genetic center [7]. Conducting the selection program directly within this geographic region ensures excellent adaptation of the animals to the specific local climatic conditions.

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CONCLUSIONS

The results indicate promising growth performance in the new "ROKARN Popăuți" biological creation. The highest recorded average daily gain was 0.253 kg/day in June 2024, and the mean body weight reached 68.00 ± 5.86 kg in February 2025, compared with 57.00 ± 8.81 kg in the Karakul control group. The ROKARN Popăuți group maintained higher average daily gains throughout the monitored period. These findings support the potential of this biological creation for meat production under the conditions studied. Further research, including feed conversion, carcass characteristics, and economic analyses, is necessary to identify the optimal age for marketing and to quantify profitability.

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