

Meat productivity and slaughter qualities of young sheep of different genotypes

Volodymyr Sheiko*

Postgraduate Student

Odesa State Agrarian University

65039, 39 Kanatna Str., Odesa, Ukraine

<https://orcid.org/0009-0008-5208-8821>

Abstract. Increasing the efficiency of lamb production requires the identification of genetic combinations that ensure high meat productivity and desirable slaughter characteristics in young sheep. Interbreed crossing is considered a promising approach for combining the productive traits of specialised meat breeds with the adaptive characteristics of other genetic groups. The study aimed to comparatively assess the meat productivity and slaughter characteristics of purebred and crossbred young sheep of different genetic origins. The study was conducted at Sheyko Farm in the Kyiv region using young sheep obtained from ewes of different genetic origins and Dorper rams. Three groups were compared: purebred Dorsers (D), two-breed crossbreds $\frac{3}{4}D \frac{1}{4}R$, and three-breed crossbreds $\frac{1}{2}D \frac{1}{4}ML \frac{1}{4}R$; after weaning at three months, the animals were fed for 60 days and slaughtered at five months to determine live and carcass characteristics, morphological composition, and meat chemical composition. It was established that genotype affected the meat productivity and tissue composition of the carcasses. The highest pre-slaughter live weight (44.1 kg), hot carcass weight (18.44 kg), and slaughter weight (19.0 kg) were recorded in the three-breed crossbreds $\frac{1}{2}D \frac{1}{4}ML \frac{1}{4}R$. Purebred Dorsers had the highest dressing percentage (43.6%), muscle tissue proportion (71.9%), and meatiness coefficient (2.88). In the crossbred groups, the muscle tissue proportion was 70.6–70.9%, while the meatiness coefficient ranged from 2.67 to 2.70. The proportion of adipose tissue remained low (2.1–2.3%), whereas protein and fat contents ranged from 17.54–17.81% and 7.14–8.03%, respectively. The results demonstrated the potential of interbreed crossing for obtaining young sheep with high meat productivity and slaughter characteristics approaching those of purebred Dorsers. The findings can be applied by sheep breeders and livestock production specialists when selecting genetic combinations and developing breeding and feeding systems for high-quality lamb production

Keywords: Dorper; Merinoland; Romanov; crossbreds; meat productivity; slaughter qualities; morphological composition of carcass

INTRODUCTION

The modern development of sheep farming requires increased efficiency of lamb production and more effective utilisation of the genetic potential of animals. One of the principal approaches involves the selection of young animals according to meat productivity

traits that determine both the quantity and quality of obtained products. Objective assessment of productive characteristics among young sheep of different genetic origins is therefore essential for the development of effective breeding strategies. Meat productivity is

Article's History:

Received: 26.05.2026 Revised: 07.08.2026 Accepted: 29.09.2026 Published: 07.10.2026

Suggested Citation:

Sheiko, V. (2026). Meat productivity and slaughter qualities of young sheep of different genotypes. *Ukrainian Black Sea Region Agrarian Science*, 30(3), 101–108. doi: 10.56407/bs.agrarian/3.2026.101.

*Corresponding author (attis.ukraine@gmail.com)



determined by the interaction of genetic and environmental factors, including breed, genotype, paternal genetic origin, age, nutrition, and housing conditions. Genetic differences may affect growth rate, muscle and adipose tissue development, carcass composition, and the achievement of optimal slaughter condition. Particular attention is warranted for crossbred young sheep, as the combination of parental genotypes may produce differences in economically important productive traits (Figueiredo *et al.*, 2019).

Assessment based solely on live weight or weight gain is insufficient because similar live weights may correspond to different carcass yields and tissue proportions. Slaughter evaluation therefore requires a combination of indicators, including pre-slaughter live weight, carcass weight, slaughter weight, dressing percentage, muscle development, fat deposition, and morphological carcass composition. S. Prache *et al.* (2022) emphasised the importance of considering carcass weight, conformation, fat deposition, muscle development, and meat quality simultaneously when assessing meat productivity. Such a comprehensive approach provides a more reliable basis for comparing the productive potential of different genetic groups. Recent studies confirm that slaughter traits possess sufficient genetic variation for application in breeding programmes. N. McHugh *et al.* (2023), based on data from 15,714 lambs, estimated heritability coefficients of 0.14 for carcass weight, 0.19 for carcass conformation, 0.08 for fat deposition, and 0.22 for dressing percentage. A high genetic correlation (0.83) was identified between post-weaning live weight and carcass weight, supporting the use of live-weight measurements as an indicator of genetic merit for selected slaughter traits.

Genetic determination of growth and carcass development remains an important research direction. R. Talebi *et al.* (2022) reported substantial genetic variation in growth traits, carcass composition, and meat quality, with moderate heritability estimates for several economically important characteristics. Differences in muscle development may be associated with variation in both muscle fibre number and fibre hypertrophy, thereby influencing the formation of meat productivity. Further evidence of the potential of meat-oriented genetic resources was provided by O. Güngör *et al.* (2022), who evaluated the use of Dorper and Hissar rams in crosses with Kazakh coarse-wool sheep. Crossbred lambs demonstrated increased live weight and enhanced muscle tissue development. At 120 days of age, crossbred ram lambs sired by Hissar rams reached a live weight of 45.2 kg, while increased muscle tissue proportions were observed in crossbred carcasses at 4-4.5 months of age. Meat protein content in the

crossbred groups ranged from 19.6 to 20.1%. These findings support the potential of targeted crossbreeding for increasing meat productivity.

An additional contemporary research direction involves the prediction of slaughter characteristics before slaughter. M. Lagonikou *et al.* (2024), studying Chios and Serres lambs, demonstrated the potential of live weight and ultrasound measurements for predicting carcass characteristics. Such approaches allow the development of non-invasive methods for assessing muscle and fat development and may contribute to more precise determination of the optimal marketing age. Recent evidence therefore indicates a substantial influence of genetic origin on slaughter characteristics and meat productivity in young sheep (Brand *et al.*, 2018). Genotype comparisons involving Dorper genetics have demonstrated advantages in selected growth and carcass traits, although the magnitude and direction of effects vary according to the genetic combination and production environment. Comprehensive assessment incorporating live weight, carcass weight, dressing percentage, muscle development, fat deposition, and meat quality remains necessary for identifying genetic combinations with the most favourable production characteristics (Deribe *et al.*, 2023).

Thus, the comparative evaluation of the slaughter characteristics of specific genotypes of young sheep under identical rearing and feeding conditions remains insufficiently studied. This provides a rationale for investigating the meat productivity and slaughter characteristics of young sheep of different genetic origins and for identifying the genotype that ensures the most favorable combination of carcass weight, dressing percentage, muscle tissue development, and an optimal level of fat deposition. Given the relevance of this issue, the study aimed to comparatively assess the meat productivity and slaughter characteristics of purebred and crossbred young sheep of different genetic origins.

MATERIALS AND METHODS

The study was conducted under the conditions of the Sheyko Farm, Kyiv region, Ukraine. Dorper rams were mated with crossbred ewes of Dorper × Romanov ($\frac{1}{2}D \times \frac{1}{2}R$) and Merinoland × Romanov ($\frac{1}{2}ML \times \frac{1}{2}R$) origin to obtain the experimental offspring. Three groups of ram lambs were formed: a control group consisting of purebred Dorper (D) animals and two experimental groups consisting of two-breed ($\frac{3}{4}D \frac{1}{4}R$) and three-breed ($\frac{1}{2}D \frac{1}{4}ML \frac{1}{4}R$) crossbreds. Control slaughter was performed according to the methodology for assessing sheep meat productivity Z. Norhayati *et al.* (2018) at five months of age, with three animals from each group. The morphological composition of the carcasses

was determined based on the dissection of the right half-carasses after 24 hours of chilling, with the yields of muscle tissue, bone, and fat being determined. The right half-carasses were dissected into individual tissue components. Muscle tissue, adipose tissue, and bone were separated manually and weighed separately. The proportion of each tissue component was calculated as a percentage of the weight of the dissected half-carass.

For the assessment of carcass commercial quality, the carcasses were divided into individual cuts according to the anatomical boundaries adopted in the farm-based carcass evaluation procedure. The cuts were classified into quality grades I, II, and III according to their anatomical location, degree of muscular development, and commercial value. The weight of each cut was determined separately, and its proportion in the carcass was calculated as a percentage of carcass weight. The distribution of cuts among the three quality grades was used to characterise the commercial structure of the carcasses. Internal fat was collected during carcass processing and included the fat deposits located in the abdominal and pelvic cavities that could be separated without contamination by other tissues. The collected internal fat was weighed separately for each carcass using a laboratory or electronic scale. The absolute mass of internal fat was expressed in kilograms, and its relative proportion was calculated as a percentage of pre-slaughter live weight and/or carcass weight,

depending on the indicator presented. The chemical composition of meat was determined using an average meat sample. The obtained data were used to characterise the carcass composition, distribution of commercial cuts, deposition of internal fat, and basic chemical composition of meat in purebred and crossbred ram lambs. Biometric data processing was performed using Microsoft Excel software and its statistical functions. The statistical analysis included calculation of the arithmetic mean (M), standard error of the mean (m), minimum and maximum values, and coefficient of variation (CV), where appropriate. The obtained parameters were used for comparative characterisation of the experimental groups and assessment of the variability of the studied traits.

RESULTS AND DISCUSSION

The heterozygosity of crossbred animals, determined by their genetic background, enables them to adapt more effectively to environmental conditions and to express their genetic potential more fully. The level of meat productivity in ram lambs of different genetic origins at five months of age was investigated. It was established that, in terms of pre-slaughter weight, the $\frac{1}{2}D \frac{1}{4}ML \frac{1}{4}R$ crossbreds exceeded the purebred animals by 1.8% and the $\frac{3}{4}D \frac{1}{4}R$ crossbreds by 5.75% (Table 1). In this respect, purebred Dorper ram lambs exceeded the two-breed crossbreds by 1.6 kg, or 3.8%.

Table 1. Slaughter characteristics of young sheep at five months of age, ($\bar{X} \pm S_{\bar{X}}$)

Indicators	D	Genotypes	
		$\frac{3}{4}D \frac{1}{4}R$	$\frac{1}{2}D \frac{1}{4}ML \frac{1}{4}R$
Pre-slaughter weight, kg	43.3 $\pm$ 0.86	41.7 $\pm$ 0.63	44.1 $\pm$ 0.91
Hot carcass weight, kg	18.39 $\pm$ 0.47	17.37 $\pm$ 0.59	18.44 $\pm$ 0.50
Internal fat weight, kg	0.50 $\pm$ 0.04	0.39 $\pm$ 0.01*	0.54 $\pm$ 0.02
Slaughter weight, kg	18.9 $\pm$ 0.37	17.7 $\pm$ 0.44	19.0 $\pm$ 0.57
Slaughter yield, %	43.6	42.4	43.1
Chilled carcass weight, kg	17.53 $\pm$ 0.41	16.64 $\pm$ 0.47	17.51 $\pm$ 0.46

Note: significance of differences compared with D: $P > 0.95$; ** $P > 0.99$; *** $P > 0.999$

Source: compiled by the author

The slaughter weight of the $\frac{1}{2}D \frac{1}{4}ML \frac{1}{4}R$ crossbred animals was 19.0 kg, exceeding that of the purebred animals by 0.5% and that of the $\frac{3}{4}D \frac{1}{4}R$ crossbreds by 7.3%. The dressing percentage of the experimental animals ranged from 42.4 to 43.6%. The highest value was observed in the purebred Dorper animals (43.6%). In terms of internal fat weight, the $\frac{3}{4}D \frac{1}{4}R$ crossbreds were significantly lower than the purebred animals by 28.2% ($P > 0.95$) and than the three-breed $\frac{1}{2}D \frac{1}{4}ML \frac{1}{4}R$ crossbreds by 38.4% ($P > 0.99$). Overall, the carcasses obtained from the experimental animals indicate their high growth intensity and early maturity, as well as the potential to produce prime-quality lamb. Particular attention

should be paid to internal fat deposition (Pokhil & Mykolaychuk, 2020). The lowest internal fat weight was recorded in the $\frac{3}{4}D \frac{1}{4}R$ lambs (0.39 kg), compared with 0.50 kg in purebred Dorpers and 0.54 kg in the $\frac{1}{2}D \frac{1}{4}ML \frac{1}{4}R$ crossbreds. The statistically significant differences indicated in Table 1 confirm that the two-breed crossbreds differed from both comparison groups in this trait. From a carcass composition perspective, this finding is important because differences in internal fat deposition may influence the proportion of economically valuable tissues and the overall distribution of carcass components. The level of meat productivity is determined not only by slaughter weight and dressing percentage

but also by the morphological and commercial-grade composition of the chilled carcass. The chilled carcass weight of the experimental animals ranged from 16.64 to 17.53 kg (Table 2). Purebred young animals had an

advantage in this trait, with a carcass weight of 17.53 kg, exceeding that of the crossbreds by 0.1-5.3%. The three-breed $\frac{1}{2}$ D $\frac{1}{4}$ ML $\frac{1}{4}$ R crossbreds exceeded the two-breed $\frac{3}{4}$ D $\frac{1}{4}$ R crossbreds by 5.2%.

Table 2. Morphological and commercial-grade composition of carcasses of young sheep, ($\bar{X} \pm S_{\bar{X}}$)

Indicators		Genotypes		
D		$\frac{3}{4}$ D $\frac{1}{4}$ R	$\frac{1}{2}$ D $\frac{1}{4}$ ML $\frac{1}{4}$ R	$\frac{1}{2}$ D $\frac{1}{4}$ ML $\frac{1}{4}$ R
Chilled carcass weight, kg.		17.53 $\pm$ 0.41	16.64 $\pm$ 0.47	17.51 $\pm$ 0.46
Muscle tissue	kg	12.62 $\pm$ 0.27	11.79 $\pm$ 0.17	12.37 $\pm$ 0.34
	% of carcass weight	71.9	70.9	70.6
Adipose tissue	kg	0.40 $\pm$ 0.03	0.34 $\pm$ 0.04	0.38 $\pm$ 0.03
	% of carcass weight	2.3	2.1	2.1
Bone tissue	kg	4.52 $\pm$ 0.18	4.50 $\pm$ 0.22	4.78 $\pm$ 0.21
	% of carcass weight	25.8	27.0	27.3
Meatiness coefficient		2.88	2.70	2.67
Grade I: meat		9.54 $\pm$ 0.22	8.75 $\pm$ 0.31	9.36 $\pm$ 0.28
fat		0.27 $\pm$ 0.01	0.23 $\pm$ 0.01*	0.27 $\pm$ 0.02
bones		2.91 $\pm$ 0.18	2.91 $\pm$ 0.19	3.06 $\pm$ 0.31
Total Grade I		12.72 $\pm$ 0.26	11.89 $\pm$ 0.28	12.68 $\pm$ 0.31
Grade II: meat		2.53 $\pm$ 0.17	2.62 $\pm$ 0.21	2.41 $\pm$ 0.20
fat		0.12 $\pm$ 0.01	0.11 $\pm$ 0.008	0.10 $\pm$ 0.01
bones and tendons		0.86 $\pm$ 0.08	0.76 $\pm$ 0.14	0.91 $\pm$ 0.16
Total Grade II		3.51 $\pm$ 0.17	3.49 $\pm$ 0.21	3.42 $\pm$ 0.19
Grade III: meat		0.55 $\pm$ 0.02	0.42 $\pm$ 0.03*	0.60 $\pm$ 0.03
bones and tendons		0.75 $\pm$ 0.05	0.82 $\pm$ 0.04**	0.81 $\pm$ 0.04
Total Grade III		1.3 $\pm$ 0.12	1.24 $\pm$ 0.10	1.41 $\pm$ 0.14

Source: compiled by the author

Muscle tissue is the main component of the carcass, and the degree of its development largely determines the assessment of meat productivity and the nutritional value of meat. Carcasses of 5-month-old purebred and crossbred animals were characterised by different proportions of tissues. Thus, in crossbred genotypes, the proportion of muscle tissue ranged from 70.6 to 70.9%. In purebred Dorper animals, which are characterised by a meat-oriented production type, a higher proportion of muscle tissue was observed, reaching 71.9%. Accordingly, they had a higher meatiness coefficient of 2.88, compared with 2.67-2.70 in crossbred animals. The proportion of adipose tissue in the carcasses of the experimental animals was 2.1-2.3%, which is characteristic of young animals. The study of the morphological composition of carcasses was supplemented by data on their commercial-grade cutting. It was established that in purebred animals at 5 months of age, the yield of Grade I cuts was 72.5%. In the $\frac{1}{2}$ D $\frac{1}{4}$ ML $\frac{1}{4}$ R crossbreds, this indicator was comparable, amounting to 72.4%. In the $\frac{3}{4}$ D $\frac{1}{4}$ R animals, this value was slightly lower, at 71.4%.

The commercial-grade structure of the carcasses provided additional information on the distribution of valuable meat among cuts. Grade I cuts constituted

the largest part of the carcass in all three genotypes. Their total weight was 12.72 kg in purebred Dorpers, 11.89 kg in $\frac{3}{4}$ D $\frac{1}{4}$ R, and 12.68 kg in $\frac{1}{2}$ D $\frac{1}{4}$ ML $\frac{1}{4}$ R crossbreds. When expressed relative to chilled carcass weight, these values corresponded to approximately 72.5%, 71.4%, and 72.4%, respectively. Therefore, the three-breed crossbreds were very close to purebred Dorpers in the proportion of Grade I cuts, whereas the two-breed crossbreds showed a slightly lower proportion. Within Grade I cuts, meat represented the predominant component in all groups. Its mass ranged from 8.75 to 9.54 kg, with the highest value observed in purebred Dorper lambs. The amount of fat in Grade I cuts was relatively small, ranging from 0.23 to 0.27 kg, whereas bone tissue ranged from 2.91 to 3.06 kg. This distribution indicates that the main contribution to the weight of Grade I cuts was provided by muscle tissue rather than adipose tissue.

Grade II cuts accounted for 3.42-3.51 kg of the carcass. In contrast to Grade I cuts, the differences among genotypes were relatively small. The meat component ranged from 2.41 to 2.62 kg, while fat amounted to 0.10-0.12 kg and bones and tendons to 0.76-0.91 kg. The relatively similar total mass of Grade II cuts across the genotypes indicates that the principal differences

in commercial carcass value were associated primarily with the distribution of Grade I cuts and the overall tissue composition. Grade III cuts represented the smallest commercial fraction of the carcasses, with total weights of 1.24-1.41 kg. The meat component varied from 0.42 to 0.60 kg, whereas no separate fat component was recorded for these cuts. The $\frac{1}{2}$ D $\frac{1}{4}$ ML $\frac{1}{4}$ R crossbreds had the highest total Grade III cut weight (1.41 kg), while the $\frac{3}{4}$ D $\frac{1}{4}$ R group had the lowest value (1.24 kg). These differences should be considered together with the higher proportion of Grade I cuts observed in the three-breed and purebred groups.

Overall, a high level of meat productivity was established both in purebred and crossbred animals. Owing to the heterosis effect, the crossbred animals also achieved comparable performance indicators. Taken together, the results of the morphological and commercial-grade evaluation show that carcass quality cannot be characterised by carcass weight alone. The relative proportion of muscle tissue, the meatiness coefficient, the amount of internal and carcass fat, and the distribution of cuts among quality grades provide complementary characteristics of the meat-producing phenotype. The results of the analysis of the chemical composition of the average meat sample indicate high-quality characteristics of the carcasses obtained. At 5 months of age, the total moisture content in animals of different genotypes ranged from 71.4 to 72.6%, with a tendency toward a decrease in purebred Dorpers. The highest moisture content was observed in the

$\frac{3}{4}$ D $\frac{1}{4}$ R crossbreds (72.6%), whereas the lowest value was recorded in purebred Dorpers (71.4%). The three-breed $\frac{1}{2}$ D $\frac{1}{4}$ ML $\frac{1}{4}$ R crossbreds had an intermediate moisture content of 71.9%.

Protein content was comparatively stable among the genotypes and ranged from 17.54 to 17.81%. The highest value was recorded in purebred Dorper lambs (17.81%), while the lowest was observed in the $\frac{3}{4}$ D $\frac{1}{4}$ R group (17.54%). The difference between the extreme values was only 0.27 percentage points, indicating relatively small variation in protein concentration among the studied genotypes. No significant differences in protein content were observed among animals of different genotypes, with values ranging from 17.54 to 17.81%. The most pronounced numerical difference was observed for fat content. The $\frac{1}{2}$ D $\frac{1}{4}$ ML $\frac{1}{4}$ R crossbreds had the highest fat concentration (8.03%), whereas the $\frac{3}{4}$ D $\frac{1}{4}$ R and purebred Dorper groups had lower values of 7.14 and 7.34%, respectively. Thus, the three-breed crossbreds combined a relatively high carcass weight with the highest intramuscular fat concentration among the studied groups. This characteristic may be relevant when considering the relationship between carcass composition and the physicochemical properties of meat. The highest fat content was recorded in the $\frac{1}{2}$ D $\frac{1}{4}$ ML $\frac{1}{4}$ R crossbreds and amounted to 8.03%. In contrast, this indicator was lower in contemporaries of the other genotypes, ranging from 7.14 to 7.34%, with a tendency toward an increase in purebred animals (Table 3).

Table 3. Chemical composition of the average meat sample of the experimental young animals

Indicators	Genotypes, %		
	D	$\frac{3}{4}$ D $\frac{1}{4}$ R	$\frac{1}{2}$ D $\frac{1}{4}$ ML $\frac{1}{4}$ R
Moisture	71.4±0.87	72.6±1.53	71.9±0.96
Protein	17.81±0.39	17.54±0.43	17.66±0.29
Fat	7.34±0.62	7.14±1.07	8.03±1.14
Ash	1.11±0.05	1.03±0.03	0.97±0.04

Source: compiled by the author

Ash content varied from 0.97 to 1.11%. The highest value was found in purebred Dorpers (1.11%), followed by the $\frac{3}{4}$ D $\frac{1}{4}$ R crossbreds (1.03%), whereas the lowest value was recorded in the $\frac{1}{2}$ D $\frac{1}{4}$ ML $\frac{1}{4}$ R group (0.97%). The relatively narrow range of ash content indicates comparatively small differences in the mineral fraction of meat among the genotypes. Thus, the research results demonstrated a pronounced effect of genotype on the realisation of the meat-production potential of young sheep. The $\frac{1}{2}$ D $\frac{1}{4}$ ML $\frac{1}{4}$ R crossbreds were characterised by the highest carcass weight, whereas purebred Dorpers showed the highest dressing percentage

and meatiness, confirming the prospects of their use in breeding programs (Zaruba *et al.*, 2020).

S. Shackelford *et al.* (2012) and Z. Norhayati *et al.* (2018) further demonstrated genotype-related differences in longissimus muscle development and fat deposition, including pronounced muscular development in lambs carrying Texel, Suffolk, White Dorper, and Dorper genetics. Studies involving Romanov genetics also identified differences in physicochemical meat characteristics and carcass tissue composition depending on the breed combination (Kuchtik *et al.*, 2012; Khaldari & Ghiasi, 2018). Research involving

Merinoland and its crosses with specialised meat breeds demonstrated genetic variation in growth, carcass, and meat traits, including differences in average daily gain, carcass dimensions, subcutaneous fat thickness, and longissimus muscle area (Stratz *et al.*, 2018). Evidence from Red Maasai, Dorper, and crossbred sheep likewise indicated differences in live weight, conformation, and carcass characteristics associated with breed composition (Zonabend König *et al.*, 2017). J. Issakowicz *et al.* (2018) investigated the productive performance, carcass characteristics and meat quality of locally adapted Brazilian hair sheep (Morada Nova and Santa Inês) and their crosses with Dorper. The crossbred lambs generally showed better carcass conformation and compactness than the purebred animals. The Dorper × Santa Inês cross also had a more favourable fatty-acid profile and lower intramuscular fat content. The authors concluded that crossbreeding with Dorper can improve meat-production characteristics while maintaining a favourable nutritional profile. A. Ombayev *et al.* (2023) studied the use of Dorper and Hissar rams for improving the meat productivity of Kazakh fat-tailed coarse-haired sheep. Three groups were compared: purebred animals and two groups crossbred with Dorper or Hissar. The crossbred lambs had higher live weights and growth rates, as well as greater carcass and meat yields. At 120 days, the crossbred groups exceeded the purebred animals substantially in live weight. The authors concluded that introducing Dorper and Hissar genetics can increase growth and meat productivity under the same feeding and management conditions. J. Partida *et al.* (2012) examined how the sire breed (Charollais, Dorper, Suffolk or Texel) affected carcass traits, muscle composition, meat quality and consumer acceptability in Katahdin lambs. Sire breed clearly affected several carcass characteristics, including fat thickness and loin-eye area, and also influenced meat colour. However, it did not significantly affect chemical composition, pH, tenderness or overall consumer acceptability. The authors therefore concluded that sire breed was more important for carcass characteristics than for the measured aspects of meat quality. S. Rozanski *et al.* (2017) investigated the effect of increasing dietary urea levels (0-1.5% of dry matter) on carcass, meat and non-carcass characteristics of crossbred Dorper lambs. Most carcass measurements, fat deposition and non-carcass components were not affected by urea level. However, intermediate urea levels produced favourable responses in loin yield and several meat-quality characteristics, including pH and colour. The authors concluded that approximately

0.84% dietary urea could maximise loin yield, while approximately 0.53-0.70% could produce desirable meat-quality characteristics. Collectively, these earlier findings provide a historical basis for the contemporary evaluation of genetic effects on meat productivity, although differences in production systems, breed combinations, slaughter age, and assessment methodology limit direct comparison with more recent experimental results.

CONCLUSIONS

The studies conducted indicate that the genetic origin of young sheep is one of the key factors determining their meat productivity, slaughter performance, and morphological characteristics. The use of Dorper rams in combination with ewes of different genetic backgrounds resulted in differences in live weight, carcass weight, dressing percentage, the proportions of muscle, fat, and bone tissues, as well as the chemical composition of meat. Overall, it was established that purebred Dorpers were characterised by the highest proportion of muscle tissue, meatiness coefficient, and dressing percentage, whereas the three-breed crossbreds $\frac{1}{2}D\frac{1}{4}M\frac{1}{4}R$ had an advantage in pre-slaughter live weight, hot carcass weight, and slaughter weight. This indicates the feasibility of using the $\frac{1}{2}D\frac{1}{4}M\frac{1}{4}R$ breed combination to obtain young animals with high meat-production potential.

The results of the analysis of the chemical composition of the average meat sample (Table 3) demonstrated no statistically significant differences between the groups in moisture content ($P > 0.05$) or protein content ($P > 0.05$), indicating the stability of these parameters irrespective of the genetic origin of the young animals. The difference in total protein content between the highest value in purebred Dorper lambs (17.81%) and the lowest value in two-breed crosses (17.54%) did not reach the threshold of statistical significance. At the same time, a pronounced differentiation was observed in intramuscular fat content: in three-breed crosses ($\frac{3}{4}R$), this parameter was 8.03%, which was statistically significantly higher than the fat content in the meat of two-breed crosses (7.14%). Differences in ash content (0.97 - 1.11%) showed a trend and were not statistically significant ($P > 0.05$). Thus, three-breed crosses combine a high slaughter weight with a statistically significant increase in intramuscular fat deposition. The results obtained confirm the effectiveness of crossbreeding for developing the desired type of meat productivity. Crossbred young animals reached levels close to those of purebred Dorpers in the main slaughter performance indicators, providing grounds for further investigation

of the ½D¼M¼R genotype in systems for the production of high-quality lamb.

None.

FUNDING

ACKNOWLEDGEMENTS

None.

CONFLICT OF INTEREST

None.

REFERENCES

- [1] Brand, T.S., van der Westhuizen, E.J., van Der Merwe, D.A., & Hoffman, L.C. (2018). Analysis of carcass characteristics and fat deposition of Merino, South African Mutton Merino and Dorper lambs housed in a feedlot. *South African Journal of Animal Science*, 48(3), 477-488. doi: [10.4314/sajas.v48i3.8](https://doi.org/10.4314/sajas.v48i3.8).
- [2] Deribe, B., Tesema, Z., Lakew, M., Zegeye, A., Kefale, A., Shibesh, M., Yizengaw, L., & Belayneh, N. (2023). Growth and growth curve analysis in Dorper × Tumele crossbred sheep under a smallholder management system. *Translational Animal Science*, 7(1), article number txad034. doi: [10.1093/tas/txad034](https://doi.org/10.1093/tas/txad034).
- [3] Figueiredo, G.C., de Rezende, M.P.G., de Figueiredo, M.P., Bozzi, R., Oliveira Souza, A.A., Souza Carneiro, P.L., & Mendes Malhado, C.H. (2019). Morphofunctional characteristics of Dorper sheep crossed with Brazilian native breeds. *Small Ruminant Research*, 170, 143-148. doi: [10.1016/j.smallrumres.2018.11.024](https://doi.org/10.1016/j.smallrumres.2018.11.024).
- [4] Güngör, Ö.F., Özbeyaz, C., Ünal, N., Çapar Akyüz, H., Arslan, R., & Akçapınar, H. (2022). Evaluation of the genotype and slaughter weight effect on the meat production traits: Comparison of fattening, slaughter, and carcass characteristics between two native sheep. *Small Ruminant Research*, 217, article number 106846. doi: [10.1016/j.smallrumres.2022.106846](https://doi.org/10.1016/j.smallrumres.2022.106846).
- [5] Issakowicz, J., Issakowicz, A.C.K.S., Bueno, M.S., da Costa, R.L.D., Geraldo, A.T., Abdalla, A.L., McManus, C., & Louvandini, H. (2018). Crossbreeding locally adapted hair sheep to improve productivity and meat quality. *Scientia Agricola*, 75(4), 288-295. doi: [10.1590/1678-992X-2016-0505](https://doi.org/10.1590/1678-992X-2016-0505).
- [6] Khaldari, M., & Ghiasi, H. (2018). Effect of crossbreeding on growth, feed efficiency, carcass characteristics and sensory traits of lambs from Lori-Bakhtiari and Romanov breeds. *Livestock Science*, 214, 18-24. doi: [10.1016/j.livsci.2018.05.004](https://doi.org/10.1016/j.livsci.2018.05.004).
- [7] Kuchtík, J., Zapletal, D., & Šustová, K. (2012). Chemical and physical characteristics of lamb meat related to crossbreeding of Romanov ewes with Suffolk and Charollais sires. *Meat Science*, 90(2), 426-430. doi: [10.1016/j.meatsci.2011.08.012](https://doi.org/10.1016/j.meatsci.2011.08.012).
- [8] Lagonikou, M., Tsimpouri, E., Gelasakis, D.E., Denez, E., & Gelasakis, A.I. (2024). Prediction of carcass traits in fattening Chios and Serres lambs using real-time ultrasonography and live body weight measurements pre-slaughter. *Meat Science*, 208, article number 109396. doi: [10.1016/j.meatsci.2023.109396](https://doi.org/10.1016/j.meatsci.2023.109396).
- [9] McHugh, N., Pabiau, T., McDermott, K., & Berry, D.P. (2023). Genetic (co)variance components for slaughter traits in a multi-breed sheep population. *Animal*, 17(8), article number 100883. doi: [10.1016/j.animal.2023.100883](https://doi.org/10.1016/j.animal.2023.100883).
- [10] Norhayati, Z., Wan Zahari, M., & Shanmugavelu, S. (2018). [Carcass characteristics of Dorper ram lambs weaned at different ages](#). *Malaysian Journal of Animal Science*, 21(1), 29-39.
- [11] Ombayev, A., Parzhanov, Zh., Azhimetov, N., Zhylybayev, A., Abishov, M., & Issabayeva, A. (2023). Increasing the meat productivity of young sheep based on the use of the gene pool of the Dorper and Hissar breeds. *Brazilian Journal of Biology*, 83, article number e278807. doi: [10.1590/1519-6984.278807](https://doi.org/10.1590/1519-6984.278807).
- [12] Partida, J.A., Vázquez, E., Rubio, M.S., & Méndez, D. (2012). Effect of breed of sire on carcass traits and meat quality of Katahdin lambs. *Journal of Food Research*, 1(4), 141-147. doi: [10.5539/jfr.v1n4p141](https://doi.org/10.5539/jfr.v1n4p141).
- [13] Pokhil, V.I., & Mykolaychuk, L.P. (2020). Meat productivity of young sheep animals of different origin. *Theoretical and Applied Veterinary Medicine*, 8(1), 26-30. doi: [10.32819/2020.81005](https://doi.org/10.32819/2020.81005).
- [14] Prache, S., Schreurs, N., & Guillier, L. (2022). Review: Factors affecting sheep carcass and meat quality attributes. *Animal*, 16(1), article number 100330. doi: [10.1016/j.animal.2021.100330](https://doi.org/10.1016/j.animal.2021.100330).
- [15] Rozanski, S., Vivian, D.R., Kowalski, L.H., Prado, O.R., Fernandes, S.R., de Souza, J.C., & de Freitas, J.A. (2017). Carcass and meat traits, and non-carcass components of lambs fed ration containing increasing levels of urea. *Semina: Ciências Agrárias*, 38(3), 1587-1604. doi: [10.5433/1679-0359.2017v38n3p1587](https://doi.org/10.5433/1679-0359.2017v38n3p1587).
- [16] Shackelford, S.D., Leymaster, K.A., Wheeler, T.L., & Koohmaraie, M. (2012). Effects of breed of sire on carcass composition and sensory traits of lamb. *Journal of Animal Science*, 90(11), 4131-4139. doi: [10.2527/jas.2012-5219](https://doi.org/10.2527/jas.2012-5219).

- [17] Stratz, P., Schiller, K.F., Wellmann, R., Preuss, S., Baes, C., & Bennewitz, J. (2018). Genetic parameter estimates and targeted association analyses of growth, carcass, and meat quality traits in German Merinoland and Merinoland-cross lambs. *Journal of Animal Science*, 96(2), 398-406. doi: [10.1093/jas/sky012](https://doi.org/10.1093/jas/sky012).
- [18] Talebi, R., Ghaffari, M.R., Zeinalabedini, M., Abdoli, R., & Mardi, M. (2022). Genetic basis of muscle-related traits in sheep: A review. *Animal Genetics*, 53(6), 723-739. doi: [10.1111/age.13266](https://doi.org/10.1111/age.13266).
- [19] Zaruba, K.V., Drozd, S.L., & Gladiy, I.A. (2020). The slaughter qualities of different origin young sheep. *Scientific Bulletin "Askania-Nova"*, 13, 37-47. doi: [10.33694/2617-0787-2020-1-13-37-47](https://doi.org/10.33694/2617-0787-2020-1-13-37-47).
- [20] Zonabend König, E., Ojango, J.M.K., Audho, J., Mirkena, T., Strandberg, E., Okeyo, A.M., & Philipsson, J. (2017). Live weight, conformation, carcass traits and economic values of ram lambs of Red Maasai and Dorper sheep and their crosses. *Tropical Animal Health and Production*, 49(1), 121-129. doi: [10.1007/s11250-016-1168-5](https://doi.org/10.1007/s11250-016-1168-5).

М'ясна продуктивність та забійні якості молодняку овець різних генотипів

Володимир Шейко

Аспірант

Одеський державний аграрний університет

65039, вул. Канатна, 39, м. Одеса, Україна

<https://orcid.org/0009-0008-5208-8821>

Анотація. Підвищення ефективності виробництва ягнятини потребує визначення генетичних поєднань, які забезпечують високу м'ясну продуктивність і бажані забійні характеристики молодняку овець. Міжпородне схрещування розглядається як перспективний підхід до поєднання продуктивних ознак спеціалізованих м'ясних порід з адаптивними характеристиками інших генетичних груп. Метою дослідження було порівняльне оцінювання м'ясної продуктивності та забійних характеристик чистопородного і помісного молодняку овець різного генетичного походження. Дослідження проведено у фермерському господарстві Шейка Київської області на молодняку овець, отриманому від маток різного генетичного походження та баранів породи дорпер. Порівнювали три групи: чистопородних дорперів (D), двопородних помісей $\frac{3}{4}D \frac{1}{4}R$ та трипородних помісей $\frac{1}{2}D \frac{1}{4}ML \frac{1}{4}R$; після відлучення у тримісячному віці тварин утримували на відгодівлі протягом 60 діб і забивали у п'ятимісячному віці для визначення живої та забійної маси, морфологічного складу туші та хімічного складу м'яса. Встановлено, що генотип впливав на м'ясну продуктивність і тканинний склад туш. Найвищі показники передзабійної живої маси (44,1 кг), маси гарячої туші (18,44 кг) та забійної маси (19,0 кг) зафіксовано у трипородних помісей $\frac{1}{2}D \frac{1}{4}ML \frac{1}{4}R$. Чистопородні дорпери мали найвищий забійний вихід (43,6 %), частку м'язової тканини (71,9 %) та коефіцієнт м'ясності (2,88). У помісних групах частка м'язової тканини становила 70,6-70,9 %, тоді як коефіцієнт м'ясності варіював від 2,67 до 2,70. Частка жирової тканини залишалася низькою (2,1-2,3 %), а вміст білка та жиру становив відповідно 17,54-17,81 % і 7,14-8,03 %. Результати продемонстрували потенціал міжпородного схрещування для отримання молодняку овець із високою м'ясною продуктивністю та забійними характеристиками, наближеними до показників чистопородних дорперів. Отримані результати можуть бути використані селекціонерами та фахівцями тваринницької галузі під час вибору генетичних поєднань і розроблення систем розведення та годівлі для виробництва високоякісної ягнятини.

Ключові слова: дорпер; меріноланд; романівська порода; помісі; м'ясна продуктивність; забійні якості; морфологічний склад туші