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**В.4.1. Панайотов, Д., И. Ценков, П. Славова, М. Илиев, 2002.** Фенотипна и генотипна  
характеристика на основните продуктивни признаци при тънкорунни овце от племенните стада  
в Ю. България, II. Вълнодайност, Животновъдни науки, 6, 20-23.

### PHENOTYPIC AND GENOTYPIC CHARACTERISTICS OF BASIC PRODUCTIVE TRAITS OF FINE WOOL SHEEP FROM BREEDING HERDS OF SOWTH BULGARIA. II. WOOL PRODUCTION

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#### SUMMARY

Study comprised 1517 fine wool sheep in total including 621 in village of Konevets, born in the period from 1989–1995, 453 from the flock in the Experimental Base NIGO – Stara Zagora and 443 in Agricultural Institute – Karnobat, born in the period from 1992 to 1996.

Basic selection traits of wool production were studied – greasy wool, wool yield, clean wool, staple length, fines of wool at 18 months and at 2.5 years of age.

With the highest average values for greasy and clean wool were sheep from flock in Konevets (7.64 kg and 4.01 kg), and with the lowest – those from the flock in AI Karnobat – (6.02 kg and 3.08 kg). Wool yield was with very high values for the three flocks – over 50% for ewes and with 2–5% higher for animals at 18 months of age. Average staple length of sheep from the studied population was 10.02 cm at 2.5 years of age. With the longest staple length were ewes from Karnobat – 10.78 cm. In the flocks of Konevets and Karnobat the relative shear of animals with 64<sup>th</sup> quality grade was higher and for NIGO – Stara Zagora – of those with 60<sup>th</sup> grade.

**Key words:** *fine wool sheep, greasy wool, clean wool, wool yield*

**В.4.2.** Райчев, Св., Д. Памукова, И. Станков, Р. Славов, **Д. Панайотов**, 2008. Проучване съдържанието на макро- и микро елементи във вълната на овце от различни породи, Животновъдни науки, 5, 184-187.

A STUDY ON MACRO- AND TRACE ELEMENT CONTENT IN THE WOOL  
OF SHEEP OF VARIOUS BREEDS

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SUMMARY

The content of Ca, P, Zn, Cu, Fe and Mn was assayed in wool samples obtained from 81 sheep from 13 breeds. Macro- and trace element concentrations were determined by atomic absorption spectrophotometry (Perkin Elmer-380).

In merino type and local breeds there were no statistically significant differences in Ca content, whereas the half-merino breeds exhibited a low content for Tsigai sheep and Suffolk sheep.

The content of P showed larger variations in the three groups as well as between the breeds.

With regard to the trace element contents, there were significant differences between the different breeds within one production type.

No substantial differences in macro- and trace element concentrations depending on the wool type were observed.

**Key words:** *wool, chemical composition, macro-and trace elements*

**B.4.3. Panayotov, D.,** T. Iliev, N. Naydenova, D. Pamukova, M. Simeonov. 2011. Study of milk composition in sheep of Pleven Blackhead breed, Agricultural science and Technology, vol. 3, No 1, pp 47 - 49, 2011.

**Abstract.**

The aim of the study was to investigate somatic cell count and milk composition from Pleven Black head breed of sheep. A total of 96 ewes on first lactation were used belonging to the flock of the village of Komarevo, Pleven district. The studied animals – daughters of six rams from 2 lines, were fed year round in a barn (November-March) and pasture period (April-October). A total of 384 individual milk samples were taken at four selection controls. The milk composition – fat, protein, casei, lactose, solids-non-fat and dry matter was established by Milko-Skan 104 (A/S Foss Elektrik, Denmark). The total number of the somatic cells was established by an Ekoscope SCC automated system (Bulteh 2000, Stara Zagora, Bulgaria). The results of this investigation showed that the studied animals had very good milk quality indices. The milk of line 522 animals had significantly higher dry matter, solids-non-fat, fat, protein, casein and lactose content in comparison to those of line 32. For all studied milk indicators the daughters of ram No.33 in line 32 showed the highest average values whereas those of ram No.321 belonging to the same line had the lowest. The average somatic cell count of the milk in the studied animals was very low – 66 254 cells/ml. Minimum variation was established in respect to average SCC values of the milk in both lines but very large between the individual rams.

Keywords: sheep milk, milk composition, somatic cells, line, rams

Keywords: PBHB – Pleven Blackhead breed, SCC – somatic cell count, DM – dry matter, SNF – solids-non-fat substance

**B.4.4.** Slavov, R., G. Mihaylova, St. Ribarski, **D. Panayotov**, D. Pamukova, D. Dragnev, 2016. Amino acid composition of lamb meat from the North East Bulgarian fine fleece breed and its crossbreds with Australian merino and Ile de France from internal breeding, *Agricultural Science and Technology*, vol. 8, 3, pp 256-261.

**Abstract.**

A comparative analysis of amino acid composition of lamb meat from the North East Bulgarian fine fleece breed (I gr.) and its crossbreds from internal breeding with 25% heredity from the Australian merino (II gr.) and Ile de France (III gr.) breeds was conducted. Upon starting the experiment lambs were equal and during the experiment they were placed under similar conditions of feeding and rearing. To establish the amino acid composition of meat slaughter analyses were performed at 100 and 130 days of age. From the carcass of each slaughtered animal individual mean samples were taken. Studies were carried out in the Research Laboratory of the Faculty of Agriculture at Trakia University. As a result of the studies the following conclusions were made: 1/4 Ile de France crossbreds in a sophisticated crossing have the highest total amino acid content, including essential amino acids in the meat of 100- and 130-day-old lambs, 6.87% and 7.36%, respectively. The lysine/arginine ratio, relating to protein atherogenicity, varies within narrow ranges among groups and marks slight increase with age – from 1.31-1.37 at 100 days to 1.41-1.46 at 130 days. With the increase of age in crossbreds from internal breeding total protein amino acid content grows, that being most prominent in lambs from the III group – from 41.92 to 43.49%. The values of total protein indices increase compared to the reference protein (from 117.97% to 118.22% for II group and from 116.44% to 120.80% for III group) and the whole egg protein (from 89.39% to 91.92% for II group and from 90.53% to 93.93 for III group). It has been found that internal breeding of crossbreds with 25% heredity from the Ile de France breed has positive effect concerning the total amino acid content of lamb meat at 100 and 130 days of age, essential amino acid content in it and the levels of total amino acid indices. Internal breeding of crossbreds with 25% heredity from the Australian merino breed does not have an adverse effect on the levels of the studied traits.

**Keywords:** lambs, crossing, internal breeding, meat, amino acid content of meat and amino acid index of meat

**B.4.5.** Pamukova, D., G. Staykova, N. Stancheva, **D. Panayotov**, 2017. Evaluation of some technological properties of Caucasian ram wool, Agricultural Science and Technology, vol. 8, 311-314.

**Abstract.**

The aim of the study was to establish the levels of the main selection traits which determine the technological wool production in the rams from the breed of Caucasian merino sheep. The study included a total of 126 rams at 18 months of age from Caucasian merino breed. To determine the fibre diameter, a total of 252 wool samples from two parts of the body (side and leg) were analyzed. For laboratory examination of staple length and crimp of wool, a total 36 wool samples (from the side and the leg) were studied. The rams from Caucasian breed had a very good topographic equality of fiber thickness and staple length. The average fiber diameter of the side was 21.98 $\mu$ m (with variation from 21.71 $\mu$ m to 22.30  $\mu$ m) and the leg was 23.05 $\mu$ m (with variation from 22.76 $\mu$ m to 23.34 $\mu$ m). The wool's fineness in the fleece was 64's quality in 76.98% of the samples, which characterized it as a fine merino wool. The number of crimps per 1 cm in the rams was an average of 5.07 nrs. on the side and 4.46 nrs. on the leg and in the rams at 18 months of age – 5.26 nrs. and 4.82 nrs., respectively.

**Keywords:** Caucasian breed, merino wool, fibre diameter, staple length, crimp of wool

**B.4.6.** Slavov T., **D. Panayotov**, I. Nedeva, V. Radev, I. Varlyakov, 2018. Haematological parameters in Lacaune ewes associated to the parity. Bulgarian Journal of Agricultural Science, 24 (Suppl. 1), 82-87. (SJ2018=0.223)

**Abstract:**

The aim of the present study was to evaluate the changes in blood haematological parameters in Lacaune ewes at the time of the first and second lactation. To achieve the aim 26 ewes divided in two groups (first and second lactation) were investigated. Higher white blood cell counts ( $p < 0.001$ ), platelets and plateletcrit ( $p < 0.05$  –  $p < 0.01$ ) were established in the ewes in second lactation. It was also demonstrated that haemoglobin and haematocrit were similarly elevated in the second-lactation ewes ( $p < 0.05$  –  $p < 0.01$ ). Blood total protein, albumin and globulins in Lacaune ewes varied within the normal physiological range during the first and second lactation.

Keywords: blood parameters; Lacaune breed; lactation; sheep

**B.4.7. Panayotov, D.,** N. Naydenova, G. Mihailova, T. Iliev. 2018. Physico-chemical and technological haracteristics of Lacaune ewe's milk. Bulgarian Journal of Agricultural Science, 24 (Suppl. 1), 101-108. (SJR2018=0.223)

**Abstract:**

The chemical composition of the Lacaune ewe's milk and its basic technological properties in production of Bulgarian sour milk and Bulgarian white brined cheese were studied during March-August 2016. Studied Lacaune ewe's milk exhibited high content of total solids, fat and protein. The average percentage of these milk components was 18.84, 7.21 and 6.19%, respectively. The established renneting time (495.0 s - first appearance of small visual flocs) in Lacaune ewe's milk was in the normal limits for cheese-making. Lacaune ewe's milk is a good and suitable medium for the growth of *Lactobacillus delbrueckii* ssp. *bulgaricus* and *Streptococcus thermophilus*. The studied Bulgarian sour milk had a dense, smooth, uniform coagulum, surface without syneresis and pleasantly sour taste. Matured Bulgarian white brined cheese had 50.22 % moisture, 54.66 % fat in dry matter, 8.33 % salt in the moisture and 69.06 % moisture in the non-fat substance. The titratable acidity reached average value 251.9 °T. The cheese yield was very similar to that established in studies on the milk of other Bulgarian sheep breeds.

**Keywords:** cheese; Lacaune; renneting; syneresis; yogurt

**B.4.8.** Nedeva, I., T. Slavov, I. Varlyakov, V. Radev, **D. Panayotov**, K. Nedelkov, 2019. Behavior of Lacaune sheep in a milking parlour, Bulgarian Journal of Agricultural Science, 25 (Suppl. 3), 74 -80. (SJ2019=0.191)

#### **Abstract**

The aim of the study was to evaluate the effect of intensive farming of dairy ewes on their behavior during the milking process. The study was focused on the entry order and preference for a specific milking side, either left or right, of the milking installation. The data from 215 Lacaune ewes over a whole lactational period (240 days) were analyzed. Groups were formed according the following parameters: productivity (high- or low- producing); order/sequence of entry for milking (first group – FG and last group – LG); with preference (SP) or without preference (NoSP) for the side of the milking installation. Our results showed that most of the animals developed a preference for the entry order (FG, Index of Entries in the Milking Installation /IEMI/ = 668.62; LG, IEMI = 129.31) and the side of the milking station (SP, Index of Side preference in the Milking Installation /ISMI/ = 69.38%; NoSP, ISMI = 31.85%), but not to the milking place, which favors the process of machine milking in the milking parlour.

Keywords: sheep; milking order; milking; milk flow; milking parlour



**B.4.9.** Nedeva, I., T. Slavov, V. Radev, **D. Panayotov**, I. Varlyakov, 2020. Adaptation potential of imported Lacaune rams evaluated by haematological parameters, Bulgarian Journal of Agricultural Science, 26 (Supplement 1) 2020, 109-114.

**Abstract:**

The adaptation potential and resistance to stress of Lacaune rams, imported from southern France to environmental and climatic conditions in Bulgaria were investigated. The following blood parameters were assayed on day 15, month 2 and one year after the import: complete blood counts, total cholesterol, aspartate aminotransferase (ASAT), alanine aminotransferase (ALAT), gamma-glutamyltransferase (GGT), alkaline phosphatase, total protein, albumin, globulins, cortisol, triiodothyronine (T3) and thyroxine (T4). Blood serum concentrations of hormones were determined by enzymatic microimmune assay on an AccuBind<sup>TM</sup> ELISA Test System. It was found out that adaptation potential of rams was good – the values of most of analysed parameters were regained with period of adaptation that lasted more than 2 months after the import and ended within a year after that. Adaptation was accompanied by metabolic changes – reduction of blood serum glucose ( $p<0.001$ ), cholesterol ( $p<0.01$ ), albumins ( $p<0.01$ ) and alkaline phosphatase ( $p<0.001$ ), and increase in ALAT ( $p<0.01$ ) and GGT ( $p<0.05$ ) activities. The elevation ( $p<0.001$ ) in serum cortisol, triiodothyronine (T3) and thyroxine (T4) corresponded to presence of idiopathic stress, while the lack of negative health and behavioural signs indicated good resistance to stress, making Lacaune sheep breed appropriate for raising in conditions specific for the Republic of Bulgaria.

Keywords: adaptation; blood parameters; cortisol; Lacaune; rams; thyroxine; triiodothyronine

**B.4.10.** Ivelina Nedeva, Todor Slavov, Veselin Radev, **Dimitar Panayotov** and Ivan Varlyakov. 2022. Blood biochemical profile as an objective measure of welfare in Lacaune sheep. Bulgarian Journal of Agricultural Science 28 (No 2) 2022, 324–330.

**Abstract:**

Blood serum biochemical parameters of 32 Lacaune sheep divided into two groups by productivity (high- and low-producing) were studied. The surveys were conducted in three different seasons (summer, autumn and winter). An increase ( $p < 0.001$ ) in blood serum urea was found during the summer compared to winter in both study groups. The total cholesterol in both study groups increased ( $p < 0.05$ ) in the autumn compared to the summer. During the autumn, triglycerides increased ( $p < 0.01$ - $p < 0.001$ ) in low- and high-producing Lacaune sheep. A decrease ( $p < 0.001$ ) in the level of AST was found in summer and autumn compared to winter in both studied groups of sheep. GGT levels decreased ( $p < 0.01$ ) during the summer season in low-yielding sheep compared to the winter. In high- producing Lacaune sheep, the blood serum ALP decreased ( $p < 0.01$ ) during the summer compared to the other two seasons. The total protein in the blood serum was not affected by the season in both groups of sheep. The studied blood serum biochemical parameters in Lacaune sheep were an objective factor for their welfare.

**Keywords:** blood serum enzymes; season; sheep; total cholesterol; urea; welfare

Г.7.1. Панайотов, Д., Р. Славов, Д. Памукова, 2001. Топографска характеристика на руна при дзвизки с тънка, кросбредна и цигайска вълна, Животновъдни науки, 69-73.

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TOPOGRAPHY CHARACTERISTICS  
OF FLEECE OF SHE-YEARLING LAMBS  
WITH, FINE WOOL, CROSSBRED  
AND TSIGAI WOOL

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SUMMARY

The study encompassed 35 animals with fine, crossbred and Tsigai wool – 10 Caucasian fine wool, 15 crossbreds of South Bulgarian Corrideale and 15 from Tsigai breed, respectfully.

A topographic characteristics of wool was made on basic qualitative wool traits - finess, equality of fibers, staple and real length, curlity, greasiness, on the basis of laboratory tests on wool samples from 6 parts of the body - neck, shoulder, side, back, abdomen and leg.

The three studied types of wool have characterized with very good topographic and staple equalation on traits finess, staple length and real length.

Variation in average fiber diameter along the staple length at fine wool and crossbred animals was considerably higher than variation in the fleece. Tsigai wool was the least influenced by external factors (season, feeding, rearing) and was characterised by a very good eggality.

Fine wool was geographically the most equilised in curliness, and variation on that trait was the highest for Tsigai.

Heavy greasiness was found for fine and crossbred wool on all topographic locations and relatively lower for Tsigai wool. It was probably due to unsatisfactory technological conditions for rearing animals as well as on some traits and characteristics (density, quantity and wax color), on which the accent should be stressed in the future breeding work.

Key words: wool, topographic characteristics, merino, Corrideale, Tsigai

Г.7.2. Тянков, Св., Ил. Димитров, И. Станков, Р. Славов, Д. Панайотов, Д. Памукова, 2003. Проблеми на българското овцевъдство, *Journal of Mountain Agriculture on the Balkans*, 6, 2, 69-83.

*Journal of Mountain Agriculture on the Balkans, vol. 6, 2, 2003, (69-83)*  
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## ПРОБЛЕМИ НА БЪЛГАРСКОТО ОВЦЕВЪДСТВО

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## PROBLEMS OF BULGARIAN SHEEP BREEDING

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### РЕЗЮМЕ

През последните 5-6 години бяха проведени редица научни форуми, на които бе обсъдено миналото, настоящето и бъдещето не само на българското овцевъдство, но и на цялото животновъдство. Само в Тракийския университет те са пет. Бяха проведени и редица конференции и кръгли маси и в някои от Институтите на Националния център за Аграрни науки. За съжаление трябва да отбележим, че много малко или почти нищо от направените предложения от научната общност не се вземат под внимание от Държавните органи и по-специално от Министерството на Земеделието. С неудовлетворение подчертаваме, че не само не се изпълняват прогнозите на самото Министерство по отношение развитието на овцевъдството (Лазаров и съавт., 1998; Михайлов, 1995), но и обратно,

### SUMMARY

In the past 5-6 years a number of scientific events have taken place at which the past, the present and the future have been discussed not only of Bulgarian sheep breeding but of animal breeding as a whole. There were five such events only at Trakia University. A number of conferences and roundtables have been held at some of the Institutes of the National Center for Agricultural Sciences. Unfortunately we have to point out that very few or almost none of the suggestions made by the scientific circles have been taken into consideration by the Government authorities and specifically by the Ministry of Agriculture. To our dissatisfaction we can stress that the forecasts of the Ministry itself not only fail in their fulfillment concerning sheep breeding (Lazarov *et al.*, 1998;



животните и продукцията от тях продължава да намалява.

В резултат на преброяването на животните към 1.03.2001 год., по данни на МЗ към 1.01.2002 год. общият брой на овцете е малко над 2,418 млн., а само на овцете-майки — 1,506 млн. Овчето мляко вече е само 83 млн. литра, месото — 65 хил. т. и то заедно с козето, а вълната — 6568 т.

Основното, с което се характеризира овцевъдството у нас сега е, че 99% от овцете се отглеждат в частни земеделски стопанства. Получената продукция от тях задоволява нуждите на самите производители, като много малка част е ориентирана към пазара. Причина за това са ниските изкупни цени, особено на млякото и вълната. В млекосъбирателни пунктове овчето мляко се смесва с кравето и козето. По този начин още повече намалява възможността за получаване на млечни продукти от овчето мляко.

Анализът на сегашното състояние относно размера на фермите показва, че един от най-големите проблеми е *силната раздробеност* на нашето овцевъдство. От близо 480 хил. стопани, отглеждащи овце, около 60% имат до 5 животни, а 88% отглеждат до 10 броя. Минимален е броят на стопаните, имащи над 50 броя — около 0,5%. Това показва, че у нас преоблада-

Mihaylov, 1995), but on the contrary, the number of animals and their products continue to decrease.

As a result of the livestock census by 1 March 2001, and according to data of the Ministry of Agriculture by 1 January 2002 the total number of sheep was slightly above 2,418 million, including ewes — 1,506 million. Sheep milk was already just 83 million litres, meat 65 M metric tons including goat meat, and wool was 6568 metric tons.

At present the main characteristic of sheep breeding in our country is that 99% of the sheep are reared on private farms. The produce obtained from them meets only the requirements of the producers and very small part is marketed. A reason about that is the low purchase price, especially of milk and wool. In the milk collecting centers sheep milk is mixed with cow's and goat's milk. In this way the opportunity for making dairy products from sheep milk is more restricted.

The analysis of the current farm size reveals that one of the gravest problems is the *great fragmentation* of our sheep breeding. Out of 480 thousand sheep farmers about 60% have up to 5 animals, 88% own up to 10 sheep. The number of farmers with

**Г.7.3. Панайотов, Д., М. Симеонов, 2008.** Проучване върху живото тегло и плодовитостта при овце от Плевенската черноглава порода, Животновъдни науки, 4, 25-29.

A STUDY ON THE LIVE WEIGHT AND PROLIFICACY  
OF THE SHEEP OF THE PLEVEN BLACK HEAD BREED

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SUMMARY

The study was carried out with 1381 ewes from the two main breeding farms of the Pleven Black head breed (PBH) - the flock at the Institute of Forages - Pleven (IF) and the flock of the Agricultural cooperative (AC) in the village of Komarevo, Pleven district.

The traits live weight (at weaning, at 18 months and at 1.5 years) and the prolificacy at the first and second lambing were studied.

It was found that the live weight of the ewes at all ages in IF was higher compared to that in Komarevo. The live weight for the two flocks was respectively 26.360 and 23.615 kg at weaning, 59.031 and 57.566 kg for the hogs at 18 months of age and 63.553 and 61.161 kg for the ewes at 2.5 years.

The prolificacy of the ewes of the studied flocks for the two consecutive lambings was relatively low, especially for the flock in Komarevo. The average values for this trait in the IF flock were respectively 1.25 and 1.30%, and for the flock in Komarevo - 1.18% for both lambings.

**Key words:** ewes, live weight, prolificacy, Pleven Black head

**Г.7.4. Панайотов, Д., М. Симеонов, Т. Илиев, Н. Желева, 2008.** Проучване върху млечната продуктивност и състав на млякото при овце от Плевенската черноглава порода, Животновъдни науки, 4, 30-36.

A STUDY ON THE MILK YIELD AND THE CONTENT OF MILK  
OF THE SHEEP OF THE PLEVEN BLACK HEAD BREED

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SUMMARY

The study was carried out with 1039 ewes from the two main breeding flocks of the Plevan Black head breed (PBH) - at the Institute of Forages - Plevan (IF) and in the village of Komarevo, Plevan district.

The phenotypic characteristics of the flocks consisted of the traits lactation length, lactation yield, milk yield for 200 days. The content of milk was determined for 30 ewes (ram-producers) at II lactation.

It was found, that the sheep of Komarevo were with a considerably longer lactation period at I and II lactation compared to their contemporaries in the flock of IF.

The average lactation milk yield for I and II lactation of the ewes in IF was about 192 l, and that of the ewes in Komarevo - 199 l. The production year as a complex factor caused a very big influence on the phenotypic appearance of that trait, especially in the IF flock.

The 200-days milk yield of the ewes in IF for most of the studied years was higher compared to that of the flock in Komarevo. For the 120-days lactation period the superiority (over 20 l in average) was in favour of the Komarevo flock.

The studied ewes excelled with very good characteristics of the milk composition. The average fat content was in the range of 5.96 to 7.64%, of the protein - from 5.70 to 6.19%, and for the dry matter - from 17.19 to 18.76%, and the three traits followed an increasing tendency with the progress of the lactation. For the lactose and dry non-fat residue the average values were very close - respectively from 4.22 to 4.80% and from 10.89 to 11.30%.

The total number of the somatic cells in the milk was relatively high - 687.7 thsnds./ml for the first test day, 836.2 thsnds./ml for the third and 424.6 thsnds./ml for the forth test day (at the end of the lactation).

**Key words:** *ewes, milk yield, milk composition, Plevan black head*

**Г.7.5. Panayotov, D.,** S. Sevov and D. Georgiev, 2018. Live weight and intensity of growth of lambs from Lacaune breed raised in Bulgaria, Bulgarian Journal of Agricultural Science, 24 (Suppl. 1), 88-94. (SJ2018=0.223)

**Abstract:**

The study was conducted with 45 lambs from the breed Lacaune which were offspring of sheep imported from France and inseminated at 9-10 months of age. The live weight and intensity of growth of the lambs from birth up to 90 days of age were controlled. A very good live weight of the lambs was observed – an average 4.516 kg at birth, 15.933 kg at weaning and 26.178 kg at 90 days of age, as well as a slight superiority of male over female lambs at all three ages. The single lambs at all studied ages had a higher live weight, than twin lambs – with 0.760 kg at birth, with 3.13 kg at weaning, and with 3.36 kg at 90 days of age. The factor “type of birth” had a reliable influence on the live weight of lambs at different ages, and that influence was relatively higher on the live weight at weaning. The results from the conducted exterior measurements of the lambs confirmed the realized very high intensity of growth during the suckling period. The wither height was an average 46.64 cm, the body length - 72.89 cm, and the chest circumference - 62.16 cm. For all three indicators the differences between the average values of the male and female lambs were minimal, and between single and twin lambs – significantly higher and reliable. The obtained phenotypic correlations between the traits, which determine the intensity of growth of lambs, were positive - with average to high level of significance.

**Keywords:** body measurements; daily gain; Lacaune; lambs growth



**Г.7.6. Panayotov, D.,** S. Sevov and D. Georgiev, 2018. Milk yield and morphological characteristics of the udder of sheep from the breed Lacaune in Bulgaria, Bulgarian Journal of Agricultural Science, 24 (Suppl. 1), 95-100. (SJ2018=0.223)

**Abstract:**

The study was conducted with 50 ewes from the breed Lacaune imported from France. The imported animals (female lambs at 5 months of age) were inseminated at 9-10 months of age, after reaching live weight around 50 kg, after synchronization of the estrous cycle and artificial insemination. After the birth and weaning of the lambs, a test on the milk yield was conducted according to the Method AC by ICAR. It was established that the studied sheep had a very good milk yield – an average 213.29 L for the 150 days milking period. The highest was the milk yield on the first test day – an average 2.279 L, with maximum deviation 3.310 L. A 77% of the ewes had a milk yield over 180 L, a relatively smaller part (6.5%) had a milk yield under 150 L, while 14.5% of the ewes had a milk yield over 270 L, and the maximum value was 298.38 L. The milk of the studied animals had a very high content of dry matter (20.06%), fat (7.60%), and protein (7.09%) and excellent technological qualities. The total number of microorganisms was 754 000 CFU g/mL, and the somatic cells count – 147 000 CFU g/mL. From the studied animals 56.3% had a normal udder, 41.7% had an udder bigger than normal and there was only one animal with a registered small udder. 52.1% of all the ewes had udders with low lateral teat placement, 10.4% - with high lateral teat placement, and 33.3% - with very high lateral teat placement. The main measurements, used to characterize the udder of the studied animals had values similar to those of some of the best modern dairy breeds. The udder width of the ewes was 12.35 cm, the depth - 16.85 cm, and the circumference - 41.46 cm. The teat length was 2.70 cm, the teat width was 1.38 cm and the distance between teats – 15.78 cm.

**Keywords:** Lacaune dairy sheep; milk composition; milk yield; udder measurements

**Г.7.7.** Naydenova, N., **D. Panayotov**, G. Mihaylova, T. Iliev, 2019., Fatty acids profile and lipids health indices of white brined cheese produced from Lacaune sheep milk. Bulgarian Journal of Agricultural Science, 25 (Suppl. 3), 85 -90. (SJ2019=0.191)

#### **Abstract**

The objective of the study was to determine the composition of fatty acids in the milk of Lacaune sheep and produced cheese from it. The study was performed with ewe's milk of Lacaune breed, reared in the herd of the private farm in a village of Yambol municipality. Milk samples were collected in the morning and the evening, proportionally to the milk yield, according to rules for milk sampling. To perform an analysis of the fatty acid composition of the Lacaune sheep milk, three milk samples were collected at three different times from April to June 2017. From the milk samples have been made Bulgarian white cheese. The fatty acid composition of raw milk and cheese samples was determined at 60 day of producing. The most abundant fatty acids in milk and cheese were saturated fatty acids (82.37% and 77.42% in the milk and cheese, respectively). Monounsaturated fatty acids (14.31% for raw milk and 16.54% for white brined cheese) were the most numerous in terms of isomers, but mostly in low concentration. The atherogenic index was calculated on the obtained values for lauric (C12:0), myristic (C14:0) and palmitic (C16:0) acids and the unsaturated fatty acids. The data for the raw sheep milk was – 2.16 and for produced white brined cheese – 1.63. Omega 6/Omega 3 ratio varies from 1.33 for raw milk and 1.00 for white brined cheese, which is within the range of the optimal values for healthy nutrition.

*Keywords:* Lacaune breeds; sheep milk; fatty acids; profile; lipids; health indices

*Abbreviations:* SFA – saturated fatty acids, USFA – unsaturated fatty acids, MUFA – monounsaturated fatty acids, PUFA – polyunsaturated fatty acids, IA – index of atherogenicity, IT – index of thrombogenicity

**Г.7.8. Panayotov, D., 2021.** Study on carcass characteristics in Boer goat kids, Bulgarian Journal of Agricultural Science, 27 (No 6), 1212–1220.

### **Abstract**

The study was conducted with four single born Boer goat kids, weaned at 120 days. Slaughter was conducted in a certified abattoir, and afterwards a carcass analysis was performed. The average slaughter weight (SW) of the studied kids was 28.25 kg. The percentage of the head (6.89%), skin (6.85%), fore and hind feet (2.77%), removed directly after slaughter was a total 19.15% of the SW (5.41 kg). The received sub-products weighted 3.748 kg in total or 13.27% of SW – 3.65% in first and 9.59% in second class. From the sub-products, in first class the liver had the largest percentage (1.76%), and in second class – the intestines (3.75%) and stomach (2.50%). From the stomach, the rumen had the largest percentage (63.12%), followed by the true stomach (16.32), and the lowest (7.80%) was the omasum. The weight ratio between the small and large intestines was 62.74%:37.26%. The average hot carcass weight (HCW) of the studied kids was 13.65 kg, and the cold carcass weight (CCW) – 13.43 kg, while chilling losses were 1.58%. The dressing out was very good in both estimation methods – 50.00% (according to BDS 4348-78) and 47.54% (according to Simela et al., 2011). The kidneys and kidney fat weighed 0.70 kg (5.18% from the CCW), and all internal fats had a total weight 0.86 kg and were 6.38% from the CCW. There were no separable subcutaneous fats on the carcasses.

According to the linear carcass measurements, the average carcass length was 53.50 cm, the chest width – 15.25 cm, and the carcass compactness index – 0.251. The leg length and leg large circumference had almost identical values – 34.50 cm and 34.12 cm, and the leg compactness index was 0.989. In the retail cuts of the cold carcasses made according BDS 4348-78 was discovered that the shoulder had biggest percentage of the CCW– 40.80%. The percentages of the other parts of the carcass are respectively 32.46% for the leg, 12.67% for the cutlet, 7.74% for the neck, and 6.33% for the flank. The best meat:bone ratio was for the cutlet – 3.8:1, and lowest – for the leg 2.9:1. The neck and shoulder had similar values – around 3:1. The meat:bone ratio for the entire carcass was 3.1:1.

*Keywords:* carcass characteristics; Boer goat; capretto goat meat; linear carcass measurements; primal carcass cuts; meat:bone ratio

**Г.7.9. Panayotov, D., 2021.** Study on chemical composition, fatty acid composition and technological quality of meat in Boer goat kids, Bulgarian Journal of Agricultural Science, 27 (No 6) 2021, 1248–1257.

### **Abstract**

The main objectives of this study are to evaluate the chemical composition, fatty acid composition and technological quality of meat in Boer goat kids weaned at 120 days of age for producing “capretto” goat meat. Analyzed were samples from four male single born kids, offsprings of the first Boer goats imported in Bulgaria. The Boer goats were kept in Agroustina farm in Plovdiv district, which was the first farm in Bulgaria to raise the bloodline Boer goat. The studied kids were raised with their mothers until 120 days of age and their main food was their mother’s milk. Analyzed were several chemicals and technological parameters: moisture %, protein %, fat %, minerals %, pH24, water-holding capacity (WHC), cooking losses at roast (%), losses at keeping (%), tenderness, (°P) in the three muscles: m. *Longissimus dorsi* (LD), m. *Semimembranosus* (SM) and m. *Iliapsoas* (Ips). LD had the highest content of moisture (75.26%) and fat (3.19%) but least protein (20.59%) and minerals (0.96). The highest content of protein (22.27%) and minerals (1.30%) had SM. The lowest pH24 was in Ips – 5.30 and the highest – in MS 5.62. The lowest WHC were found in LD 22.06% but the highest in Ips – 27.68%. The cooking losses at roast of the three analyzed muscles ranged from 47.66% for SM to 54.75 for Ips. There were large differences between the losses at keeping – from 2.38% for LD to 5.59 for SM. The highest tenderness had Ips (368.26o P) but the lowest had SM (306.74o P). The fatty acid (FA) composition was analyzed in samples from two adipose tissue depots: pelvic fat and kidney fat by gas chromatography. Fatty acid ratios ( $\Omega$ -6/  $\Omega$ -3 and PUFA/SFA ratios) as well as three indexes: the Index of atherogenicity (IA), the Index of thrombogenicity (IT) and the Cholesterolemia index (h/H) were calculated on the basis of individual FA content in kids fat depots. FA composition showed that oleic (C18:1), docosahexaenoic (C22:6  $\Omega$ -3) and arachidonic (C20:4  $\Omega$ -6) FA comprised the largest proportion of FA, with oleic acid being the most abundant – respectively 39.93% and 38.42%. The poly-unsaturated fatty acid (PUFA) presented the highest percent of FA in both fat depots – 43.87% in pelvic fat and 40.23% in kidney fat; mono-unsaturated fatty acids (MUFA) were higher in kidney fat (43.10%) than in pelvic fat (41.16%). The saturated fatty acid (SFA) percent were only 14.97% and 16.67% respectively. Desirable fatty acids (DFA) were 86.36% in pelvic fat and 85.40% in kidney fat. The value obtained for  $\Omega$ -6/  $\Omega$ -3 FA ratio is 0.908 for pelvic fat and 1.100 for kidney fat that is close to the recommended 1.0 as ideal value. The PUFA/SFA ratio varied from 2.41 in kidney fat to 2.93 in pelvic fat. The values obtained for h/H index were 3.216 in pelvic fat and 2.755 in kidney fat; the average IT was respectively 0.148 and 0.184 and the IA was 0.202 and 0.221 respectively. The all studied FA ratios and indexes were very favorable and indicate healthiness of capretto meat from Boer goat kids weaned at 120 days age.

**Keywords:** goat meat; chemical composition; technological quality; muscles; fatty acids, lipid indexes

**Abbreviations:** LD – *musculus Longissimus Dorsi*, SM – *musculus Semimembranosus*, Ips – *musculus Iliapsoas*; SFA – saturated fatty acid, UFA – unsaturated fatty acid; MUFA – mono-unsaturated fatty acid, PUFA – poly-unsaturated fatty acid, DFA – desirable fatty acid

**Г.7.10. D. Panayotov, 2022.** Body weight, morphometric measurements and number of teats of Boer goat does, reared in Bulgaria. Bulgarian Journal of Agricultural Science, 28 (No 2) 2022, 331–342

### **Abstract**

The Boer goat is a goat breed new to Bulgaria, where it was introduced a few years ago. This study was conducted to evaluate the body weight (BW) and some morphological characteristics (body and head measurements and numbers of teats) in the first Boer goats, reared in Bulgaria – imported from different country (Austria and Germany) and the generation born in Bulgaria. Data were collected from 90 does kept in Agroustina farm in Plovdiv district, situated in the pre-mountainous territories of the Rhodope mountains. The does were divided into two age groups: 1.5 years and 2.5 years. Data were collected on 12 morphometrical measurements (MM) – Body weight (BW), Withers height (WH), Rump height (RH), Body length (BL), Rump length (RL), Rump width (RW), Chest width (CW), Chest depth (CD), Heart girth (HG), Cannon circumference (CC), Head length (HDL), Head width (HDL), Horns length (HoL). The BW of does was 44.70 – 47.46 kg at 1.5 years old and 57.10 – 64.58 kg at 2.5 years old; the WH was 64.21 – 65.63 cm at 1.5 years and 65.30 – 68.26 cm at 2.5 years old. Our results are close to recommended as optimal in the majority of Boer goat standards in the world. Other important MM, which was in relation with the truly meat type, was BL (79.0 to 82.0 cm at 1.5 years old and 83.4 to 87.1 cm at 2.5 years old) and HG (81.45 to 83.00 cm at 1.5 years old and 87.6 to 91.68 cm at 2.5 years old). With ANOVA was estimated the highest and most significant influences for factor “age” on all body measurements, body weight and head measurements (( $p < 0.001$  and  $p < 0.01$ ). The majority of correlation coefficients between BW and body measurements were high and significant ( $P < 0.01$ ,  $P < 0.001$ ) in both age groups but all were the highest at 2.5 years does. The highest and strongly positive correlation ( $P < 0.001$ ) was recorded between BW and heart girth (0.94), chest width (0.87) followed by body length (0.84) and cannon circumference (0.79) for 2.5 years old goats. The studied goats were classified on the basis of the number of teats (2, 3, 4, 5, 6) by visual appraisal. The LS-means for number of teats in does born in Bulgaria and those born in Germany, was respectively 3.37 and 3.35 and the lowest was in does born in Austria (2.75). In the whole population of Boer does reared in Bulgaria we established a slight preponderance of four teats (48.89%) than two teats (46.67%) and equal share of does with three and five teats (2.22%). If we estimate the Supernumerary teats (SNT) of Boer does reared in Bulgaria, the biggest share had these born in Bulgaria (71.43%) followed by those born in Germany (70.00%) and the least – born in Austria (36.96%). In the Boer goat population reared in Bulgaria, the SNT was 53.33%. But if we compute the share of individuals with more than 4 teats (that was accepted in all Boer goat standards), only 2.22% of Boer goats introduced in Bulgaria had more than 4 teats (not acceptable).

**Keywords:** Boer goat; Breed standards; Body weigh; morphometric measurements; number of teats

**Г.7.11.** Yankov, D. Georgiev, P. Iliev, A. Tonev, S. Arangelov, K. Valchev, **D. Panayotov**, S. Peeva. 2022. Infestation with protostrongylids of the Balkan chamois (*Rupicapra rupicapra balcanica*, Bolkey 1925) in Rila National Park, Bulgaria: preliminary data. Bulgarian Journal of Agricultural Science, 28 (3) pp. .... (под печат)

### **Abstract**

A total of 109 fecal samples were collected from May to September, 2020 in the area of Rila National Park, Bulgaria. The samples were processed by flotation technique using saturated sodium chloride (sp. gr. 1.20), routine sedimentation method, Baermann's method and larval cultivation. In a total of 59 samples (54.12%) representatives of the family Protostrongylidae were found. The larvae found belong to four genera. The predominant infestations were with *Muellerius* spp. presented in 35.78% of the studied samples followed by *Cystocaulus* spp.- in 34.86%, respectively. The genus *Protostrongylus* was present in 7.34% of the samples, and *Neostrongylus* – 3.67%. Research on protostrongylid infestation of the Balkan chamois in the area of Rila National Park was carried out for the first time in Bulgaria.

*Keywords:* Protostrongylidae; pastures; *Rupicapra rupicapra*; environmental factors

**Г.8.1.** Станков, И., Д. Панайотов, Р. Славов, 2003. Ролята на държавата и неправителствените организации при осъществяването на хоризонталната и вертикалната интеграция в животновъдството, Интеграционните процеси в българското животновъдство, Сборник доклади от национална конференция с международно участие, проведена на 7 май в Аграрен факултет при Тракийски университет, 42-48.

## РОЛЯТА НА ДЪРЖАВАТА И НЕПРАВИТЕЛСТВЕНИТЕ ОРГАНИЗАЦИИ

В Български Алманах (1895) е записано от Н.Петров. "Нашата земя се обединява и изпуска, забулена с викове и крясъци за свобода и политически независимости. До кога с тази гламавост в държавния ни и политически живот? За каква свобода и независимост може да се мисли при държава потънала в дългове и оголен народ.

Ний трябва да кажем на нашите приятели и неприятели, че тържищата в България са отворени за промишлените стоки само на ония народи, които купуват нашите произведения. Търговията и икономическите интереси трябва да почиват само на реални основи и с никакви видими съображения и политически сметки те не бива да се свързват."

Така е и днес, почти 14 години след промяната на системата политическите партии се сменят в управлението на страната, а производствените проблеми все повече и повече се задълбочават. Голяма част от плодородните български земи не се обработват, пасищата пустеят, а страната ни е залята със земеделски стоки отвън, често със съмнително качество и получени при неравностойни на нашите условия (субсидирано производство). Необходима е най-после решителната намеса на Държавата. Преди всичко трябва чрез законите ясно и точно да се формулират изискванията и да се уточнят взаимоотношенията между производители, преработватели, търговци и потребители.

По-важно обаче е другото – да се научим да спазваме законите и правилата. Неспазването на законите е неписано правило у нас и това е характерно за всички нива, дори и най-високите.

Например от Закона за животновъдството в България, публикуван в ДВ бр.65 от 2000 г. много от нещата не се спазват. В закона е предвидено да се създаде Съвет по животновъдство като консултативен орган към МЗГ, в който трябва да има представител и на Тракийски университет. Логично би било този представител да бъде от единствения до сега факултет, който подготвя кадри с висша квалификация по животновъдство – Аграрния факултет. Такъв представител няма, но дори и това не е най-важното. В този Съвет трябва да има по-широко представителство на неправителствените организации

В същия закон е записано, че всички въпроси в животновъдството се решават от животновъдните организации, а те са три:

- Развъдни асоциации;
- Браншови съюзи;
- Национален животновъден съюз;

**Г.8.2. Панайотов, Д., И. Станков, Р. Славов, Д. Памукова, 2005.** Актуални проблеми на българското овцевъдство и козевъдство, Сборник доклади от Научен семинар „Българското животновъдство в навечерието на присъединяването към Европейския съюз”, 5 май, 2005 г., Тракийски университет, Аграрен факултет, 27-41.

## АКТУАЛНИ ПРОБЛЕМИ НА БЪЛГАРСКОТО ОВЦЕВЪДСТВО И КОЗЕВЪДСТВО

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доц. д-р Радослав Славов, гл. ас. д-р Дарина Памукова*

### Състояние на овцевъдството и козевъдството в Р. България.

Овцевъдството и козевъдството са традиционни отрасли за нашата страна. В продължение на десетилетия овцете и козите са осигурявали поминък на голяма част от населението и са били неизменна част от националния ландшафт.

Години наред страната ни е заемала едно от челните места в света и първо място в Европа по брой на овцете на 1000 дка стопанисвана площ и произведена вълна на човек от населението.

От началото на миналия век до 1990 г., броят на овцете по официални данни се е колебаел между 7 и 10 млн., въпреки, че редица автори считат, че през довоенните години овцете са били повече.

Като най-успешен за българското овцевъдство може да се посочи периода 1980-1984 г., през който броят на овцете достигна своя максимум - 10978 хил. през 1984 г. (табл. 1). През същата година в страната бяха произведени 36158 т. неправа вълна, 243418 т. месо и 313116 т. овче мляко. Изкупени бяха 31000 т. вълна, от която 14000 т. мериносова.

*Таблица 1. Брой на овцете и производство на вълна, месо и мляко*

Година	Общ брой на овцете (хил. бр.)	Неправа вълна (т.)	Месо в ж. тегло (т.)	Овче мляко (т.)
1939	9028	12772	111892	286329
1984	10978	36158	243418	313116
1990	8130	2811	168925	262911
2003	1599	6600	28392.2	85680



**Г.8.3.** Станков, И., Р. Славов, **Д. Панайотов**, Д. Памукова, 2007. Състояние и перспективи за развитие на овцевъдството в Р. България, Овцевъдство у нас и в Европа, Сборник доклади от научни конференции, проведени в Института по фуражни култури – Плевен, Издателство “Еньовче”, 23-34, стр. 255. ISBN 9789549373462

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## СЪСТОЯНИЕ И ПЕРСПЕКТИВИ ЗА РАЗВИТИЕ НА ОВЦЕВЪДСТВОТО В Р. БЪЛГАРИЯ

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### Резюме

С настоящия научен труд си поставихме за цел да анализираме състоянието на овцевъдството в България и да посочим пътищата за по-нататъшното му успешно развитие. Посочен е броя на овцете, капацитета на фермите, количеството на получаваните продукти и пазарите на които те се реализират.

Данните показват, че спрямо 1990 год. броя на овцете е намалял 5 пъти на овчето мляко 2,5 пъти, на месото 9,5 пъти и на вълната 4,5 пъти. Дребните ферми с капацитет до 50 овце-майки съставляват 70%. В страната се развъждат 37 породи овце, при нарушена породна структура.

В доклада са посочени мерките за по-нататъшното развитие на овцевъдството. Те се изразяват преди всичко в модернизация и окрупняване на фермите, изграждане на породна структура, повишаване на професионалната подготовка на овцевъдите.

**Ключове думи:** овце, агнета, овче мляко, месо, вълна, порода.

**Г.8.4.** Р. Славов, И. Станков, **Д. Панайотов**, Д. Памукова, 2008. Възможности за устойчиво развитие на овцевъдството и козевъдството в България. Сборник с доклади от научна конференция с международно участие „Устойчиво аграрно развитие на България в Европейския съюз“ 8-9 май 2008 г. издателство Алфамаркет + , ISBN 978-954-9443-01-1

## **Възможности за устойчиво развитие на овцевъдството и козевъдството в България**

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Овцевъдството и козевъдството са традиционни подотрасли за нашата страна. В продължение на столетия овцете и козите са осигурявали поминък на голяма част от населението и са били неизменна част от националния ландшафт.

По официални данни, от началото на миналия век до 1990 г., броят на овцете у нас варира между 7 и 10 млн. Най-успешен за българското овцевъдство е периодът 1980–1984 г., през който броят на овцете достига своя максимум – 10 978 хил. през 1984 г. През същата година в страната са произведени 36 158 t непрана вълна, 243 418 t месо и 313 116 t овче мляко. Изкупени са 31 000 t вълна, от която 14 000 t мериносова.

От 1980 до 1986 г. ежегодно от страната са изнасяни по 28-33 хил. тона сирене и кашкавал в близо 100 страни от Европа и света, а броят на изнасяните шилета надхвърля 1 млн.

През периода 1990–2007 г. броят на овцете в страната намалява с 6 603,6 хил., като само за последните 5 години това намаление е с 928,6 хил. или с 37,8 % (табл. 1). През последните две години общият брой на овцете в страната е вече под 2 млн., като към 1. 11. 2007 г. е регистриран най-малкият брой в националната статистика - 1 526,4 хил., в т.ч. 1 233,4 овце майки.

**Г.8.5. Панайотов, Д., Д. Памукова, 2012.** Проучване върху вълнодайността и типа на вълната при кочове от племенните стада на тънкорунната популация, Животновъдни науки, 1, 22-29.

INVESTIGATIONS ON WOOL YIELD AND TYPE  
IN RAMS FROM BULGARIAN FINE-WOOL ELITE HERDS

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SUMMARY

The investigation was conducted with 86 rams at the age of 18 months from five fine wool sheep breeds: Ascanian, Caucasian, Northeast Bulgarian Merino, Trakia Merino and Karnobat Merino.

On the basis of animal goodness data and the results from laboratory tests of individual wool samples, an integrated assessment of wool yield and type was performed using the following selection traits and parameters: fleece yield, wool yield, clean wool yield, wool fineness, natural staple length, staple impurity, number of crimps, wool grease colour and wool type.

Relatively low fleece and clean wool yields with high variations among the herds have been established ranging between 7.25–12.89 kg and 3.782–6.585 kg, respectively. Wool yields also varied considerably (app. 14%), but in most farms, average yields were over 50%.

Wool fineness in most studied farms corresponded to grade 64s (from 21.20 to 22.75  $\mu\text{m}$ ), and thigh wool – to grade 60s (23.11–25.03  $\mu\text{m}$ ).

**Г.8.6. Панайотов, Д., 2012.** Проучване технологичните свойства на стокови партии тънка (меринова) вълна, Животновъдни науки, XLIX, 4, 25-31

## INVESTIGATION ON TECHNOLOGICAL FEATURES OF MERINO WOOL STOCK BATCHES

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### SUMMARY

The study was performed on 29 industrial Merino wool batches. During the initial processing, the wool from each batch was divided into worsted (grade 64s and 60s) and carded (grades 64s and 60s). The washing of sorted wool and determination of industrial yields was done according to the technology currently used in textile enterprises.

The following technological parameters were determined in all clean wool industrial batches: moisture, residual fat, mineral and vegetable matter; fineness and length.

It was established that out of the total amount of greasy wool (3 103 557 kg) purchased and processed in Kolhida-Sliven LTD, the share of Bulgarian wool was 61.28% and that of imported wool – 38.72%. The greatest relative share of purchased wool was that of native improved wool – 92.61%, followed by Merino wool – 6.92% and Merino-like wool – 0.47%.

In both greasy and clean wool, about one-third of the total amount was worsted and two-thirds – carded. The grade 64s prevailed among worsted wool, whereas grade 60s – among carded wool samples.

The industrial yield after washing of stock batches was 45.77% in average, with slightly higher values for carded wool.

The average moisture, residual fat and mineral matter in the different clean wool types were in compliance with the Bulgarian State Standard, whereas the vegetable matter content of all wool types exceeded significantly the specified limits.

The average fineness of studied wools types was 23.29  $\mu\text{m}$  for worsted wool and 23.62  $\mu\text{m}$  for carded wool, whereas the mean weighted lengths – 59.12 mm and 47.65 mm for worsted and carded wools, respectively.

**Key words:** *Merino wool, worsted wool, carded wool, technological characteristics*

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**Г.8.7. Панайотов, Д., М. Симеонов, 2012.** Проучване върху живото тегло, телесното състояние и екстериора на овце от Плевенската черноглава порода, Животновъдни науки, 3, 3-10.

INVESTIGATION ON LIVE BODY WEIGHT, BODY CONDITION  
AND EXTERIOR TRAITS OF PLEVEN BLACKHEAD SHEEP

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SUMMARY

The investigations were conducted on 311 Plevan Blackhead sheep born between 2004 and 2009. Immediately before the reproduction campaign (August 2010) all animals were submitted to an integrated evaluation of exterior traits, live body weight and body condition.

Twelve exterior traits were measured on 207 sheep from four different age groups (at the age of 18 months; 2.5, 3.5 and 4.5 years), using a small ruminant stick, Wilkens' compasses and a centimetre measuring tape. Body condition of sheep was evaluated on a 5-score scale as per Todorov et al. (1994).

The lowest live body weight of studied sheep was that of ewes – 52.78 kg, and the highest – in 4.5- and 5.5-year-old sheep, 67.32 and 67.88 kg respectively. The lowest body condition scores (BCS) were those of ewes again – 2.74, and the highest – in adult sheep aged 3.5, 4.5 and 5.5 years: between 3.36–3.54.

The exterior traits showed a tendency toward increase of dimensions with age. Average values of main exterior traits in the different groups of sheep varied as followed: wither height – from 73.74 to 76.08 cm; croup height – from 71.29 to 74.19 cm; body length – from 74.44 to 77.48 cm; chest perimeter – from 91.85 to 100.54 cm.

The phenotypic correlation coefficient between live body weight and BCS at the age of 18 months was 0.401, while in adult sheep – over 0.700.

The correlations between live body weight and chest width, chest depth, chest perimeter and body length were assessed as strongly beneficial.

**Г.8.8. Панайотов, Д., С. Бойковски, 2012. Сравняване на различни методи за определяне на рандемана на вълната, Животновъдни науки, XLIX, 4, 3-7.**

#### COMPARISON OF DIFFERENT METHODS FOR WOOL YIELD EVALUATION

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#### SUMMARY

The research was performed on 308 female sheep at the age of 18 months from the Caucasian merino breed.

Individual wool yields were determined using three methods, differing mainly by the sampling technique used: **Method 1.** The commonly accepted technique for determination of wool yield of elite flocks in Bulgaria (on 50 g wool clipped from the side); **Method 2.** Method of Kogan-Bergman and Novikova (on 200 g wool sample collected from the fleece using a rectangular 20×20 cm frame grid); **Method 3.** On 50 g bulk wool samples clipped from six body areas (neck, shoulder, side, back, belly and thigh).

After collection of individual samples (a total of 924), wool yields were determined uniformly using the following protocol: determination of the air-dry weight of grease wool sample; washing in a washing machine with alkaline soapy solution containing 0.3% soap and 0.3% sodium hydroxide; drying of samples in a dryer and determination of the air-dry weight of clean wool; determination of wool yield.

Wool yields determined by the three sampling methods varied within a very narrow range – from 53.43 to 54.58%. The lowest yield was obtained in bulk samples from six areas of the fleece and the highest – by the method of Kogan-Bergman and Novikova.

The lowest and statistically insignificant repeatability coefficient was between the first and the third method – 0.571, and the highest – between the second and the third (0.705\*\*). The difference between average yields between the method traditionally used in the selection practice and that of Kogan-Bergman and Novikova was insignificant, with repeatability coefficient of 0.633\*.

**Key words:** *sheep, wool, wool yield, clean wool*

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Г.8.9. Панайотов, Д., 2012. Проучване върху технологичните свойства на стокови партии вълнени ленти, Животновъдни науки, XLIX, 5, 44-49.

## INVESTIGATION ON TECHNOLOGICAL FEATURES OF WOOL ROVING STOCK BATCHES

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### SUMMARY

The study was performed on 8 stock wool roving batches with a total weight of 33,138 kg, produced from Merino wool at the wool textile enterprise Kolhida-Sliven LTD.

The initial processing of wool (sorting and washing), the carding and wool roving making are done according to the existing technology in the enterprise.

The following technological parameters were determined in all wool roving batches: moisture, residual fat, vegetable matter; fineness and length.

It was found out that the moisture content of studied wool roving ranged between 15.02 and 17.56%, the residual fact content – from 0.52 to 0.64%, and vegetable matter – from 0.01 to 0.08%.

The average fineness of fibres was 23.85  $\mu\text{m}$ . Batch No. 0210 was the finest (22.91  $\mu\text{m}$ ) and the only one compliant to Bradford grade 64s. The mean values of the other batches corresponded to grade 60s, whereas batch No 0510 was at the low limit of grade 58s. The best uniformity of fibres was exhibited by batch No. 0810, with coefficient of variation 18.78%. The same batch had also the lowest relative share of fibres with thickness over 30  $\mu\text{m}$  – 6.95%.

The mean weighted lengths of wool in seven batches of wool roving ranged within 60.45–69.99 mm. The short fibre content in the different batches varied from 17.41 to 26.12%, whereas the mean base values – between 57.44 and 61.56%.

**Key words:** *wool; wool roving; technological features*

**Г.8.10. Панайотов, Д., М. Симеонов, 2014.** Проучване върху някои морфологични особености и функционални характеристики на вимето при овце от Плевенската черноглава порода, Животновъдни науки, LI, 4, 10 -14

#### **SUMMARY**

The study was performed on 29 Pleven Blackhead sheep; 14 at first lactation and 12 – at second lactation. Udder measurements were taken between the 54th and 57th day after lambing, before the morning milking. The following udder dimensions were determined by means of Wilkens' compass, centimeter tape and Vernier caliper: 1. Udder width; 2. Udder depth (of the right half; of the left half); 3. Udder circumference (longitudinal; horizontal ); 4. Teat length (right teat length; left teat length); 5. Teat width (right teat width; left teat width); 6. Distance between teats. The milk yield from the left and right udder halves was determined on test day milking. Udder width of sheep at first and second lactations was 15.96 and 16.13 cm, respectively; longitudinal circumferences – 23.48 and 23.90 cm, and horizontal circumferences – 36.09 and 37.48 cm. Teat lengths in first-lactation sheep were 3.34 – 3.51 cm, and in those at second lactation – 2.83–3.13 cm. Teat widths were established to be 1.98–2.18 and 1.82–2.12 cm respectively, and the distance between teats was about 16 cm. The relative proportion of milk from the right udder half was 47.31% (first-lactation sheep) and 51.26% (second-lactation sheep). Strong correlations were established between udder width and both circumferences (longitudinal and horizontal): 0.889 and 0.845 for both studied groups. The values of correlation coefficients depicting the relationship between right and left teat lengths (0.870 – 0.906) and between right and left teat widths (0.754–0.758). Strong correlations existed between udder width, longitudinal and horizontal circumferences vs milk yield (0.882–0.908 in first-lactation sheep and 0.683–0.843 in second lactation sheep).

Key words: Pleven blackhead breed, Udder measurements, Milk yield, Correlations



**Г.8.11. Панайотов, Д., 2014. Сравнително проучване върху нежността на вълната при стокови партиди вълнени ленти, Животновъдни науки, LI, 4, 51-54.**

#### **SUMMARY**

In the experiments, 8 wool roving batches with total weight of 33 138 kg, produced of fine (Merino) wool in Kolhida- Siven Ltd were used. The fineness of wool in each studied batch was determined by lanameter and by Optical Fibre Diameter Analyzer (OFDA-100).

It was found out that the mean thickness of fibres in the studied wool roving batches ranged between 22.91 and 25.30  $\mu\text{m}$  when measured with lanameter and between 23.03 and 26.55  $\mu\text{m}$  in OFDA tests. In all studied batches, the mean thickness of fibres determined with OFDA was higher than that determined with the lanameter. According to the average thickness of fibres in lanameter tests, one of studied batches was evaluated as grade 64s, six – with grade 60s and one with grade 58s according to the Bradford system, whereas the results from OFDA tests yielded one batch with grade 64s, three with grade 60s and four – with grade 58s. Coefficients of variations of the individual wool roving batches varied within relatively narrow ranges – from 23.29 to 25.47% in lanameter tests and from 22.20 to 25.07% in OFDA tests. For all studied batches, the relative share of fibres thicker than 30  $\mu\text{m}$  exceeded the limit of 5% for fine (Merino) wool. The values of this parameter, as determined by OFDA were significantly higher for all studied batches.

Key words: wool: fineness, coefficient of variation, prickly factor.

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