RESEARCHES REGARDING THE IMPROVEMENT OF THE MEAT PRODUCTION AT THE LOCAL SHEEP BREEDS FROM ROMANIA THROUGH CROSSBREEDING WITH SPECIALIZED BREEDS, PALAS MEAT BREED, SUFFOLK, CHAROLLAIS

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Abstract

At the Research and Development Institute for Sheep and Goats Breeding- Palas it was aimed the improvement of the meat production at the sheep breeds, by obtaining half-bred sheep from the maternal breeds of Palas Merino and Ţigaie crossbred with paternal breeds specialized for meat: Meat Breed of Palas, Suffolk, Charollais. The male half-bred lambs F1 and the lambs from maternal breeds were subject to control fattening for 80 days using granulated mixed fodder. The half-bred lambs F1 (Meat breed of-Palas X Palas MerinoBreed) had an average daily weight gain of 260.13 g, lambs of Meat breed of Palas lambs a daily gain of 247.42 g and the lambs of Palas Merino Breed 205.39 g, resulting an increase of 26.65%. The male half-bred lambs F_1 (Meat breed of Palas X Ţigaie Breed) had an average daily weight gain of 193.50 g, comparatively to the Ţigaie lambs that had 130.71 g, at the half-bred lambs it is obtained higher daily weight gain with 48.04%. The half-bred male lambs F1(Suffolk X Merinos) make an average daily increasing rate of 229.35 g, besides 190.25 g Merinos contemporaries, the half-bred sheep make an increase higher with 9.1 g, bigger with 20.55%. The average daily increasing rate of the half-bred lambs F1 (Charollais X Merinos) was of 190.50 g, and at the lambs from Merinos breed, from the witness lot, 160.41 g, the half-bred sheep make an increasing rate with 29.6 g higher, with 18.45%. The half-bred sheep F1 (Meat breed of Palas X Palas MerinoBreed) had at the slaughtering output 1, 48.12% and at the output 2, of 54.74 %. The F1 half-bred lambs (Meat breed of Palas X Ţigaie Breed) had at the output 1 the value of 47.54 and at the output 2, of 53.98%. The lambs of Ţigaie had at output 1, 44.25% and at output 2, 49.54%. The F1 half-bred lambs (Suffolk Breed X Merino Breed) had at output 1, 51.21% and at output 2, 55.94%. The half-bred male lambs of F1 (Charollais x Merinos) had the output 1, of 47.14%, and at output 2, of 54.74%.

Key words: half-bred, slaughtering output, tissue structure

INTRODUCTION

The increase of the meat production at local sheep breeds is necessary because the adaptation and breeding of the sheep that are specialized for meat which origin in other countries did not have results, they did not adapt themselves to the conditions from Romania, much loss occurred through deaths and necessity slaughtering, decreased dramatically the prolificacy and birthing. So, the solution for improving the quality of the meat production from the Romanian sheep breeds is to create F_1 half-bred sheep, for this kind of production using the local breeds and improved breeds that are created in other countries. Another reason for using this method is heterosis, so the vigour of the hybrid organisms in the first F1 generation comparatively to the parental forms [3]. In the present, the sheep breeding and exploitation must be oriented to make a production based on the market requirements depending on the biological particularities of the breeds.

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The work has as objective to increase the quantity of meat of young sheep, to increase the quality of carcases, in actual international context, in which this meat is more and more appreciated by consumers for its organoleptic qualities and for the low content of fat. The sheep meat production had a special development during last years both in the Middle East and Asia, and also in West Europe.

MATERIAL AND METHOD

The animals that were subject to research works were watched individually regarding own performances, registering data regarding: control of productions; weight of lambs during the fattening period, calculation of weight, and control of fodder consumption. After the control slaughtering, the carcasses were cooled for 24 hours at the temperature of +2, +4^{0}C.

The output at slaughtering was determined according to formula:

$$\text{Output 1} = \frac{\text{Weight of cooled carcass}}{\text{Living Weight}} \times 100$$

$$\text{Output 2} = \frac{\text{Weight of cooled carcass}}{\text{Empty Living Weight}} \times 100$$

Empty Living Weight = Living Weight without digestive tube (pre-stomachs, glandular stomach, intestines).

Cut of the carcasses: The cooled carcasses were sectioned on the middle line in two equal halves, all determinations being done on the right side.

The tissue structure of the carcases: After having cut of the semi-carcases in the three pieces, they were dissected, separating the muscles, fat (of covering and inter-muscular) and the bones. Each tissue was weighted on electronic balance with a precision of ±5 g) establishing the tissue structure.

Classification of the carcases was done after EUROP grid [3].

All data were statistically processed, and for the significance of the differences the Fisher Test was used [7].

RESULTS AND DISCUSSIONS

In table 1 it is presented the average daily increasing rate made by the half-bred lambs and the lambs from the parental breeds.

From table 1 it results that the male half-bred lambs of F1 (Meat breed of Palas X Palas Merino Breed) had an average daily weight increasing rate of 260.13 g, the male lambs from Meat breed of Palas had an daily gain of 247.42 g and the male lambs of Palas Merino Breed had an daily gain lower than 205.39 g.

Table 1 The average daily weight increasing rate made by the fattened male lambs

No	Breed	Average daily weight gain (g)		
		n	X ± sx	V%
1	Half-bred lambs F_1 (Meat breed of Palas x Palas Merino)	16	260.13±9.4644	14.55
2	Palas Merino Breed	18	205.39±7.6210	15.74
3	Meat breed of Palas	19	247.42±6.9749	12.29
4	Half-bred lambs F_1 (Meat breed of Palas x Ţigaie Breed)	20	193.50±7.5896	17.54
5	Breed Ţigaie	14	30.71±12.2045	34.94
6	Half-bred lambs F_1 (Suffolk X Merinos)	17	229.35±12.6532	22.75
7	Merino Breed	24	190.25±5.5378	14.26
8	Half-bred lams F_1 (Charollais X Merino Breed)	20	190.50±3.880	9.15
9	Merino Breed	20	160.41±3.240	9.04

The calculus of the differences between the average daily increasing rates made by the three genotypes show that between the male half-bred lambs of F1 (Meat breed of Palas x Palas Merino Breed) and Palas Merino lambs there are very significant differences

(P<0.001) regarding the differentiation between the average daily weight increasing rate, the half-bred lambs making a rate with 54.74 g bigger, representing an increase of 26.65%. Comparatively to the lambs of Meat breed of Palas at the half-bred male lambs of F1 (Meat breed of Palas x Palas Merino Breed) the increasing rate is bigger with 12.71 g, a plus of 5.14%, the differences being insignificant (P>0.05). Comparing the two breeds, Meat breed of Palas and Palas Merino Breed, it can be noted that between them there are very significant differences (P<0.001), Meat breed of Palas makes an average daily increasing rate with 42.03 g/head bigger than Palas Merino Breed, an increasing rate bigger with 20.46%.The average daily weight gain of the male half-bred lambs of F1 (Meat breed of Palas X Ţigaie Breed) was 193.50 g, comparatively to the lambs of Ţigaie breed which had an increasing rate of 130.71 g. between the male half-bred lambs of F1 (Meat breed of Palas X Ţigaie Breed) and the lambs of Ţigaie breed very significant differences (P<0.001) are noted, at the half-bred lambs it is obtained a weight gain higher with 48.04%. From the table it can be noted that the average daily increasing rate on the whole fattening period was of 229.35 g at the male half-bred lambs of F1 (Suffolk X Merino), besides 190.25 g at the Merino contemporaries. Between the half-bred of F1 (Suffolk X Merino) and the Merino lambs there are very significant differences (P<0.001), the half-bred sheep make an average daily increasing rate bigger with 39.1 g, an increasing rate with 20.55% bigger.

The average daily weight increasing rate of the male half-bred lambs of F1 (Charollais X Merino) was of 190.50 g, and at the lambs of Merinos breed 160.41 g. There are noted between the two lots of half-bred lambs of F1 (Charollais X Merino Breed) and Merino Breed very significant differences (P < 0.001), the average daily increasing rate is higher at the half-bred sheep with 29.6 g, with 18.45%.

From the data in table 2 it is noted that the fattened male half-bred lambs of F1 (Meat breed of Palas X Palas Merino Breed) had higher values both at output 1, of 48.12%, and also at output 2, of 54.74%. The male lambs of Palas Merino Breed had at output 1 of 44.25%, and at output 2 of 49.54%, and the male lambs of Meat breed of Palas had at output 1 of 47.54% and at output 2 of 53.98%.There were calculated the differences obtained at slaughtering of the fattened male youth, so, between half-bred sheep F1 (Meat breed of Palas X Palas Merino Breed) and Palas Merino Breed significant differences were obtained (P<0.05), between Meat breed of Palas and Palas Merino Breed significant differences (P<0.05), and between half-bred sheep F1 (Meat breed of Palas X Palas Merino Breed) and Meat breed of Palas insignificant differences (P>0.05). At Palas Merino Breed Vicovan P.G and colab. in 2009 [7] obtain similar data.

Table 2 Output at slaughtering of the fattened male lambs

No	Breed	Slaughtering Output 1 (%)			Slaughtering Output 2 (%)		
		n	X ± sx	V%	n	X ± sx	V%
1	F_1 half-bred lambs (Meat breed of Palas X Palas Merino Breed)	3	48.12±0.4988	1.79	3	54.74±1.1800	3.74
2	Meat breed of Palas	3	47.54±0.5100	1.85	3	53.98±0.4700	1.51
3	Palas Merino Breed	3	44.25±0.8290	3.21	3	49.54±1.3700	4.79
4	Half-bred lambs of F1 (Meat breed of Palas X Ţigaie Breed)	3	47.54±0.5100	1.85	3	53.98±0.4700	1.51
5	Ţigaie Breed	3	44.25±0.8290	3.21	3	49.54±1.3700	4.79
6	Half-bred lambs F_1 (Suffolk x Merino Breed)	3	51.21±1.2200	4.12	3	55.94±0.9100	2.83
7	Merino Breed	3	44.25±0.8200	3.21	3	49.54±1.3700	4.79
8	F1 Half-Bred (Charollais x Merino)	3	47.14±0.5121	1.88	3	54.74±1.1800	3.74
9	Merino Breed	3	44.25±0.8290	3.21	3	49.54±1.3700	4.79

Also from the data in table 2 it is noted that the fattened male half-bred lambs of F1 (Meat breed of Palas X Ţigaie Breed) had higher values than Ţigaie lambs, both at output 1, of 47.54%, and also at output 2, of 53.98%. The male lambs of Ţigaie Breed had at output 1 of 44.25% and at output 2 of 49.54%. The calculated differences are significant (P<0.05).

It is noted that the fattened male half-bred lambs of F1 (Suffolk Breed X Merinos Breed) had higher values both at output 1, of 51.21%, and also at output 2 of 55.94%, comparatively to male lambs of Merinos Breed which had at output 1 the value of 44.25%, at output 2 the value of 49.54%, differences calculated between the values of the output at slaughtering are significant (P<0.05).

The fattened male half-bred lambs of F1 (Charollais x Merino) had at output 1, of 47.14% and at output 2, 54.74%. The male lambs of Merino Breed had at output 1 the value of 44.25% and at output 2 the value of 49.54 %, the calculated differences are very significant (P<0.001).

Table 3 Tissue structure of the carcass

Genotype	Tissue Structure (%)			
	Muscles	Fat	Bones	Proportion of Muscles / bones
Half-bred sheep of F1 (Meat breed of Palas X Palas Merino)	62.03	16.70	21.27	2.92
Meat breed of Palas	64.34	14.20	21.46	2.99
Palas Merino Breed	60.77	15.95	23.32	2.61
Half-bred sheep F1 (Meat breed of Palas X Ţigaie)	53.69	24.40	21.91	2.45
Ţigaie	51.56	24.38	24.06	2.14
Half-bred lambs of F1 (Suffolk X Merinos)	59.13	18.45	22.42	2.63
Merinos	60.72	15.96	23.32	2.60
Half-bred lambs of F1 (Charollais X Merinos)	61.35	16.40	22.25	2.75
Merinos	60.45	14.35	25.20	2.39

In table 3 it is presented the tissue structure of the semi-carcass at the lambs experimentally slaughtered. There are noted differences regarding the weight of the tissues that were detached by dissection from the semi-carcass. As it can be noted in table 3 at all half-bred lambs, the carcasses had a higher quantity of muscles comparatively to maternal breeds.

The muscles are 62.03% la half-bred lambs of F_1 Meat breed of Palas X Palas Merino Breed, and at the lambs of Palas Merino Breed it is obtained the value of 60.77%. The bones are 21.27% of the semi-carcass at the half-bred lambs of F_1 Meat breed of Palas X Palas Merino Breed and 23.32% at Palas Merino Breed. The proportion of muscles/bones is of 2.92% at the half-bred lambs of F_1 Meat breed of Palas X Palas Merino Breed, and at the lambs of Palas Merino Breed it is obtained a proportion of 2.61%. The fat is 16.70% of the semi-carcass at the half-bred lambs of F_1 Meat breed of Palas X Palas Merino Breed) and 15.95% at Palas Merino Breed. At the half-bred lambs of F_1 Meat breed of Palas X Ţigaie Breed the muscles are 53.69% la, and at the lambs of Ţigaie Breed it is obtained the value of 51.56%. The bones are 21.91% of the semi-carcass at the half-bred lambs of F_1 Meat breed of Palas X Ţigaie Breed and 24.06% at the Ţigaie Breed. The proportion of muscles/bones is of 2.45% at the half-bred lambs of F_1 Meat breed of Palas X Ţigaie, and at the lambs of Ţigaie Breed it is obtained a proportion of 2.14%. The fat is 24.40% of the semi-carcass at the half-breed lambs of F_1 Meat breed of Palas X Ţigaie Breed and 24.38% at Ţigaie Breed.

At the half-bred lambs of F_1 Suffolk X Breed Merinos the muscles are 59.13%, and at the lambs of Merinos Breed it is obtained the value of 60.72%. The bones are 22.42% of the semi-carcass at the half-bred lambs of F1 Suffolk X Breed Merinos, 23.32% at Merino Breed. The proportion of

muscles/bones is of 2.63% at the half-bred lambs of F_1 Suffolk X Merino Breed, and at the lambs of Merino Breed it is obtained a proportion of 2.63%. The fat is 22.42% of the semi-carcass at the half-bred lambs of F_1 Suffolk X Merino Breed and 15.65% at Merino Breed. At the half-bred lambs of F_1 Charollais x Merinos the muscles are 60.72 and at the lambs of Merinos Breed it is obtained the value of 60.45%. The bones are 22.25% of the semi-carcass at the half-bred lambs of F_1 Charollais x Merinos, 25.20% at the Merinos Breed. The proportion of muscles/bones is of 2.75% at the half-bred lambs of F_1 Charollais X Merinos Breed, and at the lambs of Merino Breed it is obtained a proportion of 2.39%. The fat is 16.40% of the semi-carcass at the half-bred lambs of F_1 Charollais X Merinos Breed and 14.35% at Merinos Breed.

According to the classification of the carcasses by EUROP grid the best carcasses under the aspect of conformation and the degree of fattening were those of half-bred lambs of F_1 Suffolk x Merinos (class U 100%, respectively class 2, by the degree of fattening 67% and 33% in class 3), the half-bred lambs of F1 Charollais X Merinos (class U 100%, respectively class 2, by the degree of fattening 67% and 33% in class 3), and also the carcasses from the lambs of the Meat breed of Palas (all the carcasses from class U and classes 2 and 3 by the degree of fattening).

The half-bred lambs of F_1 Meat breed of Palas x Palas Merino Breed had the carcasses from classes U 67% and R 33%, comparatively to maternal breed whose carcasses were in class R, and from the point of view of the degree of fattening the half-bred lambs of F_1 Meat breed of Palas x Palas Merino Breed 33% were in class 2 and 67% in class 3, and at Palas Merino Breed was the same.

CONCLUSIONS

1. The male half-bred lambs of F_1 (Meat breed of Palas X Palas Merino Breed) had an average daily weight gain with 54.74 g bigger, representing an increase of 26.65% comparatively with Palas Merino Breed. Comparatively to the lambs of Meat breed of Palas at the half-bred male lambs of F_1 (Meat breed of Palas x Palas Merino Breed) the increasing rate is bigger with 12.71 g, a plus of 5.14%. Between Meat breed of Palas and Palas Merino Breed, it can be noted an average daily increasing rate with 42.03 g/head bigger than Palas Merino Breed, an increasing rate bigger with 20.46%. The average daily weight increasing rate of the male half-bred lambs of F1 (Meat breed of Palas X Ţigaie Breed) was bigger with 39.1 g (20.55 %) than Ţigaie Breed. The average daily weight increasing rate of the male half-bred lambs of F_1 (Charollais X Merino) was higher at the half-bred lambs with 29.6 g (18.45%) comparatively Merino.

2. The fattened male half-bred lambs of F1 (Meat breed of Palas X Palas Merino Breed) had bigger values for slaughtering output 1 of 3.87 %, and for output 2 of 5.20% in comparison with male lambs of Palas Merino Breed. The fattened male half-bred lambs of F1 (Meat breed of Palas X Ţigaie Breed) had higher values than Ţigaie lambs, both at output 1 (with 3.29 %) and also at output 2, (with 4.44%). The fattened male half-bred lambs of F1 (Suffolk Breed X Merino Breed) had higher values both at output 1 (with 6.96%) and also at output 2 (with 6.40 %), comparatively to male lambs of Merino Breed. The fattened male half-bred lambs of F1 (Charollais x Merinos) had higher values both at output 1 (with 2.89%) and also at output 2 (with 3.52%), comparatively to male lambs of Merino Breed

3. It was made the tissue structure of the semi-carcass at the lambs experimentally slaughtered. At all half-bred lambs the carcasses had a bigger quantity of musculature comparatively to maternal breeds, the muscles are 62.03% la half-bred lambs of F_1 Meat breed of Palas X Palas Merino Breed, and at the lambs of Palas Merino Breed it is obtained the value of 60.77%. The bones are 21.27% of the semi-carcass at the half-bred lambs of F_1 Meat breed of Palas X Palas Merino Breed and 23.32% at Palas Merino Breed. At the half-bred lambs of F_1 Meat breed of Palas X Ţigaie Breed the muscles are 53.69%, and at the lambs of Ţigaie Breed it is obtained the value of 51.56%., the bones are 21.91% of the semi-carcass at the half-bred lambs of F_1 Meat breed of Palas X Ţigaie Breed and 24.06% at the Ţigaie Breed. At the half-bred lambs of F_1

Suffolk X Breed Merino the muscles are 59.13%, and at the lambs of Merino Breed it is obtained the value of 60.72%. The bones are 22.42% of the semi-carcass at the half-bred lambs of F_1 Suffolk X Merino Breed, 23.32% la Merino Breed. At the half-bred lambs of F_1 Charollais x Merino the muscles are 60.72 and at the lambs of Merino Breed it is obtained the value of 60.45%. The bones are 22.25% of the semi-carcass at the half-bred lambs of F_1 Charollais x Merino, 25.20% at the Merino Breed.

4. The Classification of the carcasses by EUROP grid: the best carcasses under the aspect of conformation and the degree of fattening were those of half-bred lambs of F_1 Suffolk x Merino (class U 100%, respectively class 2, by the degree of fattening 67% and 33% in class 3), the half-bred lambs of F_1 Charollais X Merino (class U 100%, respectively class 2, by the degree of fattening 67% and 33% in class 3), and also the carcasses from the lambs of the Meat breed of Palas (all the carcasses from class U and classes 2 and 3 by the degree of fattening).

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