RESEARCHES REGARDING THE IMPROVEMENT OF MEAT PRODUCTION UNDER QUANTITATIVE AND QUALITATIVE ASPECT AT THE ROMANIAN SHEEP BREEDS

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Abstract

Due to the raise of interest for the lamb meat we planned to optimize the technology of fattening the lambs and to obtain the improvement of the carcasses the use of crossbreeding the local breeds with sheep breeds that are specialized for the meat production. There was done the fattening in system of 100 days, structured in 3 stages: accommodation, effective fattening and finishing. At the fattening of lambs in intensive system in the beginning of the experiment the lots had similar average body weights, and in the end of fattening there are emphasized big differences between the lots of half-breeds: Texel x Merino half-bred lambs had the weight of 39.90±0.69 kg, the lambs of Merino breed 34.35 ±0.56 kg, Blackface x Ţzgaie 40.02 ± 0.86 kg, half-bred lambs of Palas Meat-Breed X Tzgaie 38.08 ± 0.59 kg, lambs of Tzgaie breed 32.24 ± 0.56 kg, half-bred lambs of Suffolk x Tzurcana 37.92 ± 0.55 kg, lambs of Tzurcana 33.12±2.01kg. At the control slaughtering there were obtained bigger values of the slaughter output and the commercial output at the half-bred lams.

Key words: fattening, intensive system, accommodation, finishing

INTRODUCTION

The Romanian researchers, in time, have been preoccupied with the increase of the meat production at the local breeds because adapting and breeding the specialized sheep for meat coming from other countries did not have results, they could not be adapted to the conditions from Romania, many losses occurring by mortalities and the prolificacy and giving birth increasing dramatically [8]. From these reasons, the solution to improve the qualities of the qualities of meat production at the Romanian sheep breeds is represented by the creation of F1 half-bred lambs, for this production being used local breeds and specialized breeds created in other countries. By using the method, the heterosis is used, which increases the vigour of the hybrid bodies in the first F1 generation comparatively to the parental forms. In 2006 Drăgănescu C. [2], correctly makes an appreciation regarding the development of sheep breeding: "the sheep breeding was and must remain an important economical, ecological and historical branch of Romanian agriculture."

MATERIAL AND METHOD

The animals included in the works have been individually watched regarding own performances, registering data regarding: control of productions; weight of lambs in the fattening period, calculating the weight increasing rate, control of fodder consumption.

The maintenance of sheep was made in stable for 150-160 days and 205-215 days on pasture, there were provided fodder ratios depending on the physiological estate of animals. The feeding of the youth started at the age of 8-10 days, when very good quality hay and vitamin hay and concentrated fodders were provided to the lambs, in special arranged places, the foddering being continued until weaning, and then the fattening in intensive system being made, a

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The manuscript was received: 31.08.2016
Accepted for publication: 14.10.2016

period of 100 days, structured in 3 stages: *stage I -"accommodation",* 15 days, „*ad libitum*" unique mixture being given in 3 daily portions, the content of the daily ratio being of 0,97 UNC, 92 g PDIN and 89 g PDIE; water and salt being given for liking, there were established days for the control of the fodders' consumption, at 3 days; *stage II - "fattening"*, 60 de days, the content of daily ratio in nutritive principles being of 1,46 UNC, 329 g PDIN and 373 g PDIE; the fodders being given in two daily portions there were established days for control of the consumption of fodders, one day per week and the days of control for the fattening estate, one day per month; *stage III - "finishing"*, 25 days, the fodders were also given in 2 daily portions, the content of ratio being of 1.88 UNC, 383 PDIN and 415 g PDIE, according to the nutritional norms [7].

In the end of the period of fattening the control slaughtering were made, the output at slaughtering was calculated (slaughter output, commercial output). The cutting of the carcass was done according to the French cutting system.

The data were statistically processed.

RESULTS AND DISCUSSIONS

After weaning the lambs the experimental lots were formed, randomly chosen (15-20 animals each lot), the fattening in intensive system of 100 days being made, according to the nutritional norms previously presented. Control of fattening was done through periodical individual weighing, establishing the growing speed, expressed through the total increase in the three stages of the period of fattening and through the average daily increasing rate, according to the tables 1 and 2.

Half-bred lambs of Texel x Merino had in the beginning of the period of fattening weight of 17.35±0.51 kg, in the end of the accommodation stage 20.15±0.75 kg, in the end of the stage of fattening 33.86±0.74 kg, and in the end of finishing stage had the weight of 39.90±0.69 kg. The lambs of Merino breed in the beginning of the period of fattening had the weight of 17.70±0.43 kg, in the end of the period of accommodation had the weight of 19.18 ± 0.51 kg, in the end of the stage of fattening 29.45±0.68 kg, and in the end of the finishing stage had the weight of 34.35±0.56 kg. The lambs of Blackface x Tzigaie in the beginning of the period of fattening had the average weight of 16.55±0.47 kg, in the end of the period of accommodation had the weight of 19.47±0.51 kg, in the end of the fattening stage 35.01±0.77 kg, and in the end of the finishing stage had the weight of 40.02±0.86 kg.

Table 1 Evolution of body weight of the sheep male youth fattened in intensive system (kg)

Lambs	Initial weight	Stages of fattening and their duration in days		
		Accommodation (15 days)	Fattening (60 days)	Finishing (25 days)
	X ± s_x V%	X ± s_x V%	X ± s_x V%	X ± s_x V%
Texel x Merino (n=20)	17.35±0.51 13.14	20.15±0.75 16.64	33.86±0.74 9.77	39.90±0.69 7.73
Merino (n=20)	17.70±0.43 10.84	19.18±0.51 11.89	29.45±0.68 10.29	34.35±0.56 7.30
Blackface x Tzgaie (n=15)	16.55±0.47 10.99	19.47±0.51 11.71	35.01±0.77 8.51	40.02±0.86 8.32
Palas Meat-Breed X Tzgaie (n=20)	15.54±0.23 6.56	18.02±0.18 4.74	32.34±0.49 6.74	38.08±0.59 6.92
Tzgaie (n=20)	17.12±0.43 11.23	18.59±0.57 13.71	27.80±0.57 9.16	32.24±0.56 7.76
Suffolk X Tzurcana (n=20)	16.70±0.24 5.44	19.63±0.24 5.44	32.12±0.50 7.04	37.92±0.55 6.50
Tzurcana (n=20)	14.62 ±0.67 20.49	16.71±0.44 11.77	28.61 ±1.69 25.52	33.12 ±2.01 7.14

Table 2 Average daily increasing rate at the male sheep youth which was fattened in intensive system (g/day)

Lambs	Stages of fattening and their duration in days			Total increasing rate (100 days)
	Accommodation (15 days)	Fattening (60 days)	Finishing (25 days)	
	X ± s_x V%	X ± s_x V%	X ± s_x V%	X ± s_x V%
Texel x Merino (n=20)	186.7± 5.12 12.26	228.5 ± 4.28 8.37	241.6 ± 9.48 17.54	225.5± 6.59 13.06
Merino (n=20)	98.7±2.26 10.24	171.2 ± 5.06 13.21	196.0±6.05 13.80	166.5 ± 4.35 11.68
Blackface x Tzgaie (n=15)	194.7±2.45 4.87	259.0±3.15 4.71	200.4±5.14 9.64	234.7±6.11 10.08
Meat Breed - Palas X Tzigaie (n=20)	165.4±7.59 20.52	238.7±7.54 14.12	229.6±7.79 15.18	225.4±6.87 13.63
Tzgaie (n=20)	98.0±2.36 10.76	153.5±5.16 15.03	176.6±5.42 13.72	151.2± 3.39 10.02
Lambs of Suffolk X Tzurcana (n=20)	195.4±7.85 17.96	208.2±10.99 23.60	232.0±10.70 20.62	212.2±6.88 14.49
Lambs of Tzurcana (n=20)	139.4 ±8.15 26.14	198.4±8.39 18.91	180.4±9.17 22.73	185.0±8.56 20.69

Half-bred lambs of Meat-Breed of Palas x Tzigaie in the beginning of the period of fattening had the average weight of 15.54±0.23 kg, in the end of the period of accommodation had the weight of 18.02±0.18 kg, in the end of the fattening stage 32.34± 0.49 kg, and in the end of the finishing stage had the weight of 38.08±0.59 kg. Lambs of Tzgaie in the beginning of the period of fattening had the average weight of 17.12±0.43 kg, in the end of the period of accommodation had the weight of 18.59±0.57 kg, in the end of the fattening stage 27.80 ± 0.57 kg, and in the end of the finishing stage had the weight of 32.24±0.56 kg. Half-bred lambs of Suffolk X Tzurcana in the beginning of the period of fattening had the average weight of 16.70 ± 0.24 kg, in the end of the period of accommodation had the weight of 19.63 ± 0.24 kg, in the end of the fattening stage 32.12 ± 0.50 kg, and in the end of the finishing stage had the weight of 37.92 ± 0.55 kg. Lambs of Tzurcana in the beginning of the period of fattening had the average weight of 14.62 ±0.67 kg, in the end of the period of accommodation had the weight of 16.71±0.44 kg, in the end of the fattening stage 29.61 ±1.69 kg, and in the end of the finishing stage had the weight of 33.12 ±2.01 kg.

Analysing the evolution of the body weight at the lots of lambs which were subject of fattening it is noted that we start from initial similar body weights, keeping them in the accommodation stage-se and then, in the end of the fattening and the finishing stages differences of weight appear between the lots of fattened lambs.

The improvement of meat production under qualitative and quantitative aspect at the sheep breeds concerned a lot of researchers from Romania and in the world. So, Poajor and co. (2009) study the effect of crossbreeding of Hungarian sheep of Merinos with the meat breeds of Ile de France and Suffolk obtaining fattened half-bred lambs with a weight of 31-32 kg, that make increasing rates similar to those obtained by us. Also, Pascal and co. (2009) aimed to obtain the half-bred lamb with good aptitudes for meat production, using the crossbreeding of sheep from local breeds of Merino de Palas, Tzigaie and Tzurcana with male reproducers from Texel breed, the half-bred did an average daily increasing rate with more than 20% comparatively to the increasing rates of the witness lots.

Calculating the daily average weight increasing rate, did on stages and on the total period of fattening it is noted at the half-bred

lambs of Texel x Merino an increasing rate of 186.7± 5.12 g in the stage of accommodation, 228.5± 4.28 g in the stage of fattening, 241.6 ± 9.48 g in the finishing stage, and on the total period of fattening 225.5 ±6.59 g. At the lambs of Merino in all phases of fattening and on the total period of fattening there were obtained smaller increasing rates comparatively to those made by the half-bred lambs of Texel x Merino, 98.7±2.26 g in the stage of accommodation, 171.2±5.06 g in the stage of fattening, 196.0± 6.05 g in the stage of finishing, and on the total period 166.5 ± 4.35g. Half-bred lambs of Blackface x Tzigaie obtained in the stage of accommodation 194.7 ± 2.45g, in the stage of fattening 259.0 ±3.15 g, in the stage of finishing 200.4±5.14, and on the total period 234.7±6.11g. Half-bred lambs of Palas Meat-Breed X Tzigaie obtained in the stage of accommodation 165.4 ±7.59 g, in the stage of fattening 238.7± 7.54 g, in the stage of finishing 229.6 ± 7.79, and on the total period 225.4 ± 6.87 g. Lambs of Tzigaie obtained in the stage of accommodation 98.0± 2.36 g, in the stage of fattening 153.5±5.16g, in the stage of finishing 176.6±5.42, and on the total period 151.2±3.39. Half-bred lambs of Suffolk X Tzurcana obtained in the stage of accommodation e 195.4±7.85 g, in the stage of fattening 208.2±10.99 g, in the stage of finishing 232.0±10.70 g, and on the total period 212.2±6.88 g. Lambs of Tzurcana breed obtained smaller increasing rates in the stage of accommodation 139.4 ±8.15 g, in the stage of fattening 198.4±8.39 g, in the stage of finishing 180.4±9.17g, and on the total period 185.0±8.56 g.

The daily weight increasing rates of the half-bred lambs, whose value is appreciated as being very good is a result of the phenomenon of heterosis, produced as a result of crossbreeding the two breeds and also of the aptitudes for the meat production from the parental breeds. After the end of the period of fattening, to analyse the results of the fattening process, control slaughtering were done. The carcass and the output are given in table 3.

Table 3 The weight of carcass and the output (of slaughter and commercial) after slaughtering the lambs

Lambs	n	Living Weight (kg)		Weight of carcass (kg)		Output (%)			
						Slaughter		Commercial	
		$X \pm s_x$	V%	$X \pm s_x$	V%	$X \pm s_x$	V%	$X \pm s_x$	V%
Texel x Merino	20	39.90±0.69	7.73	19.36±0.56	12.93	48.52±0.92	8.48	54.12±0.73	6.03
Merino	20	34.35±0.56	7.30	15.08±0.52	15.42	43.90±0.64	6.51	50.35±0.41	3.64
Blackface x Tigaie	15	40.02±0.86	8.32	18.65±0.43	8.92	46.60±0.48	3.98	52.47±0.63	5.36
Meat Breed-Palas X Tzigaie	20	38.08±0.59	6.92	17.96± 0.51	12.70	47.16±0.91	8.62	55.30±0.34	2.75
Tzigaie	20	32.24±0.56	7.76	13.84±0.38	10.73	42.92±0.81	8.43	49.14±0.72	6.55
Suffolk x Tzurcana	20	37.92±0.55	6.50	17.83±0.75	18.81	47.02±0.91	8.65	54.78±0.37	3.02
Tzurcana	20	32.08±0.59	8.22	13.86± 0.51	16.45	43.20±0.91	8.62	45.42±0.34	3.34

The half - bred lambs did the highest values of the slaughter and commercial output, so Texel x Merinos, had a slaughter output of 48.52 ± 0.92% and a commercial output of 54.12 ± 0.73%, half-bred lambs of Blackface x Tzigaie a slaughter output of 46.60 ± 0.64% and a commercial output of 52.47 ± 0.63%, half-bred lambs of Suffolk x Tzurcana did a slaughter output of 47.02± 0.91% and a commercial output of 54.78 ± 0.37 %.

As a result of applying a technology of intensive fattening with the same fodder norms, for all the lots of lambs, it was noted that the carcasses from the half bred of Texel x Merino, Blackface x Tzigaie, Suffolk x Tzurcana and from the half-bred lambs of Meat breed Palas x Tzigaie had bigger weights, these carcases had a compact conformation, with well-developed muscularity and a uniform layer of fat, except back, loins, tail crinkle, chest, inguinal region), where it was in bigger deposits. After the appreciation of the carcasses as a whole it was done the commercial cutting of the carcass (table 4), establishing how it is divided on commercial qualities and regions by French method.

Table 4 Commercial cutting of the fattened lambs

Meat quality (%) 1st quality	F1 Half-Bred Lambs			
	Texel x Merinos (n=10)	Meat Breed of Palas x Tzigaie (n=10)	Suffolk x Tzurcana (n=10)	Blackface x Tzigaie (n=10)
	X ± s_x V%	X ± s_x V%	X ± s_x V%	X ± s_x V%
- mutton's leg	35.18±0.76 6.83	36.09±0.84 7.36	36.03±0.41 5.59	37.27±0.73 6.19
-filet	10.14±0.20 6.23	8.20±0.14 5.39	8.87± 0.11 3.92	8.04±0.13 5.11
-chop I	10.30±0.21 6.44	10.86±0.23 6.69	10.62 ± 0.12 3.57	9.49±0.15 4.99
Total 1st quality	**55.62**	**55.15**	**55.52**	**54.80**
2nd quality - chop II	6.81 ± 0.11 5.10	8.19± 0.13 5.02	8.06 ± 0.25 9.80	7.09±0.13 5.79
- back	21.24 ±0.46 6.84	19.02 ± 0.35 5.81	17.40 ±0.37 6.72	20.03±0.39 6.15
Total 2nd quality	**28.05**	**27.21**	**25.46**	**27.12**
3rd quality - chest	9.83 ± 0.18 5.79	12.10 ± 0.27 7.05	10.01 ± 0.22 6.95	12.05±0.24 6.29
- neck	6.50 ± 0.10 4.86	5.54 ± 0.09 5.13	9.01 ± 0.15 5.26	6.03±0.10 5.24
Total 3rd quality	**16.33**	**17.64**	**19.02**	**18.08**

Meat quality (%) 1st quality	Lambs of maternal breeds		
	Merino (n=10)	Tzigaie (n=10)	Tzurcana (n=10)
- mutton's leg	35.98±0.73 6.41	34.57±0.69 6.31	32.15±0.42 4.13
-filet	7.10±0.14 6.23	8.30±0.18 5.71	8.22±0.15 5.77
-chop I	8.48±0.16 5.96	9.12±0.26 9.01	9.72±0.26 8.45
Total 1st quality	**51.56**	**51.99**	**50.09**
2nd quality - chop II	5.89±0.09 4.83	8.02±0.15 5.91	7.12±0.15 6.66
- back	20.62±0.44 6.74	18.07±0.35 6.12	19.96±0.35 5.54
Total **2nd quality**	**26.51**	**26.09**	**27.08**
3rd quality - chest	11.53±0.24 6.58	11.37±0.19 5.28	12.07±0.19 4.97
- neck	10.40±0.19 5.77	10.55±0.21 6.29	10.76±0.21 6.17
Total **3rd quality**	**21.93**	**21.92**	**22.83**

Analysing the data from table 4 we note that the half-bred lambs had the total meat of 1st quality between 54.80 and 55.62%, 2nd quality meat of 25.46 and 28.05%, and 3rd quality of 16.33 and 19.02%, comparatively to the lambs of mother breeds where the meat of first quality was between 50.09 and 51.99%, 2nd quality meat of 26.09 and 27.08%, and 3rd quality of 21.92 and 22.83%. The improvement of the carcasses quality is obtained also by other researchers which use this method of crossbreeding the local sheep breeds with breeds that are specialized for meat [1,3,4,5], Gutierrez, J., Rubio M.S. and Mendez, R.D. (2005) study the effect of crossbreeding the sheep from the breed of Mexican Pelibuey with rams of meat breeds of Rambouillet and Suffolk, Kukovics and collaborators (2015) studied the effects of the genotype and the technology fattening upon the sheep from Transylvanian Ratzca breed which was crossbred with rams from various meat breeds.

CONCLUSIONS

1. Analysing the evolution of the body weight at the lots of lambs subject to fattening it is noted that they start from similar body weights, maintaining them also in the accommodation stage, and then, in the end of the stages of fattening and finishing differences of weight occur between lots of fattened lambs; the lambs had in the end of finishing stage, the weights of: half-bred lambs of Texel x Merino 39.90±0.69 kg, lambs of Merino breed 34.35±0.56 kg, half-bred lambs of Blackface x Tzigaie 40.02±0.86 kg, half-bred lambs of Meat breed Palas x Tzigaie 38.08±0.59 kg., lambs of Tzigaie 32.24±0.56 kg, half-bred lambs of Suffolk X Tzurcana 37.92 ± 0.55 kg and the lambs of Tzurcana 33.12 ±2.01 kg.

2. The highest daily increasing rates of weight were obtained by the half-bred lambs, both on stages and on the total period of fattening; the increasing rates did on the total period of fattening were: at half-bred lambs Texel x Merino 225.5±6.59 g, at the lambs of

Merino 166.5±4.35g, half-bred of Blackface x Tzigaie 234.7±6.11g, half-bred lambs of Palas Meat-Breed X Tzigaie 225.4 ± 6.87 g, lambs of Tzigaie 151.2±3.39, half-bred lambs of Suffolk X Tzurcană 212.2±6.88 g and lambs of Tzurcană 185.0±8.56 g.

3. At slaughtering, the best slaughter and commercial outputs were obtained by the half-bred lambs: the slaughter output at the half-bred lambs was between 48.52 and 47.16%, and the commercial output between 55.30 and 52.47%; at the lambs of maternal breeds the slaughter output was between 43.90 and 42.92%, and the commercial output was between 50.35 and 45.42%.

4. The half-bred lambs had a total of meat of 1st quality I between 54.80 and 55.62%, meat of 2nd quality 25.46 and 28.05%, and 3rd quality 16.33 and 19.02%, comparatively to the lambs from the maternal breeds were the meat of 1st quality was between 50.09 and 51.99%, meat of 2nd quality 26.09 and 27.08%, and 3rd quality 21.92 and 22.83%.

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