RESEARCHES CONCERNING THE MEAT PRODUCTION IMPROVEMENT AT THE INDIGENOUS SHEEP POPULATIONS, THROUGH THE APPLIANCE OF CERTAIN APPROPRIATE FATTENING TECHNOLOGIES

C. Pascal[1], I. Gîlcă[1], I. Pădeanu[2], Gh. Nacu[1], S.V. Daraban[3], N. Iftimie[4], C. Costica[4]

[1] University of Agricultural Sciences and Veterinary Medicine, Faculty of Animal Science Iasi, Romania
[2]Faculty of Animal Sciences and Biotechnologies, Timisoara, Romania
[3]University of Agricultural Sciences and Veterinary Medicine, Cluj–Napoca, Romania
[4]S.C.D.C.O.C. Secuieni Bacau, Romania
e-mail : pascalc@uaiasi.ro; pascalc61@yahoo.com

Abstract

The main purpose of the researches was to reveal the production capacity of sheep youth for increased quantities of high quality mutton, under semi-intensive fattening conditions. The biological material belonged to Ţigaie and Ţurcană breeds, while the groups have been established on several criteria, such as: gender, breed, variety, age and body weight. Control weightings have been run in order to assess whole cumulated body mass and the average daily gain. These data served to calculate the feed conversion ratio for each kg gain of live weight. During the researches, the feeding was identical for all groups. However, the diets were different, in accordance with the technological stage. At the end of the fattening period, control slaughtering has been run, in order to evaluate the real fattening degree, on the slaughtered animal. Consequently, the slaughtering efficiency and the participation ratio of the trenched parts in whole carcass have been calculated after carcasses weighting. The fattening technology supposed an overall period of 175 days and comprised three technological periods: adaptation, growing and fattening and finishing. During adaptation period, the daily average gains had very low values, while during the second phase, certain statistic distinct differentiations occurred between groups, the daily gain being comprised between 108.5 ± 9.8g in Ţurcană females, grey variety and 139.0 ± 11.8g in Ţigaie males. Highest values for slaughtering efficiency were recorded at the Ţigaie males lambs, meaning 44.40%, slightly followed by the Ţurcană males group, black variety (44.10%). Among the females groups, the best results have been consecutively achieved by Ţigaie, Ţurcană black variety and Ţurcană white variety.After carcasses trenching in Ţigaie breed, the participation of the parts belonging to Ist quality class were found at 62.8%, meaning that from this value, 46.9% represented the leg of mutton. Poorest results after trenching and quality classifying have been achieved from the Ţurcană females, white variety. Our researches revealed significant increases of carcasses quality and prove that prior to delivery the youth fattened on pasture should receive concentrate supplementation during the last 30 days.

Key words: carcasses, Turcana, Tigaie, fattening technologies, mutton

INTRODUCTION

The aim of these researches was to underline the yielding ability and capacity of indigenous sheep breeds for increased quantities of high quality meat. This capacity was studied within the semiintensive fattening conditions for some local breeds and varieties of youth sheep. The sheep populations studied differ from each other through some biological and yield specific features.

Many studies from Romania [5, 6, 14, 15, 16, 17, 18, 22] and from other countries [8, 10, 11], as well, proved the sheep biological potential for meat production is significantly different between sheep breeds or sheep populations. These differences issue from breeds specifically precocity (precociousness) and also from fattening technology used for sheep meat producing.

Since last century, it has been proven that precocity is a specific feature of the improved

breeds, resulting from an almost simultaneous development of bony tissue, muscle tissue and adipose tissue. The precocious breeds have a fast rearing rhythm and increased daily gains values, allowing thus the shortening of the productive cycle length. These breeds, as compared to the semiprecocious and belated breeds, have good conversion rates for forages, high slaughtering efficiency (dressed weights), the carcasses having very good quality, meaning high proportions of best value meat [1, 14, 18, 22].

Other Romanian researches, carried on different sheep indigenous breeds, varieties and populations [18, 19, 20, 21], proved their good abilities for meat production but they aren't adequate for current requests, mainly concerning carcasses quality. The final results of these researches are comparable and integrate in the main trend flow of other specialty data and publications from Romania or from other countries.

MATERIALS AND METHODS

The research has been carried on during 2005, within a specialized unit for sheep youth rearing and fattening. The biological material we used comprised Tigaie and Turcana youth local sheep from both genders. Depending on breed and gender, six experimental groups have been established, having all the same living conditions, same food and same microclimate factors all along the fattening period.

As primary experimental methods, weightings have been run, at the start and the end of fattening period. The issued results served to been calculate the total rearing weight gains, for each phase and also the daily gain.

A semiintensive type technology has been used, comprising three technological periods, lasting 175 days. Control slaughters have been done at the end of the fattening period, in order to assess the slaughtering efficiency and the real evaluation of fattening rank. Carcasses quality has been also evaluated using the chopped portions, too. The achieved result have been input into a data base, used to run statistical analysis through the with REML algorithm (REstricted Maximum Likelihood), which provide the achievements of the statistical estimators within the normal parametric range.

RESULTS AND DISCUSSION

Body weight dynamics was an extremely relevant index for these researches, knowing that the fattening rhythm and the intensity of body gains influence the other main indexes used later in the evaluation of quantitative and qualitative meat production.

Table 1 includes the average weight values, as recorded at the beginning and at the end of each technological stage. Thus, when adaptation phase ended, the averages of each group weight didn't differ so much because this phase had a short length. After the ending of fattening process, clear differences have been found between experimental groups, the same situation being noticed at the finishing period ending (fattening end).

Statistical computation revealed that the females from white Turcana group has the lowest average values for body weight at the fattening end. Comparing with females from black Turcana group, the former ones had 3.38% lower weight, the differences being non significant statistically.

Not significant differences have been found between males lambs groups for body weight, although the males from black Turcana group were weightier than the others.

All these results confirm that the colour variety isn't an important factor which could influence the meat production.

Using the same rearing conditions, meaning the same food and microclimate, at the end of the fattening weight, the Turcana females group had 3.681 kg lower body weight than males.

These differences, with high statistic significances, (tab. 2) proved that descendants' gender is an important factor which influences the fattening capacity. Consequently, it imposes to consider this factor when sheep meat production is to be designed.

The daily gain is also a very important indicator to be considered in meat producing, no matter species or used technology. During the adaptation stage, the daily gains presented

low values (tab. 3). This is explicable because the groups were setup after the lambs weaning and the animals were stressed by transportation and by other factors.

During the second phase, clear differences occurred between groups, the daily gains varying between 108.5 ± 9.8g (grey Turcana females) and 139.0 ± 11.8g (Tigaie males group). Intermediate values have been noticed for the other three studied groups. The third phase, finishing presented modification in feed ratio structure: voluminous fodder decreased, while concentrated feed increased its proportion. The groups' hierarchy for daily gains preserved the same dynamics, but the indicator itself had higher values than previous phases of fattening technology. Overall the entire fattening period, the daily gains varied between 140 ± 8.7g at the Tigaie males lambs and 108 ± 7.3g at the females of the white Turcana variety. The presented data indicated the superiority of both genders Tigaie groups, as compared to both Turcana groups. This superiority underlines once again the better abilities for meat production of the Tigaia breed. The data related to body weight and daily gains dynamics of all experimental groups clearly indicates that meat producing success is straightly related to the biological material quality and to the conditions provided during nursing period, because the descendants' developing rhythm depends on their genetically value, which interferes, during the first period of life, with sheep milk production and with her instinct to protect and carry the lamb [16].

Table 1. Lambs weight dynamics on rearing and fattening stages

Phase/ length (days)	Group	Gender	n	Average weight to at the phase start (kg) $\overline{X} \pm s_{\overline{x}}$	Average weight to at the phase end (kg) $\overline{X} \pm s_{\overline{x}}$
Adaptation (10 days)	Țigaie	Males	25	11,700 ± 0,124	12,6 22± 0,258
		Females	25	10,500 ± 0,145	11,400 ± 0,237
	Black variety Turcana	Males	25	12,615 ± 0,267	13,412 ± 0,216
		Females	25	11,100 ± 0,201	11,9 ±02 0,224
	White variety Turcana	Males	25	12,312 ± 0,183	13,118 ± 0,208
		Females	25	10,801 ± 0,284	11,551 ± 0,215
Rearing and fattening (135 days)	Țigaie	Males	25	12,622 ± 0,258	31,466 ± 0,214
		Females	25	11,411 ± 0,237	28,110 ± 0,182
	Black variety Turcana	Males	25	13,444 ± 0,216	29,612 ± 0,196
		Females	25	11,909 ± 0,224	27,009 ± 0,284
	White variety Turcana	Males	25	13,113 ± 0,208	28,836 ± 0,384
		Females	25	11,587 ± 0,215	26,123 ± 0,286
Finishing (30 days)	Țigaie	Males	25	31,422 ± 0,214	35,902 ± 0,286
		Females	25	28,125 ± 0,182	32,221 ± 0,244
	Black variety Turcana	Males	25	29,665 ± 0,196	33,632 ± 0,212
		Females	25	27,008/ ± 0,284	30,715 ± 0,208
	White variety Turcana	Males	25	28,822 ± 0,384	32,636 ± 0,192
		Females	25	26,112 ± 0,286	29,708 ± 0,184

Table 2 Weight differences between groups at the fattening end (kg) and the differences significance

Tukey Test	L1	L2	L3	L4	L5	L6
L6	6,194**	2,513**	3,924**	1,007 n.s.	2,928**	-
L5	3,266**	0,415 n.s.	0,996 n.s.	1,921**	-	-
L4	5,187**	1,506*	2,917**	-	-	-
L3	2,270**	1,411*	-	-	-	-
L2	3,681**	-	-	-	-	-
L1	-	-	-	-	-	-

L1- Țigaie Males; L2 – Țigaie Females; L3 - Black Țurcana Males; L4 - Black Țurcană Females; L5 - White Țurcană Males; L6 - White Țurcană Females

*Significant at the 0.05 level (w = 1.017)

**Significant at the 0.01 level (w = 1.740)

n.s: not significant

Another important aspect to be considered refers to the rearing velocity, because this is very variable between different breeds [17]. Generally, the lambs of the big frame breeds (Lincoln, Berrichon du cher, Ile de France, Suffolk) have higher rearing velocity than smaller frame breeds [7, 12]. The rearing velocity had average values in our experimental groups, especially for the semi-belated breeds. In this situation, we recommend the usage of these breeds to crosses for meat hybrids producing. This advice is also strengthened by the breeding practice, that have proven that crossbreeding can improve the rearing velocity, but its success depends on the breeder skills to identify those best breed combinations [3, 10, 12, 15, 17, 19, 20, 21, 22].

Table 3 The weight gain dynamics on technological phases and entire fattening period

Genotyp	Sex	Period							
		Adaptation		Fattening		Finishing		Entire period	
		Absolute (kg)	d.g. (g)	Absolute (kg)	d.g. (g)	Absolute (kg)	d.g. (g)	Absolute (kg)	d.g. (g)
Ţigaie	Males	0,90	86,0 ±7,4	18,8	139,0 ± 11,8	4,5	150,1 ± 13,6	24,5	140 ± 8,7
	Females	0,80	80,2 ± 6,5	16,7	124,4 ± 11,2	4,1	138,5 ± 12,6	21,6	123 ± 7,6
Black variet. Turcana	Males	0,81	81,2 ± 5,4	16,2	120,0 ± 10,4	4,0	135,3 ± 11,3	21,9	125 ± 7,9
	Females	0,78	78,3 ± 5,8	15,1	112,2 ± 11,1	3,7	123,5 ± 12,1	19,6	112 ± 7,1
White variet. Turcana	Males	0,77	77,0 ± 7,5	15,7	116,2 ± 9,3	3,8	128,3 ± 11,6	20,3	116 ± 6,1
	Females	0,74	74,1 ± 6,2	14,6	108,1 ± 9,8	3,6	121,1 ± 10,5	18,9	108 ± 7,3

The slaughtering efficiency. Specimens of both genders, from each experimental group, have been slaughtered, the carcasses being immediately weighted, resulting the data presented in table 3. The adhering fat (suet) was kept on carcasses during weighting. The best average values for slaughtering efficiency were found at the Tigaie males lambs (44.40%), nearly followed by Turcana black variety males group (44.1%). It is interesting to notice that, despite the significant differences of the body weight values that occurred prior to slaughtering between both groups, the slaughtering efficiency values were extremely close (table 4).

Table 4 Slaughtering efficiency-dressed weight (%)

Genotyp	Sex	n	Weight before slaughter (kg)	Carcass weight (kg)	Efficiency Dressed weight (%)
			$\overline{X} \pm s_{\overline{x}}$	$\overline{X} \pm s_{\overline{x}}$	$\overline{X} \pm s_{\overline{x}}$
Ţigaie	Males	6	35,184 ± 0,111	15,600 ± 0,180	44,331 ± 0,207
	Females	6	30,033 ± 0,214	13,260 ± 0,151	44,150 ± 0,113
Black variety Turcana	Males	6	32,725 ± 0,212	14,430 ± 0,122	44,130 ± 0,125
	Females	6	30,000 ± 0,208	12,153 ± 0,134	40,094 ± 0,351
White variety Turcana	Males	6	32,121 ± 0,023	13,618 ± 0,224	42,395 ± 0,482
	Females	6	29,131 ± 0,213	11,497 ± 0,261	39,466 ± 0,531

Among the females groups, the best results have been achieved by the Tigaie (43.90%) group, then by the black variety of Turcana (40.50%) and by the white variety of Turcana (39.50%). Considering the same feeding conditions and the same fattening technology provided to all groups, statistically significant differences occurred for the body weights before slaughter, even if the slaughter efficiencies hat almost same

values. This situation is similarly to the evaluation on males groups and proved that Turcana breed has a slowly rhythm for body gains for entire fattening period, but it has very good values for the slaughter efficiency. Our results are close to those reported within the Romanian scientific literature, for the studied breeds [7, 14, 15, 18, 20, 21, 22].

The carcasses quality evaluation has been made in accordance with European legislation and have based on the carcass conformation and the observed fattening rank. Comparing with other quoted data from scientific references [4], our results proved that both Romanian breeds had low possibilities to produce high quality carcasses. For all groups, the carcasses proportion in U and R categories were under 10%, in P category was over 20% and in superior category S and E was null (tab. 5)

The carcasses assessment in accordance to the fattening rank proved the conformity of most of the carcasses with the European requests for third and forth categories.

All achieved results suggest that both breeds have intermediate abilities for meat production. Consequently, using them to produce fatten lambs carcasses is not economical efficient, mainly because the carcasses aren't in accordance with European standards for high categories.

After efficiency calculating, the carcasses have been evaluate for slaughter portions, in order to find out participation of each slaughter portion in whole carcasses weight. There are three categories for the slaughter portions:

- First quality: hip, loin, sirloin and shoulder;
- Second quality: chest, chest head and ribsteak;
- Third quality: neck, brisket, foreshank and hindshank.

The poorest slaughter results have been obtained by the females in the Turcana white variety group (tab. 6).

Table 5 Carcasses classification according to EU standards (% of carcasses)

Category	Breed					
	Tigaie		Black Turcana		White turcana	
	Males	Females	Males	Females	Males	Females
After conformation						
S	-	-	-	-	-	-
E	-	-	-	-	-	-
U	4	3	4	2	3	2
R	6	5	5	2	3	2
O	68	71	70	68	74	71
P	22	21	21	28	20	25
After fattening rank						
1	-	-	-	-	-	-
2	11	5	4	3	4	3
3	52	47	45	27	43	40
4	35	35	42	48	48	45
5	6	13	9	22	5	12

Table 6 Structure of carcasses portions depending on quality class

Specification	Percent from carcasses total weight (%)					
	Tigaie		Black Turcana		White turcana	
	Males	Females	Males	Females	Males	Females
	$\overline{X} \pm s_{\overline{x}}$	$\overline{X} \pm s_{\overline{x}}$	$\overline{X} \pm s_{\overline{x}}$	$\overline{X} \pm s_{\overline{x}}$	$\overline{X} \pm s_{\overline{x}}$	$\overline{X} \pm s_{\overline{x}}$
First quality	9,81 ± 0,21	7,92 ± 0,11	8,71 ± 0,12	7,11 ± 0,31	8,11 ± 0,31	6,81 ± 0,12
Second quality	3,20 ± 0,13	2,90 ± 0,14	3,11 ± 0,09	2,81 ± 0,03	3,00 ± 0,13	2,62 ± 0,16
Third quality	2,61 ± 0,32	2,44 ± 0,19	2,61 ± 0,31	2,23 ± 0,19	2,50 ± 0,8	2,06 ± 0,02

The data previously presented suggests that breed is an influence factor for carcasses quality. The best results have been achieved by Tigaie youth males. Thus, from whole weight of cut portions, the first class meat represented 62.8% and from this, almost 46.9% was hips.

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CONCLUSIONS

These researches proved that both local breeds have poor features for meat production. Also, the obtained data indicated that meat production is influenced by many other factors, even when the same fattening technology conditions are used. The most important factors are the animals breed and gender. This affirmation is sustained by the achieved results related to low percent of good quality muscle weight, to the low slaughter efficiency and with the obtained data after carcasses classification in accordance with European legislation.

We are recommending to use Tigaie sheep with limits in pure breed and to use them to crossings for obtaining hybrids lambs, because of the heterozygosis effect occurrence. Consequently, these crossings are advisable to be used, bringing more economically efficiency and more advantages for breeders.

Turcana breed have been created and adapted in mountainous area, so Turcana breed populates extremely varied areas with a microclimate which is improperly for other breeds. Thus, the usage of the alpine natural pastures is an optimal solution for meat producing to entire grazing period, in semiintensive fattening conditions.

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