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*The study of the local population of sheep raised in the North-East of the country,
for meat improving production*
2009 RESEARCH REPORT

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RESEARCH ON SKILLS AT EARLY WEANED PLUMP YOUTH BELONGING TO THE ROMANIAN SHEEP BREEDS

Introduction

The research conducted had as main purpose highlighting the ability of producing greater quantities of high quality meat from the early weaned sheep youth, subsequently getting through a semi intensive type of fattening technology.

The analyzed sheep breeds possess the greatest weight in the Romanian effective and are distinguished through a series of biological and productive particularities. Concerning the biological potential of meat production at sheep, the research performed inside the country and abroad, on different breeds and varieties of sheep, points out the fact that there are important differences between these. Thus, the studies performed in Romania by many researchers (*Dinescu S. 1972 and 1973; Ciolcă L., 1972; Taftă V., Zuhair F J 1979; Mireșan E., and col 1982, Murat Lemon, 1993, Dima T 2005, Pascal C 1995 and from other countries as well, Hammond, J. 1961; Frasser, A. 1968; Dransfield, E., Nute G.R. 1990; Hanekamp, W.J.A., Boer D J. 1995; Leymaster, K.A., Jenkis T.G. 1993 and many others*) confirms the existence of these differences.

From the studies realized up to now, it is concluded that among the several factors that directly influence the mutton production, the most important is represented by the precocity of the breeds. Regarding this aspect, from 1932 Hammond showed that precocity is a characteristic of graded up breeds and results from the simultaneously development of osseous tissue, as well as the muscular and adipose ones. The precocious breeds are characterized by a rapid growing rate and realize, through fattening, high daily average growths, fact which allows the shortening of productive cycle duration. Compared to the precocious breeds, the semi precocious and backward ones use the fodder in a good way, have a high effective power on slaughter, their carcasses are of very good quality and possess a percentage of high quality meat (Angelescu I. and Drăgănescu, C. 1970; Mireșan E. and colab. 1979; Noter D.R. 1991 and others).

In the case of researches performed in Romania on different breeds, species and varieties of sheep, (*Ciolcă și colab. 1972, Taftă V și colab. 1979, Pascal C 2002, Pascal C 2008*) it is highlighted the fact that these show, most of them, good capacity of meat production, but do not entirely meet the current requirements of quality concerning the carcasses conformation.

Material and method

The studies were conducted in 2008 in a unity specialized on breeding and fattening of sheep youth, and the biological material analyzed belonged to heterogeneous populations represented by sheep youth, of both sexes, from the breeds Tigaie and Turcana. The batches were constituted shortly after the arrival in the unity, but not before a period of quarantine. The analyzed sheep youth was randomly chosen and allotted in experimental batches varying with sex and birth type.

In order to determine the daily average growth, there were realized weighing processes at the end of every technological fattening phase applied. During the fattening, the foddering of lambs batches was similar, but structurally, the fodder rations used were different, in accordance with the technological phase. At the end of fattening period there were performed control slaughters, so it was also estimated the rate of fattening on the slaughtered animal, but also a classification of carcasses according to the European legislation. Also, through the weighing of the carcasses was determined the effective power of the slaughter, and after disjointing was estimated the percentage of butcher's parts participation on total carcass.

In the researches performed was utilized a semi intensive system of fattening, with three technological phases and a total duration of 165 days.

Results of investigations and discussion

1. The dynamics of body weight evolution was determined through the individual weighing of the lambs from every single batch, at the beginning and end of each phase, and the results obtained were statistically processed. Thus, in table 1 there are presented the average weights recorded at the beginning and end of each phase, component of the fattening technology applied.

In the first phase - of adjustment, thanks to its short duration (10 days), the values determined for the body weight evolution are reduced, and the differences ascertained between the batches are insignificant from a statistic point of view. Nevertheless, it can be noticed that the growth intensity is better than in the case of batches which in 10 days accumulated approximately 1 kg mass. This value was 6,18% higher than the weight accumulated by the batch formed of males resulted from simple birth, 13,40% higher than the values realized by the batch formed of females resulted from double birth and 15,46% higher than the weight accumulated by the batch formed of females resulted from simple birth.

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The highest value of the total growth estimated in the case of batches from black varieties of Turcana breed was of 0,83 kg and was realized by the two batches formed of males. At white variety of Turcana breed, the highest value of total growth accumulated in the adjustment phase was of 0,80 kg and was realized by the batch formed of males resulted from simple birth.

Second phase - of growing and fattening had the greatest duration and as a consequence, the value of total growth was higher than the early phase and the final one. The analysis of the data regarding the total growth increase shows different intensities of muscle mass accumulation, thing which argues the existence of differences between populations, as well as between the birth type. From the data presented in table 1 it can be noticed that during the growing and fattening phase, the weight accumulation were remarkable in the case of all batches. Nevertheless, the batches formed of young sheep from Tigaie breed had higher values of total growth. The highest were 18,94 kg and were recorded in the case of the batch formed male lambs resulted from double birth and exceed, but not very much the performances realized by the males resulted from simple birth. Close values of total growth increase were noticed in the case of batches formed by females of the same breed.

The analysis of the same parameter, but in the batches belonging to black varieties in the breed Turcana, highlights lower growth intensities. Thus, the batch formed of males resulted from double birth realizes performances of 4,64% lower than the total increase accumulated by the males resulted from simple birth. Compared to the growth performances realized by the same category, but in Tigaie breed, the total increase realized by the males resulted from double birth at the black variety of the breed Turcane is 18,10% lower.

The existence of these differences were noticed in other researches too (*Pascal C 2008, Dima T 2005, Miresan e 1989*) and confirm the fact that between the two breeds there are distinctions of precocity, fact which recommends that Tigaie breed to be more intensely utilized when it is pursued the production of meat. In the same technological phase, the batches formed of youth belonging to white variety from breed Turcana realizes values close with those found at black variety.

The finishing phase closed the fattening technology applied and had a duration of 30 days. The purpose of this phase was that, through increasing the concentrated fodder added in the daily ration, to facilitate the qualitative improvement of the carcass and of the physical-chemical properties of muscular masses. during this phase, the batches formed of youth from Tigaie breed realized total increase of over 4 kg in the case of those formed of individuals resulted from simple birth and lower than 4 kg in the case of those formed of individuals resulted from double birth. At the end of the fattening process, the males resulted from simple birth had a weight of 1,34 kg higher compared to the weight of the batch formed of males resulted from double birth. The batch formed of females resulted from unpaired birth had a final weight of approximately 2% higher than that ascertained in the case of batch with females resulted from double birth. These performances are comparable as value with the data obtained in the case of the other batches which were estimated.

The researches performed highlight the existence of differences between breeds regarding the meat production potential. On the basis of the obtained data we can ascertain that Tigaie breed is characterized by a more intense rhythm of muscular mass accumulation. The same intense rhythm is characteristic to the batches formed of lambs resulted from simple birth. Nevertheless, the existence of differences small as value confirms that the lambs resulted from double birth have the positive capacity of reaction to fattening, and thus the rise of polygraph rate can be a viable solution to increase the meat production obtained from every female of the queen nucleus.

Among all the batches were recorded significant differences for the statistic stages taken in consideration. The exception is the difference of weight ascertained between L6, L1, L9 and L4, L9 and L5, and between L12 and L7 which were insignificant from a statistic point of view.

2. The daily average increase. The estimation of this indicator was realized on the basis of the results obtained after the control weighing, performed at the beginning and end of each phase, and the results obtained were statistically processed and presented in table 3. From the results presentation it can be concluded that in the adjustment phase, the daily average increases were very low, because of the fact that the lambs had acute problems when weaned, and what is more, to the realization of these low increases contributed the stress of transport and adjustment also, as well as other factors.

In the second phase, between the batches already appear distinct differences, and the daily average increase at the experimental batches was comprised between $145,7 \pm 11,8g$ at the batch constituted of males from Tigaie breed resulted from double birth and $102,30 \pm 9,8g$ at the batch formed of females from Turcana breed - white variety, resulted from double birth.

The third phase was the finishing one, in which the daily average increase recorded in this period had the highest value of $138,45 \pm 11,5g$ and was realized by the batch constituted of males from Tigaie breed resulted from simple birth. If we analyze the absolute daily average increase recorded on the whole fattening period, we see that the highest values are realized by the male batches.

The analysis of values resulted in the case of statistical processing of the data, we notice that the best performances were obtained, on the whole fattening period, by the batch belonging to Tigaie breed, formed of

lambs from simple birth, which exceeded with 3,37%, the performance realized by the males resulted from double birth. Among the males batches from Turcana breed, from both varieties of color, regarding the daily average increase realized on the whole fattening period were comprised between the following limits: $114,7 \pm 7,9g$ and $119,9 \pm 17,7g$ and were realized by males resulted from double and simple birth.

At females, the values realized by the Tigaie batches are superior compared to the performances obtained at Turcana breed from both varieties. From the presented data it can be concluded the superiority of batches of both sexes from the breed Tigaie, with the batches of the two varieties of breed Turcana, finding once again that this one possesses better capacities for meat production.

3. The effective power of slaughter. From each experimental batch were slaughtered individuals of both sexes, and the carcasses resulted were the element of analysis in order to estimate the effective power of slaughter and conformations and rate of fattening. The carcasses were weighed immediately after slaughter, being determined in this case the warm effective power, and the results obtained are presented in table 3. It must be mentioned the fact that during the weighing, on the carcasses was left the adhesive fat.

The data regarding the effective power of slaughter estimated after the control slaughter are comparable with many data quoted in the specialty literature in Romania for these breeds (*Cilca N 1972, Dinescu S 1973, Tafta V 1973, Pascal C 1995, Pascal C 2008*). In this way it can be concluded that the effective power at slaughter with the highest values was recorded at male lambs belonging to Tigaie, Turcana, Turcana black variety and Turcana white variety, in order.

4. The estimation of carcasses quality. In this purpose, the carcasses were cut in butcher's parts in accordance with the quality of muscular masses, being established the weight of participation of each cut part in the total weight of the carcasses. All these results are presented in a centralized way in table 4.

The cut parts were classified on three categorized of quality as it follows:

- Ist quality shoulder of mutton, chop, steak and saddle of mutton;
- IInd quality: chest, head of chest and round of mutton;
- IIIrd quality: neck, middle chest, anterior and posterior part

From the presented data emerges that the best results were obtained after cutting the carcasses resulted from the slaughtering of the male youth belonging to Tigaie breed. Thus, at this batch, out of the total cut parts, the means of quality I represents 62,8%, and out of this percentage 46,9% is taken by shoulder of mutton. The lowest results from cutting and classifying on quality were recorded in the case of carcasses resulted from the control slaughter of the individuals which formed the batch of females from Turcana breed - white variety.

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Conclusions

1. The studied biological material belongs to the breeds with the greatest weight in Romania, and through the enterprise analysis it was tried to highlight the potential that those possess in meat production in the case of early weaning of the lambs.

2. The dynamics of body weight evolution ascertained on the whole period in which the fattening took place, indicates a good rhythm of early weaned lambs.

3. Through the extension of early wean practicing there are created premises favorable to milk production increase at sheep, with different economic implications owed to the obtaining and utilizing of a greater quantity of milk for marketing.

4. Tigaie breed, through the realized performances at fattening can prove that it can represent a valuable population when meat production is pursued.

5. The effective power of slaughter estimated after the control slaughter proves the utility of performing some actions in order to improve this indicator.

6. After the carcasses cutting and classifying the cut parts on quality classes, the most appreciated carcasses were those of the male batch from Tigaie breed, followed by those of black variety from Turcana breed, but in all the cases the carcasses value was an average one.

Table 1. The evolution of corporal weight of sheep youth on the growing and fattening phases

Phase/ duration (days)	Breeds	Lots	n	The initial medium weight (kg)	The final medium weight (kg)
				$\bar{X} \pm s \bar{x}$	$\bar{X} \pm s \bar{x}$
I	Tigaie	males from double bring forth	25	11,21 ± 0,112	12,18 ± 0,098
		males from double bring forth	25	11,71 ± 0,124	12,62 ± 0,258
		females from double bring forth	25	10,21 ± 0,124	11,05 ± 0,144
		females from double bring forth	25	10,58 ± 0,145	11,49 ± 0,237
	Turcana, black variety	males from simple bring forth	25	12,45 ± 0,188	13,28 ± 0,154
		males from simple bring forth	25	12,62 ± 0,267	13,45 ± 0,216
		females from simple bring forth	25	10,37 ± 0,199	11,12 ± 0,185
		males from simple bring forth	25	11,18 ± 0,201	11,99 ± 0,224
	Turcana white variety	Males from double bring forth	25	11,95 ± 0,231	12,96 ± 0,231
		Males from simple bring forth	25	12,38 ± 0,183	13,18 ± 0,208
		Females from double bring forth	25	11,08 ± 0,155	11,78 ± 0,313
		Females from simple bring forth	25	10,84 ± 0,284	11,59 ± 0,215
II	Tigaie	Males from double bring forth	25	12,18 ± 0,098	31,12 ± 0,187
		Males from simple bring forth	25	12,62 ± 0,258	31,41 ± 0,214
		Females from double bring forth	25	11,05 ± 0,144	27,87 ± 0,154
		Females from simple bring forth	25	11,49 ± 0,237	28,18 ± 0,182
	Turcana , black variety	Males from double bring forth	25	13,28 ± 0,154	28,59 ± 0,111
		Males from simple ring forth	25	13,45 ± 0,216	29,68 ± 0,196
		Females from double bring forth	25	11,12 ± 0,185	25,49 ± 0,098
		Females from simple bring forth	25	11,99 ± 0,224	27,02 ± 0,284
	Turcana white variety	Males from double bring forth	25	12,96 ± 0,231	28,44 ± 0,052
		Males from simple bring forth	25	13,18 ± 0,208	28,88 ± 0,384
		Females from double bring forth	25	11,78 ± 0,313	25,08 ± 0,111
		Females from simple bring forth	25	11,59 ± 0,215	26,19 ± 0,286
III	Tigaie	Males from double bring forth	25	31,12 ± 0,187	34,55 ± 0,131
		Males from simple bring forth	25	31,41 ± 0,214	35,94 ± 0,286
		Females from double bring forth	25	27,87 ± 0,154	31,58 ± 0,089
		Females from simple bring forth	25	28,10 ± 0,182	32,21 ± 0,244
	Turcana , black variety	Males from double bring forth	25	28,59 ± 0,111	32,51 ± 0,155
		Males from simple bring forth	25	29,68 ± 0,196	33,6 ± 0,212
		Females from double bring forth	25	25,49 ± 0,098	30,15 ± 0,144
		Females from simple bring forth	25	27,02 ± 0,284	30,79 ± 0,208
	Turcana white variety	Males from double bring forth	25	28,44 ± 0,052	32,12 ± 0,121
		Males from simple bring forth	25	28,88 ± 0,384	32,68 ± 0,192
		Females from double bring forth	25	25,08 ± 0,111	29,13 ± 0,099
		Females from simple bring forth	25	26,19 ± 0,286	29,77 ± 0,184

Note: -phase I (accommodation 10 days); -phase II (fattening 130 days); -phase III (finishing 30 days)

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

Tukey Test	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12
L12	4,78**	6,17**	1,81* *	2,44* *	2,74* *	3,83**	0,38 ^{ns}	1,02**	2,35**	2,91**	-	0
L11	5,42**	6,81**	2,45* *	3,08* *	3,38* *	4,47**	1,02**	1,66**	2,99**	3,55**	0	-
L10	1,87**	3,26**	-	-	-	0,92 ^{ns}	-	-	-	0	-	-
L9	2,43**	3,82**	0,79 ^{ns}	0,09 ^{ns}	0,39 ^{ns}	1,48**	-	-	0	-	-	-
L8	3,76**	5,15**	1,43* *	1,42* *	1,72* *	2,81**	-	0	-	-	-	-
L7	4,40**	5,79**	-	2,06* *	2,36* *	3,45**	0	-	-	-	-	-
L6	0,95 ^{ns}	2,34**	-	-	-	0	-	-	-	-	-	-
L5	2,04**	3,43**	-	-	0	-	-	-	-	-	-	-
L4	2,34**	3,73**	-	0	-	-	-	-	-	-	-	-
L3	2,97**	4,36**	0	-	-	-	-	-	-	-	-	-
L2	-	0	-	-	-	-	-	-	-	-	-	-
L1	0	-	-	-	-	-	-	-	-	-	-	-

L1 - Tigaie, males from double bring forth ; L2 – Tigaie, males from simple bring forth, L3 – Tigaie, females from double bring forth; L4 – Tigaie, females from simple bring forth,

L5 – black Turcana, males from double bring forth, L6 - black Turcana, males from simple bring forth, L7 - black Turcana, females from double bring forth; L8 - black Turcana , females from simple bring forth

L9 – white Turcana, , males from double bring forth, L10 – white Turcana, males from simple bring forth, L11 – white Turcana, females from double bring forth; L12 – white Turcana, females from simple bring forth

*Significant at the 0.05 level (w = 1.017)

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

n.s: not significant

Table 3: The evolution of growth on phases on the whole period

Breeds	Lots	Period							
		Accommodation (10 days)		Fattening (130 days)		Finishing (25 days)		Total period (165 days)	
		Total spore (kg)	m. d. s. (g)	Total spore (kg)	m. d. s. (g)	Total spore (kg)	m.d.s. (g)	Total spore (kg)	m.d.s. (g)
Tigaie	Males from double bring forth	0,97	97,05 ± 5,4	18,94	145,7 ± 11,8	3,41	136,4 ± 13,6	23,34	133,3 ± 8,7
	Males from simple bring forth	0,91	91,02 ± 0,9	18,79	144,53 ± 9,2	4,53	181,2 ± 11,9	24,23	138,45 ± 11,5
	Females from double bring forth	0,84	84,18 ± 1,5	16,82	129,38 ± 9,3	3,71	148,4 ± 11,54	21,37	122,11 ± 9,9
	Females from simple bring forth	0,82	82,2 ± 6,5	16,69	128,38 ± 11,2	4,11	156,8 ± 12,6	21,63	123,6 ± 7,6
Turcana black variety	Males from double bring forth	0,83	83,2 ± 5,4	15,51	119,30 ± 10,4	3,92	156,8 ± 11,3	20,06	114,7 ± 7,9
	Male from simple bring forth	0,83	83,3 ± 2,1	16,23	124,84 ± 11,5	3,92	156,8 ± 11,3	20,98	119,9 ± 17,7
	Female from double bring forth	0,75	75,01 ± 2,3	14,37	110,53 ± 12,8	4,61	166,4 ± 15,5	19,78	113,0 ± 14,6
	Females from simple bring forth	0,81	81,3 ± 5,8	15,03	115,61 ± 11,1	3,77	150,8 ± 12,1	19,61	112,1 ± 7,1
Turcana white variety	Male from double bring forth	0,65	65,0 ± 7,5	15,48	119,07 ± 9,3	3,68	147,2 ± 11,6	20,17	115,2 ± 6,1
	Male from simple bring forth	0,80	80,1 ± 6,2	14,70	120,1 ± 9,8	3,80	152,0 ± 10,5	20,30	116,1 ± 7,3
	Females from double bring forth	0,70	70,12 ± 1,8	13,30	102,30 ± 9,8	4,05	162,2 ± 11,3	18,05	103,1 ± 11,8
	Female from simple bring forth	0,75	75,31 ± 3,8	14,60	112,30 ± 6,8	3,58	143,3 ± 15,5	18,93	108,17 ± 12,8

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Table 4. The structure on qualities of the carcasses (\bar{X} = kg)

Breeds	Lots	The quality of the slaughter portion					
		The I st quality		The II nd quality		The III rd quality	
		$\bar{X} \pm s \bar{x}$	%	$\bar{X} \pm s \bar{x}$	%	$\bar{X} \pm s \bar{x}$	%
Tigăie	Males from double bring forth	9,79 ± 0,210	9,9	3,30 ± 0,139	8,8	2,51 ± 0,321	10,1
	Males from simple bring forth	10,18 ± 0,199	5,1	3,39 ± 0,105	5,7	2,54 ± 0,125	9,8
	Females from double bring forth	8,43 ± 0,074	9,8	3,09 ± 0,191	6,1	2,36 ± 0,311	5,7
	Females from simple bring forth	8,63 ± 0,041	8,7	3,21 ± 0,221	8,0	2,25 ± 0,187	9,0
Turcana black variety	Males from double bring forth	8,44 ± 0,110	6,3	3,01 ± 0,181	9,1	2,70 ± 0,201	9,4
	Males from simple bring forth	8,80 ± 0,154	7,4	3,27 ± 0,320	6,6	2,63 ± 0,184	6,6
	Females from double bring forth	7,62 ± 0,202	6,7	3,05 ± 0,181	8,7	2,28 ± 0,021	8,1
	Females from simple bring forth	7,70 ± 0,111	9,0	2,88 ± 0,099	7,1	2,46 ± 0,132	8,4
Turcana white variety	Males from double bring forth	8,03 ± 0,102	8,1	3,18 ± 0,691	7,6	2,69 ± 0,121	6,4
	Males from simple bring forth	8,20 ± 0,166	6,7	3,19 ± 0,182	7,9	2,74 ± 0,147	9,8
	Females from double bring forth	7,20 ± 0,122	9,0	2,78 ± 0,122	6,7	2,51 ± 0,125	8,7
	Females from simple bring forth	7,62 ± 0,181	7,1	2,91 ± 0,131	9,1	2,11 ± 0,184	8,8

Table 5. The effective power of slaughter (%)

Breeds	Lots	n	Weight before slaughter (kg)		Carcass weight (kg)		Yield (%)
			$\bar{X} \pm s \bar{x}$	V%	$\bar{X} \pm s \bar{x}$	V%	$\bar{X} \pm s \bar{x}$
Tigăie	Males from double bring forth	8	34,55 ± 0,131	7,1	15,60 ± 0,138	5,5	45,16 ± 0,124
	Males from simple bring forth	8	35,94 ± 0,286	8,4	16,11 ± 0,099	6,7	44,85 ± 0,098
	Females from double bring forth	8	31,58 ± 0,089	8,3	13,88 ± 0,201	8,8	43,98 ± 1,98
	Females from simple bring forth	8	32,21 ± 0,244	11,2	14,09 ± 0,187	5,7	43,75 ± 1,69
Turcana black variety	Males from double bring forth	8	32,51 ± 0,155	5,5	14,15 ± 0,131	9,1	43,54 ± 1,55
	Males from simple bring forth	8	33,60 ± 0,212	9,5	14,47 ± 0,121	6,5	43,08 ± 1,98
	Females from double bring forth	8	30,15 ± 0,144	8,1	12,95 ± 0,133	7,4	42,97 ± 1,09
	Females from simple bring forth	8	30,79 ± 0,208	11,9	13,04 ± 0,094	9,1	42,38 ± 0,99
Turcana white variety	Males from double bring forth	8	32,12 ± 0,121	10,5	13,90 ± 0,109	8,1	43,28 ± 2,87

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