

COMPARATIVE RESEARCH ON THE FATTENING APPTITUDES OF THE GROWING LAMBS OF LOCAL ROMANIAN BREEDS

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Abstract: In Romania, suckling lamb meat is on demand during the Easter, but growing suckling lambs just for this purpose is not profitable. The paper performed a comparative study of the fattening aptitudes of the lambs from three local sheep breeds to produce carcasses demanded on the international market. The research was done on three groups (Carabash, Tsigai and Tsurcana breeds) of 16 weaned lambs each, with an initial weight between 21-27 kg and continued until the animals reached an weight of 35-38 kg. The experiment started after a period of accommodation to the experimental maintenance and feeding conditions. The animals were kept indoors under similar conditions of feeding and microclimate. The body weight of the animals was measured at the beginning and end of each fattening period, as well as the average daily gain and the total weight gain for each breed. During the late period of fattening, control weighing was performed until the target weight has been achieved. The Carabash lambs, which had the highest lambing weights of all the investigated breeds, proved to be the most precocious as weight gain. Over 44 fattening days they recorded an average daily gain of 0.258 ± 0.016 kg, reaching a slaughtering weight of 38.46 ± 1.178 kg with a feed conversion ratio of 4.66 FU. The Tsigai lambs, less precocious than the Carabash lambs, recorded an average daily gain of 0.191 ± 0.043 kg, over 86 days 86, reaching a slaughtering weight of 37.16 ± 0.130 kg, with a significantly higher feed conversion ratio, of 6.35 FU. The Tsurcana lambs, on the bottom position as fattening aptitudes, reached and average daily weight of 0.154 ± 0.0142 kg over 91 days, reaching a slaughtering weight of 35.25 ± 1.445 kg with a feed conversion ratio of 6.44FU.

Key words: Romanian breeds, lambs, fattening

Introduction

Although sheep breeding has multiple purposes (milk, meat, wool, leather), in most countries worldwide, the main purpose is meat production. In Romania, sheep meat consumption is quite low, the demand of the population accounting for

just 10-12% of overall meat consumption. The types of sheep meat depend largely, both as quantity and as quality, on the slaughtering age, in connection to the traditions and preferences of the consumers (*Taftă, 1983*). In terms of slaughtering age, there are two categories of lambs: suckling lambs and fattened lambs.

Suckling lambs meat is the most demanded type of sheep meat in Romania. This kind of meat comes from lambs slaughtered at 6-8 weeks and at the body weight of 8-15 kg, the resulting carcasses weighing 4-8 kg or less. About 3-4 million lambs are slaughtered each year in Romania, in March-April before Easter. This shows that sheep meat consumption is seasonal in Romania, amounting to about 0.5 kg/year/person. Because of the low body weight, the resulting amount of meat is small related to the number of slaughtered animals. This shows that slaughtering lambs with low body weights is not profitable because this prevents the use of the period when the lambs have the fastest growth speed (high weight gains), which limits considerably the profits of the producers.

Fattened lamb meat is obtained from the male and female lambs that are not suitable for breeding; they usually have 14-15 kg at weaning and they are reared under conditions of semi-intensive or intensive fattening (high amounts of concentrated feeds). They are slaughtered at a live weight of 35-40 kg, which is the most economically-profitable weight for this type of animals. The resulting carcasses weigh in average 15-22 kg and have a proper meat to bone ratio (favourable to the meat) and 2.7% tallow. The meat has a high feeding and marketing value, it has a dense consistency; it is juicy and tender, with pleasant taste and flavour. The semi-intensive or intensive fattening with good quality feeds removes partially or completely the specific sheep smell and taste. This type of meat (15-22 kg carcasses) is a major objective of the sheep industry in most developed countries and in the large wool producing countries. One of the largest consumers and importers of fattened lamb meat was and is the Great Britain. The demands of the British market have influenced the production of the great exporters (Australia, New Zealand, South Africa and even the USA) and even the exigencies of other markets, imposing a standard of quality. The Smithfield Market in London, the main place to buy meat in England, demands lamb carcasses weighing 10.870-16.300 kg, with short legs, fleshy leg, "U"-shaped, rather than "V"-shaped when the meat is hooked, compact body, properly developed back, with a slight but not excessive coat of tallow (*Drăgănescu, 1969*). The lambs were usually hybrids from local breeds with meat breeds, marketed at the age of 4-5 months, after weaning. These requirements remained, the smaller carcasses being better suited for the modern trends for meat marketing in supermarkets. The demand for slightly heavier carcasses (18-27 kg) may also increase, particularly in Muslim countries. These carcasses are more economical. Sheep meat, particularly fattened lamb meat, is traded extensively, over 18% of the world production being exported (*Boutonnet, 1995*). The change was generated by the very economically and quantitatively convenient offer of two large producers of wool which have extensive grazing areas – Australia and New Zealand. They cover two thirds of the world exports to Muslim countries and some west European countries. The low production costs, the good quality of the meat and the technical possibilities of

New Zealand to produce fresh meat on the European market, creates large problems to the European Union, whose member Romania is.

The purpose of this paper was prompted by the current requirements; it involves a fattening experiment with lambs from three local breeds until the slaughtering weight of 35-40 kg, the characterisation of the fattening performance and the study of carcass and meat quality. This paper is part of a larger study on the quality of the meat and carcass from suckling lambs and from adult sheep of the local breeds.

Materials and Methods

The research was conducted at INCDBNA Balotesti on three groups of 16 lambs each, belonging to the following breeds: Carabash (own nucleus), Tsigai (bought from the experimental station for sheep rearing Bilciurești – Dâmbovița) and Tsurcana (bought from Domnesti farm, Arges County). The experiment started after the lambs were weaned, when their average weight ranged between 21-27 kg, and after a 21-days period of accommodation to the experimental maintenance and feeding conditions, and ended when the animal reached the target body weight of 35 to 38 kg. The animals were kept indoors under similar conditions of feeding and microclimate. The body weight of the animals was measured at the beginning and end of each fattening period, as well as the average daily gain and the total weight gain for each breed. During the late period of fattening, control weighings were performed until the target weight has been achieved.

During the accommodation period the lambs were kept under the same conditions as during the experiment and were gradually accustomed to the experimental feeds. The animals had quite similar ages at the beginning of the experiment, but their body weights were different; the purpose of the experiment was to bring the lambs to a weight of 35-40 kg (Table 1).

Table 1. Age and duration of the fattening period

	Carabash		Tsigai		Tsurcana	
	$\bar{X} \pm S_{\bar{X}}$	Cv%	$\bar{X} \pm S_{\bar{X}}$	Cv%	$\bar{X} \pm S_{\bar{X}}$	Cv%
Age at the beginning of the actual fattening period (days)	76.1±0.767	3.186	83.7±0.831	3.138	81.9±1.773	6.846
Age at the end of the fattening period (days)	120± 0.699	1.843	169.7±0.83	1.547	173.7±1.453	2.646
Duration of the fattening period (days)	44		86		91	

A diet was formulated (*Burlacu, 1998*) adequate for the fattening lambs weighing 25 kg, which allows 250 g of weight gain per day (Table 2). The requirement of nutrients and energy for the above mentioned weight gain (*Stoica, 1997*) was taken into consideration when formulating the diet.

Table 2. Diet formulation for fattening lambs; live weight 25 kg, daily weight gain 250 g

Norm Feed	Natural state (kg)	DM (kg)	meatFU	IDP (g)	Ca (g)	P (g)
		1.35	1.27	120	8.5	3.2
Alfalfa hay	1.0	0.876	0.65	82.5	19.5	2.83
Compound feed	0.5	0.440	0.53	42	5.2	4.4
Total	1.5	1.316	1.18	124.5	24.7	7.23

The experiment used a constant amount of compound feeds CF1 and CF2 and a variable amount (0.7-1 kg) of alfalfa hay, which fits the evolution of the requirements. Table 3 shows compound feeds formulation.

Table 3. Compound feeds formulation

Ingredients	CF1 Amount (kg)	CF2 Amount (kg)
Corn	51.0	31.4
Canola meal	10.0	10.0
Soybean meal	3.0	4.5
Wheat	-	20.0
Starch waste	29.0	30.0
Powder milk	3.0	-
Calcium carbonate	2.0	2.1
Salt	1.0	1.0
Vitamin-mineral premix	1.0	1.0
Total	100.0	100.0

Results and Discussion

Tables 4 and 5 show the organic matter and Weende components of the alfalfa hay and of the two variants of compound feeds, as well as the calculated feeding value of the forages.

Table 4. Chemical composition and nutritive value of the forages

Forage	DM (kg)	OM (Kg)	CP	EE	CF	NFE	Ash	GE (MJ)
Alfalfa hay	876	788	153	25	280	330	88	16.1
	1000	899	175	29	319	377	100	18.3
CF1	880	866	158	4	5	699	14	16.2
	1000	984	179	5	6	794	16	18.4
CF2	882	867	150	4	6	706	15	16.1
	1000	983	170	5	7	801	17	18.2

Table 5. The nutritional value g kg⁻¹

Forage	DM	Meat FU	IDP	Ca	P
Alfalfa hay	876	0.65	82.5	16.25	2.35
CF1	880	1.06	84	10.4	8.8
CF2	878	0.97	82	10.0	8.3

Table 1 shows that Carabash lambs, which had the lowest age at the beginning of the experiment (76 days) also had the shortest period of fattening (44 days). This is explained by the fact that Carabash lambs, which have the highest body weight at lambing, also have a higher growing capacity than the other breeds taken into the experiment, resulting in a shorter period of fattening: Carabash – 44 days; Tsigai – 86 days; Tsurcana – 91 days.

Table 6 shows the growing performance of the three groups during the period of the experiment.

Table 6 shows that Carabash lambs attained the first the target weight for slaughtering. During 44 days they accumulated 11.31 ± 0.716 kg of body mass, with an average daily weight gain of 0.258 ± 0.016 kg.

Tsigai lambs ranked second. During 86 days they accumulated 16.44 ± 0.145 kg of body mass, with an average daily weight gain of 0.191 ± 0.043 kg. Tsurcana lambs accumulated 13.98 ± 1.293 kg of body mass in 91 days, with an average daily weight gain of 0.154 ± 0.0142 kg.

The feed conversion ratio of the three breeds is as follows:

The Carabash lambs consumed 52.8 FU, of which the compound feeds represented 34.95 %, which gives a feed conversion ratio of 4.66.

The Tsigai lambs consumed 97.18 FU, of which the compound feeds represented 37.39 %, which gives a feed conversion ratio of 6.35.

The Tsurcana lambs consumed 90.09 FU, of which the compound feeds represented 43.43 %, which gives a feed conversion ratio of 6.44.

The Fisher and Tuckey tests were applied to determine the homogeneity of the average values recorded for the three groups. The results show significant differences between the three groups:

Table 6. Weight gain of the lambs

	Carabash		Tsigai		Tsurcana	
	$\bar{X} \pm S_{\bar{X}}$	Cv%	$\bar{X} \pm S_{\bar{X}}$	Cv%	$\bar{X} \pm S_{\bar{X}}$	Cv%
Live weight at the beginning of the experiment (kg)	27.15±1.048*	12.215	20.7±0.345	5.579	21.27±0.401*	5.963
Live weight at the end of the experiment (kg)	38.46±1.178 ns	9.691	36.00±1.243 ns	10.916	35.25±1.445 ns	12.970
Weight gain during the period (kg)	11.31±0.716	20.043	15.3±1.173	24.24	13.98±1.293	29.256
Duration of the fattening period (days)	44		86		91	
Average daily gain (kg)	0.258±0.016*	20.359	0.178±0.014*	24.25	0.154±0.0142*	29.330

*- significant differences (P<0, 05)

ns – not significant differences (P<0, 05)

Significant differences were noticed in the average initial body weight of Carabash and Tsigai + Tsurcana lambs.

No significant differences were noticed in the average final body weight of the three breeds

Significant differences were noticed in the average daily gain of Carabash and Tsigai + Tsurcana lambs.

Conclusion

The following observations result from the experiment:

Carabash lambs were the most precocious as weight gain. They had higher lambing weights than the other breeds. During 44 days they accumulated 11.31±0.716 kg of body weight, reaching a slaughtering weight of 38.46±1.178 kg;

Tsigai lambs, less precocious than Carabash lambs, had an average daily weight gain of 0.191±0.043 kg, for a period of 86 days and an average slaughtering weight of 37.16±0.130 kg, with a significantly higher feed conversion ratio (6.35 vs. 4.66 FU).

Tsurcana lambs were the slowest as fattening aptitudes, with an average daily weight gain of 0.154±0.0142 kg, during 91 days and an average slaughtering weight of 35.25±1.445 kg and a feed conversion ratio of 6.44 FU.

Data analysis shows that Carabash lambs can be used to produce fattened lambs over a much shorter period than the other breeds taken into the study and with a better feed conversion ratio.

Meat and carcass quality are to be studied, as well as the possibility to improve the aptitudes for meat production of the local breeds using rams from specialised meat breeds.

Komparativno ispitivanje tovnih sposobnosti jagnjadi lokalnih rumunskih rasa

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Rezime

U Rumuniji, u vreme Uskrsa postoji velika potražnja za mesom neodbijene jagnjadi, ali gajenje jagnjadi samo u tu svrhu nije profitabilno. U radu je predstavljeno komparativno istraživanje tovnih sposobnosti jagnjadi tri lokalne rumunske rase u proizvodnji trupova za kakvima postoji potražnja na međunarodnom tržištu. Ispitivanje je izvedeno na tri grupe (rase karabaš, cigaja i tsurkana) sa po 16 jagnjadi u svakoj grupi, početne mase od 21-27 kg do telesne mase grla od 35-38 kg. Ogled je započet nakon perioda prilagođavanja na eksperimentalne uslove držanja i ishrane. Životinje su držane u zatvorenom objektu i pod sličnim uslovima ishrane i mikro klimata. Telesna masa životinja je izmerena na početku ogleada i na kraju svakog perioda tova, kao i prosečni dnevni prirast i ukupni prinos za svaku rasu. Tokom kasnog perioda tova, kontrolno merenje težine je rađeno dok nije dostignuta ciljna masa. Jagnjad rase karabaš, koja su bila najlakša od svih ispitivanih rasa, su imala najbolji prirast težine. U preko 44 tovnih dana kod njih je zabeležen prosečni dnevni prirast od $0,258 \pm 0,016$ kg, i dostigli su težinu pred klanje od $38,46 \pm 1,178$ kg sa konverzijom hrane od 4,66 HJ. Jagnjad rase cigaja, su imala slabiji razvoj u odnosu na karabaš jagnjad, prosečni dnevni prirast od $0,191 \pm 0,043$ kg, u periodu od 86 dana, i dostigla su težinu pred klanje od $37,16 \pm 0,130$ kg, sa signifikantno većom konverzijom of 6,35 HJ. Jagnjad rase tsurkana su na poslednjem mestu u pogledu tovnih sposobnosti, dostigla su prosečni dnevni prirast od $0,154 \pm 0,0142$ kg u periodu od 91 dana i težinu pred klanje od $35,25 \pm 1,445$ kg sa konverzijom hrane od 6,44FU.

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