Fattening Performance and Slaughter Traits of Lambs from the North-East Bulgarian Fine Wool Breed, and Its Crossings with Australian Merino and Ile de France Sheep – Internal Breeding

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A comparative study of fattening and slaughter traits of three groups of lambs was carried out: 14 lambs from the North-East Bulgarian Fine Wool breed, 14 crossbred lambs with ¼ blood of Australian Merino (internal breeding) and 14 crossbred lambs with ¼ blood of Ile de France (internal breeding).

At the beginning of the experiment, the lambs were grouped according to age, gender, type of birth, live weight of lamb in the group, and parity of the dam. lambs were fattened intensively under similar conditions during 130 days. The forage consumption was monitored on a daily basis and the live body weight – at 14-day intervals with a precision of 0,1 kg. The carcass traits were determined via complete slaughter analysis at the age of 100 and 130 days.

The crossings from internal breeding with ¼ blood of Ile de France exhibited the best fattening and slaughter traits. The insignificant differences between the other two groups allowed to assume that the Australian merino breed did not influence negatively the fattening performance and the slaughter traits in ¼ blood crossings from internal breeding.

Keywords: North-East Bulgarian Fine Wool Breed, Australian Merino Breed, Ile de France Breed, lambs, crossbreds, fattening, slaughtering, traits.

İnce yapağılı Kuzey Doğu Bulgar, koyunları ile bunların Avusturalya Merinos İle de Fransa melez Kuzularının Besi Performansı ve Kesim Özellikleri

Üç grup (14 baş ince yapağılı Kuzey Doğu Bulgar, 14 bağ Kuzey Doğu Bulgar x ¼ Avusturalya Merino melezi ve 14 bağ de Kuzey Doğu Bulgar x ¼ Ile de France melezi) kuzunun besi ve kesim özellikleri ile ilgili karşılaştırmalı bir çalışma yürütülmüştür.

Deneme başlangıcında kuzular yaş, cinsiyet, doğum şekli, gruptaki canlı ağırlığı, ve anaın laktasyon sırasına göre gruplandırılmıştır. Kuzular aynı şartlar altında 130 gün süreyle yoğun besiye tabi tutulmuşlardır. Yem tüketimleri günlük bazda kaydedilirken, canlı vücut ağırlıkları 0.1 kg hassasiyetle 14 gün aralıklarla ölçülmüştür. Karkas özellikleri ise 100-130 günlük dönemlerde tam kesim analizleri ile belirlenmiştir.

En iyi besi ve kesim özelliklerini ¼ Fransa melezi vermiştir. Diğer gruplar arasındaki önemli olmayan farklılıklar ¼ Avusturalya melezlerinin besilenmeyi olumsuz bir şekilde etkilemediğini göstermiştir.

Anahtar kelimeler: İnce yapağılı Kuzey Doğu Bulgar kuzusu, Avusturalya Merinos melezi, Ile de France melezi, besi, kesim özellikleri

Introduction

The changes in the capacity and structure of Bulgarian sheep breeding during the last years required a revision of the trends in selection work. At present, the fine wool sheep breeding systems are undergoing an enhancement through improving breeding (introduction of new blood) with the Australian merino breed. The positive impact of the latter breed on the quality of wool are beyond any doubt (Boykovski, 1994; 1995; Tsenkov et al.,1995; Lazarov and Iliev,1997; Slavova, 2000; Slavov and Dimitrov, 2001).

With regard to the economical importance of meat productivity, fine wool sheep breeders performed a number of experiments in order to investigate the fattening and carcass traits of lambs from various breeds (Dimitrov et al., 1984; Bennett, 1990; Muhin,

1991; Morbidini et al., references'de; 1999 olarak verilmiştir. Slavova, 2000; Klewiec et al., 2002; Yilmaz et al., 2002) at different energy and protein level of diets (Crouse et al., 1978; Silva et al., 1991; Stanford et al. 1999; Silva et al., 2001) at a different age, live slaughter weight (Field et al.,1967; Boykovski et al., 1982; Aziz et al., 1993) and gender (Crouse et al., 1981; Butterfeld et al. 1983).

In Bulgarian fine wool sheep husbandry, an improving breeding for enhancement of meat qualities was also made with the Ile de France breed. A significant number of animals are in the stage of internal breeding and need an evaluation of the meat performance.

The present study aimed to investigate the fattening and slaughter traits of lambs from the North-East Bulgarian Fine Wool breed and crossbred lambs from internal breeding with the participation of Australian Merino and Ile de France breeds.

Material and Methods

In 2005, a scientific economic experiment was carried out with three groups of lambs: group I: 14 lambs from the North-East Bulgarian Fine Wool breed (NEBFW), group II -14 NEBFW lambs with ¼ blood of Australian Merino-internal breeding and group III - 14 NEBFW lambs with ¼ blood of Ile de France-internal breeding. At the beginning of the trial, the lambs were adjusted by age (43-45 days), gender (equal number of both genders), type of birth (equal number of singles and twins), weaning age (33-36 days), age of dams (3 years) and parity (second lambing). The experimental animals were placed under equal conditions and fed intensively up to the age of 130 days. The feeding was ad libitum with a starter forage for lamb fattening containing (per 1 kg) 6,72 MJ FUG (feed units for growth) and 106,1 g PDI (protein digestible in the intestine); alfalfa hay, containing (per 1 kg) 3,12 MJ FUG and 79,9 g PDI, as well as maize silage with (per 1 kg) 1,68 MJ FUG and 19,9 g PDI. The amount of consumed forage was determined on a daily basis whereas the live body weight was monitored at 14-day intervals with a precision of 0,1 kg.

The carcass traits were determined by means of slaughter analysis at the age of 100 and 130 days. Four lambs of each group with an average live body weight were slaughtered. The slaughtering was performed according to **Act 27** (1999). The carcass fabrication was done according to the recommendations of **INRA**.

Results and Discussion

The results of the experiment showed that at the age of 100 days, i.e. after 56 days of fattening, the highest live body weight was that of lambs from group III – crossbreds with ¼ blood from Ile de France, internal breeding – 30,41 kg (Table 1). At the same age they exhibited the maximum daily weight gain as well: – 0,298 kg. The differences vs the other two groups were highly statistically significant ($p<0,001$). The lowest live body weight (26,86 kg) and lowest daily weight gain (0,243 kg) were shown by lambs with ¼ blood of Australian merino, internal breeding. The difference between them and purebred lambs were insignificant. Similar lack of statistically significance by respect to the daily weight gain was reported by Slavova **(**2000) in a comparative study of lambs from the Trakia Merino breed and its ½ blood crossings with Australian Merino.

At the age of 130 days, following a 84-day fattening period, crossbreds with ¼ blood from Ile de France, internal breeding, showed again the highest live body weight (41,08 kg) and daily weight gain (0,326 kg), statistically significant different vs the other groups ($p<0,001$). The lowest live body weight and daily weight gain were those of lambs with ¼ blood of Australian Merino, internal breeding (34,18 kg and 0,249 kg, respectively). The differences vs groups I and II were not statistically significant.

With regard to forage consumption, FUG and PDI per 1 kg weight gain, the lambs of group III (crossbreds with ¼ blood from internal breeding with Ile de France) gave the best results for both studied ages (100 and 130 days) (Table 2). The observed difference with groups I and II, although not significant, were in favour of purebred lambs.

Table 3 presents the data for carcass traits at the age of 100 and 130 days. Again, the highest carcass traits values at both ages were found out in crossbreds with ¼ blood crossings from Ile de France, internal breeding. They manifested the highest proportion of chilled carcass weight vs slaughter weight at the age of 100 days – 51,05 % (compared to 47,09 % and

47,33 % for lambs in groups I and II respectively) and 130 days – 50,29 % (47,12 % and 47,06 % in groups I and II respectively). The obtained results for purebred lambs and their merino crossings allowed us to assume that they were highly comparable with regard to studied carcass traits.

The data from measurements of carcasses at the age of 100 and 130 days correlated positively with the results of slaughter analysis. They confirmed the superiority of crossbreds with ¼ blood from Ile de France, internal breeding (Table 4). The lambs from group III predominated over those from the other two groups with regard to the following parameters: big and small carcass lengths, leg length and leg circumference, the differences being statistically significant ($p<0,01$). The differences between groups I and II were small and insignificant. Our results were similar to those of Dimitrov (1988) for Trakia Merino lambs and crossbreds with ½ blood with the Ile de France breeds.

With regard to fat thickness at m. Longissimus, at tail root and at breast at the age of 100 days, purebred lambs had the lowest and Ile de France crossbreds – the highest values. The differences between group I and the other two groups were statistically significant for fat thickness at m. Longissimus ($p<0,01$ and $p<0,05$) and fat thickness at tail root ($p<0,05$). Also, fat thickness at breast differed considerably between groups I and III ($p<0,05$).

At the age of 130 days, the studied parameters were with the highest values in lambs from group III again. These differences were statistically significant only between groups I and III for fat thickness at tail root.

The data obtained after the fabrication and deboning of lamb carcasses at the age of 100 and 130 days showed the marked superiority of crossbreds with ¼ blood from Ile de France, internal breeding (Table 5). They showed the highest weight of halves and quarters as well as the highest proportion of meat in them and in the various retail cuts.

At the age of 100 days, the average weight of half carcasses in lambs from group II was by 23,74% higher than in lambs from group I and by 26,12% higher than group II, whereas the amount of meat in halves were higher by 26,57% and 28,60% respectively.

At the age of 130 days, the advantage of animals from group III was preserved vs purebred and ¼ blood crossings from internal breeding with Australian Merino – by 24,72% and 25,03% respectively for half-carcass weights and by 29,29% respectively for meat in half carcasses.

Conclusion

The crossbreds with ¼ blood from Ile de France (internal breeding) exhibited the best fattening and carcass traits (average daily weight gain of 0,298-0,326; FUG per 1 kg weight gain of 21,36-22,92; DPI per 1 kg weight gain of 325-347 g; dressing percentage of 51,80 – 51,83%; big carcass length of 80,00-86,25 cm; leg length of 26,00-28,88 cm; leg circumference of 32,13–38,88 cm and meat proportion of carcasses: 80,97-81,70%). They were superior in a considerable extent vs both purebred North-East Bulgarian Fine Wool lambs and NEBFW crossbreds with ¼ blood from Australian Merino, internal breeding. This is indicative for the positive impact of the Ile de France breed upon the fattening and carcass traits of lambs –internal breeding crossings.

The insignificant differences between groups I and II allowed to suggest that the Australian Merino breed did not resultin a negative effect of both fattening and carcass characteristics of crossbreds from internal breeding.

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Table 1. Changes of live weight and average daily weight gain at the ages of 100 and 130 days, kg

Breeds	**Initial live weight, kg (n=14)**			**At the age of 100-days, kg (n=14)**				**At the age of 130-days, kg (n=10)**			
	x ± Sx	**S**	**C**	**x ± Sx**	**S**	**C**	**Average daily weight gain**	**x ± Sx**	**S**	**C**	**Average deily weight gein**
Purebred*	13,15 ± 0,106	0,397	3,02	27,19 ± 0,519	1,944	7,15	0,250	35,05 ± 0,867	2,741	7,82	0,261
¼ bl. of AM**	13,28 ± 0,186	0,695	5,24	26,86 ± 0,512	1,915	7,13	0,243	34,18 ± 0,780	2,466	7,91	0,249
¼ bl. of Il.F***	13,68 ± 0,152	0,571	4,18	30,41 ± 0,500	1,870	6,15	0,298	41,08 ± 1,086	3,434	8,36	0,326

*:North-East Bulgarian FineWool Breed;**: ¼ bl. of Australian Merino Breed – Internal Breeding; ***:¼ bl. of Ile de France - Internal Breeding

Table 2. Feed consumption, Feed Units for Growth /FUG/, Protein Digestible in the Intestine /PDI/ <per 1 kg weight gain, at the ages of 100 end 130 days

Breeds	At the age of 100-days , kg (n=14)					At the age of 130-days , kg(n=10)				
	Feeds			**FUG /MJ/**	**PDI** /g/	Feeds			FUG **/MJ/**	**PDI /g/**
	Concentrate /kg/	Hay **/kg/**	**Silage /kg/**			**Concentrate /kg/**	Hay **/kg/**	**Silage /kg/**		
Purebred*	2,19	1,10	1,92	23,52	357	2,38	1,25	2,31	26,16	397
¼ bl. of AM**	2,23	1,13	1,98	24,00	365	2,45	1,32	2,35	27,00	410
¼ bl. of Il.F***	1,98	1,03	1,72	21,36	325	2,10	1,08	1,98	22,92	347

*: - North-East Bulgarian FineWool Breed; **: ¼ bl. of Australian Merino Breed – Internal Breeding; ***: - ¼ bl. of Ile de France - Internal Breeding