



## A study on comparison of fattening performances and some slaughter characteristics of Suffolk and German Mutton Merino lambs under intensive fattening conditions

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### ABSTRACT

The study carried out at Dort Mevsim Meat Integrated Facility in Susurluk district, Balikesir province, Turkey. In each genotype, there were 20 male lambs. Suffolk and German Mutton Merino lambs were subjected to fattening for 70 days. At the end of the trial, 6 male lambs from each genotype were slaughtered. Slaughter weight, ADG, concentrate feed efficiency, hot carcass weight, chilling carcass weight, hot dressing percentage and chilling dressing percentage were 43.9 kg, 301 g, 3.44 kg, 23.18 kg, 22.24 kg, 52.80 % and 50.66 % in Suffolk lambs; these values were 43.1 kg, 296 g, 3.86 kg, 21.85 kg, 20.89 kg, 50.70 % and 48.47 % in German Mutton Merino lambs, respectively. Hot and chilling carcass weights of Suffolk and German Mutton Merino lambs were significantly different ( $P < 0.05$ ). The findings of the current study showed that Suffolk lambs tended to have higher hot and chilling carcass weights, although there were no statistical differences between the two genotypes in terms of slaughter weights, average daily weight gains and other slaughter traits. These results also indicate that the carcasses for retail sale from the Suffolk lambs were more in quantity when compared to German Mutton Merino lambs.

**Key words:** Carcass, Fattening, German Mutton Merino, Suffolk.

### INTRODUCTION

Sheep breeding is a major sector of the national economy in Turkey. Turkey's sheep population consists of the indigenous sheep breeds and a small part of the culture breeds. The indigenous sheep breeds are raised under extensive conditions in Turkey. The indigenous sheep breeds have been well adapted to the harsh environment conditions, and they have low production.

The number of sheep in Turkey has started to decline rapidly since 1980s. Suitable conditions for the traditional sheep breeding activities, especially in western regions of Turkey, have decreased due mainly to decreasing pasture areas, migration, and wrong policies (Ozdal *et al.*, 2012). The sheep-lamb meat produced in Turkey doesn't fulfill the domestic market requirements, and nowadays, Turkey is importing Suffolk and German Mutton Merino lambs. Therefore, researches are needed to evaluate the effectiveness of imported mutton sheep in terms of fattening performance and slaughter characteristics.

The objective of this study was to determine fattening performances and some slaughter characteristics of Suffolk and German Mutton Merino lambs under intensive fattening conditions.

### MATERIALS AND METHODS

The study carried out at Dort Mevsim Meat Integrated Facility in Susurluk district, Balikesir province, Turkey. Suffolk and German Mutton Merino lambs were imported from abroad at 65 days of age. In each genotype, there were 20 male lambs. The lambs were taken into adaptation process for 5 days. After adaptation process, the lambs were medicated against internal and external parasites. Suffolk and German Mutton Merino lambs were divided according to their genotypes. They were subjected to feeding for 70 days, and were fed as group. The lambs were fed with concentrate and forage feed (barley straw) *ad libitum*. Also, during the trial, the lambs were *ad libitum* access to water. Daily feed intake and refusals were recorded for each genotype. The lambs were weighed at the beginning, by 20 day intervals, and at the end of the trial. For the detection of live weights, the lambs were left hungry in the evening before the day of weighing. The live weights of Suffolk and German Mutton Merino lambs were measured by a scale sensitive to 100 g. Composition of diet used in the trial is given in Table 1.

Average daily weight gains (ADG, g/d) of Suffolk and German Mutton Merino lambs were calculated at certain

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**Table 1:** Composition of diet.

Raw materials	%
Barley	37.75
Corn	14
Bonkalite	12
Cotton seed meal	11
Sunflower seed meal	10
Wheat	6
Soybean meal	5
Marble powder	2.8
Bicarbonate	1
Salt	0.25
Vitamins+minerals	0.2

Protein: %17.5; Metabolic energy (Kcal/kg): 2730

intervals of the trial. At the end of the trial, 6 lambs from each genotype were slaughtered. Lambs' skin, head, feet, as a whole (heart, liver and lungs), spleen, digestive organs (full and empty) and weights of carcasses were measured by a scale sensitive to 10 grams. Carcasses were stored for 24 h at 4°C, and carcasses were weighed, and chilling carcass weights were recorded for each carcass. Hot and chilling dressing percentages were calculated as the proportion of the hot and chilling carcass weights to pre-slaughter live weight. Data were analyzed by using t test in Minitab packet program. Coefficients of variance were also calculated by using Minitab (Minitab, 2010).

## RESULTS AND DISCUSSION

Average live weights (kg) and coefficients of variation (CV %) belong to live weights of Suffolk and German Mutton Merino lambs are given in Table 2. When Table 2 is examined, the differences between live weights of Suffolk and German Mutton Merino lambs were not significant ( $P>0.05$ ), and live weight variances ranged from 7.68 % to 11.37 %.

Average daily weight gains (ADG, g/day), concentrate and forage feed efficiencies (kg feed/kg live weight gain) of Suffolk and German Mutton Merino lambs are given in Table 3. ADG of Suffolk and German Mutton Merino lambs was similar, and Suffolk lambs consumed a little less concentrate and forage feed for 1 kg live weight gain when compared with the German Mutton Merino lambs. Statistically differences between feed efficiencies of Suffolk and German Mutton Merino lambs because of group feeding could not be determined.

Average weights (kg), percentages (%) and coefficients of variation (CV %) belong to slaughter characteristics of Suffolk and German Mutton Merino lambs are given in Table 4. When Table 4 is examined, only hot and chilling carcass weights of Suffolk and German Mutton Merino lambs were significantly difference ( $P<0.05$ ), and slaughter characteristics variances ranged from 2.32 % to 14.41 %.

Traditionally, lambs produced in the Mediterranean countries of the EU are slaughtered at a very young age (between 1 and 4 months), producing the lightest carcasses in all Europe (Teixeira *et al.*, 1998). The use of specialised meat breeds to improve animal productivity and economic results is desirable in some intensive sheep production conditions. The trend for heavier and leaner carcasses is widespread and favoured by the use of a large mature weight breed such as Suffolk (Wood *et al.*, 1980). Rodrigues *et al.* (2006) reported that Suffolk were preferred for meat production, since at a comparable stage of maturity they had greater proportions of expensive cuts and greater carcass lean percentage. Croston *et al.* (1987) noted that the highest muscle proportion of Suffolk lambs confirms Suffolk as a meat breed.

In the current experiment, ADG of Suffolk and German Mutton Merino lambs were determined as 301g and 296 g, respectively. Petit (2000) stated that fed female lambs consisting of a mixture of Suffolk and Hampshire crossbred lambs, and obtained 332 g ADG in female lambs slaughtered at 46.6 kg live weight. This value reported by Petit (2000) was higher than those of our study. However, ADG of Suffolk and German Mutton Merino lambs determined at a higher level when compared with findings of Karacabey Merino (275 g)slaughtered at 39.6 kg live weight and Turkish Merino (225 g) lambs slaughtered at 40.58 kg live weight (Koyuncu, 2008; Yilmaz *et al.*, 2002). Furthermore, ADG of Suffolk and German Mutton Merino lambs were higher than finding (249.7 g) reported by Santos-Silva *et al.* (2002) for Merino Branco lambs. Fahmy *et al.* (1992) reported that ADG for Suffolk lambs slaughtered at 43.4 kg live weight was generally low (199 g/day). Burke and Apple (2007) reported that ADG for Suffolk lambs slaughtered at 45.7 kg live weight was generally low (156.8 g/day). These findings (ADG) reported by above mentioned literatures were lower than the findings of the present study. Pajor *et al.* (2009) noticed that

**Table 2:** Average live weights (kg, SE.) and coefficients of variation (CV %) belong to live weights of Suffolk and German Mutton Merino lambs.

Day	Suffolk		German Mutton Merino		t- value	Suffolk	German Mutton Merino
	Mean	SE	Mean	SE		CV %	CV %
Initial fattening	22.8	0.58	22.4	0.50	0.53 <sup>·</sup>	11.37	9.98
20th day	27.9	0.64	26.8	0.58	1.28 <sup>·</sup>	10.25	9.68
40th day	34.5	0.77	33.5	0.68	0.95 <sup>·</sup>	9.98	9.07
60th day	40.9	0.84	40.3	0.71	0.55 <sup>·</sup>	9.18	7.88
70th day	43.9	0.82	43.1	0.74	0.73 <sup>·</sup>	8.35	7.68

<sup>·</sup>:  $P>0.05$

**Table 3:** Average daily weight gains (g), concentrate and forage feed efficiencies (kg feed/kg live weight gain) of Suffolk and German Mutton Merino lambs.

Genotype	Factors	Fattening stages (days)			
		0-20	0-40	0-60	0-70
Suffolk	Average daily weight gain	256	293	302	301
	Concentrate feed efficiency	3.18	3.23	3.40	3.44
	Forage feed efficiency	0.86	0.79	0.82	0.77
German Mutton Merino	Average daily weight gain	221	278	298	296
	Concentrate feed efficiency	3.77	3.73	3.76	3.86
	Forage feed efficiency	0.91	0.86	0.87	0.90

**Table 4:** Average weights (kg), percentages (%) and coefficients of variation (CV %) belong to slaughter characteristics of Suffolk and German Mutton Merino lambs.

Slaughter traits	Suffolk		German Mutton Merino		t-value	Suffolk		German Mutton Merino	
	Mean	SE	Mean	SE		%	CV %	%	CV %
Hot carcass	23.18	0.22	21.85	0.29	3.62*	52.80	2.32	50.70	3.25
Chilling carcass	22.24	0.25	20.89	0.32	3.30*	50.66	2.75	48.47	3.75
Skin	4.71	0.18	5.31	0.24	2.00 <sup>∞</sup>	10.73	9.36	12.33	11.07
Head and feet	3.04	0.11	3.29	0.11	1.60 <sup>∞</sup>	6.90	8.88	7.64	8.21
Heart+liver+lungs	1.92	0.07	2.07	0.08	1.42 <sup>∞</sup>	4.37	8.96	4.81	9.47
Spleen	0.17	0.01	0.17	0.01	0.00 <sup>∞</sup>	0.38	14.41	0.39	14.41
Digestion organs (full)	9.14	0.44	9.64	0.40	0.80 <sup>∞</sup>	20.82	12.87	22.38	10.17
Digestion organs (empty)	3.18	0.18	3.31	0.14	0.57 <sup>∞</sup>	7.24	13.87	7.68	10.36

<sup>∞</sup>: P>0.05; \*P<0.05

ADG for Hungarian Merino lambs slaughtered at approximately 31-32 kg was 323.01 g/day. The values (ADG) obtained for Suffolk and German Mutton Merino lambs in the current study are lower than the finding reported by Pajor *et al.* (2009) for Hungarian Merino.

McClure *et al.* (1985) stated that the ones the carcass weight of which is heavier feeds more concentrate feed. When concentrate feed efficiencies of Suffolk and Merino lambs are examined, Suffolk and German Mutton Merino lambs consumed concentrate feed (3.44 and 3.86 kg, respectively) for 1 kg live weight gain. Concentrate feed efficiencies of Suffolk and German Mutton Merino lambs were better when compared with the literature findings of Karacabey Merino (5.56 kg) and Turkish Merino (4.77 kg) lambs (Koyuncu, 2008; Yilmaz *et al.*, 2002).

Carcass weight is an important trait in the grading system together with fat content, sex, age, and commercial cut percentage in the categorization of lamb carcasses into commercial types (Abdullah and Qudsieh, 2008). In the current study, beginning and slaughter weights of Suffolk and German Mutton Merino lambs were not statistically significant (P>0.05), but hot and chilling carcass weights were statistically significant (P<0.05) in favour of Suffolk lambs, because weights of internal and external organs were a little bit lower for Suffolk lambs. Petit (2000) reported that hot carcass weight and dressing percentage for Suffolk and Hampshire crossbred lambs slaughtered at 46.6 kg live weight were 21.9 kg and 47.3 %, respectively. Dressing percentage in this literature was lower than those of the present study. Dressing percentage reported by Santos-Silva *et al.* (2002) for Merino Branco lambs slaughtered at 30 kg

live weight was 53.1%. Dressing percentage reported for Merino Branco lambs by Santos-Silva *et al.* (2002) is higher than values observed for Suffolk and German Mutton Merino lambs in the current experiment. Pérez *et al.* (2002) reported higher dressing percentage in Suffolk Down suckling lambs slaughtered at 10 kg or 15 kg (54.9% and 55.85%). According to findings of Pérez *et al.* (2002), dressing percentage increased with decreased of slaughter weight. Al-Suwaiegh and Al-Shathri (2014) reported that hot carcass weights increased significantly with increasing slaughtering age. Fahmy *et al.* (1992) reported that dressing percentage for Suffolk lambs slaughtered at 43.4 kg live weight was 40.7%. Dressing percentages of Suffolk and German Mutton Merino lambs were higher than finding reported by Fahmy *et al.* (1992) for Suffolk lambs slaughtered at similar live weight. Burke and Apple (2007) reported that dressing percentage for Suffolk lambs slaughtered at 45.7 kg live weight was 52.7 %. The dressing percentage reported for Suffolk lambs by Burke and Apple (2007) is similar to finding of Suffolk lambs in the current study. Pajor *et al.* (2009) observed that hot carcass weight and dressing percentage for Hungarian Merino lambs slaughtered at approximately 31-32 kg live weight were 16.01 kg and 50.74%, respectively. In this study, dressing percentage (52.80 %) of Suffolk lambs slaughtered at 43.9 kg live weight was higher than finding reported by Pajor *et al.* (2009) for Hungarian Merino lambs slaughtered at approximately 31-32 kg live weight, however dressing percentage (50.70 %) of German Mutton Merino lambs slaughtered at 43.1 kg live weight was similar to that of Hungarian Merino lambs. Ekiz *et al.* (2009) reported that hot carcass weight and dressing percentage for Turkish

Merino lambs slaughtered at 41.60 kg live weight were 23.78 kg and 57.17 %, respectively. In the present study, hot carcass weights and dressing percentages of Suffolk and German Mutton Merino lambs slaughtered at higher live weight were lower than findings reported by Ekiz *et al.* (2009) for Turkish Merino lambs. Furthermore, dressing percentage (48.47 %) of German Mutton Merino lambs in this study was lower than finding (49.2%) of Karacabey Merino lambs slaughtered at 39.6 kg live weight (Koyuncu, 2008) and was higher than finding (44.19%) of Turkish Merino lambs slaughtered at 40.58 kg live weight (Yilmaz *et al.*, 2002). Also, dressing percentages of Suffolk and German Mutton Merino lambs in the present study were higher than finding (47.32 %) of Anatolian Merino lambs slaughtered at 33.07 kg live weight (Karabacak *et al.*, 2015). Also, hot carcass percentages of Suffolk and German Mutton Merino lambs in this study were higher than finding (43.77 %) of Afshari lambs slaughtered at 41.63 kg live weight (Lavvaf and Farahvash, 2012). The

differences among literature findings may be due to factors such as genotype, the age of the lambs used in fattening, fattening time, slaughter weight and qualifications of the feed.

### CONCLUSION

The findings of the current study showed that Suffolk lambs tended to have higher hot and chilling carcass weights, although there were no statistical differences between the two genotypes in terms of slaughter weights, average daily weight gains and other slaughter traits. These results also indicate that the carcasses for retail sale from the Suffolk lambs were more in quantity when compared to German Mutton Merino lambs.

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