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In vita performance and slaughter characteristics of Suffolk and Bergamasca lambs at 90 days of age

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ABSTRACT - The objective of the present study was to compare *in vita* performance and carcass characteristics of Bergamasca and Suffolk lambs of 90 days of age. Bergamasca (15) and Suffolk (15) male lambs, originated from single and twin births equally represented, were weighed twice a month. Lambs were slaughtered to evaluate *post-mortem* characteristics and EUROP conformation score. Suffolk and Bergamasca lambs of 90 days of age produced carcasses with good quality; Suffolk had more compact carcasses than Bergamasca lambs whereas they showed higher percentage of intermuscular fat deposit. The results suggested that the two breeds raised with the forage-based feeding system could produce carcasses of good quality.

Key words: Lamb, Suffolk breed, Bergamasca breed, Carcass traits.

Introduction - Recent changes in the new Common Agricultural Policies (CAP), and the general extensification of the agriculture and especially of the livestock leads to a growing interest in meat sheep production. Apennine area is characterized both by an high abundance of disused pastures and by lack of labour, and meat sheep production could represent a good alternative to the classical livestock systems. In such situation, there is the need to verify if the sheep breeds usually raised for meat production are able to provide good results in terms of *in vita* performance and slaughter characteristics. In the framework of a wider study carried out by the "Dipartimento di Scienze Zootecniche" and the "Istituto Zooprofilattico Sperimentale" of Tuscany, the aim of the present study was to compare productive performance and slaughter characteristics of Suffolk and Bergamasca suckling lambs of 90 days of age raised on pastures.

Material and methods - Fifteen Suffolk and 15 Bergamasca lambs were used. The animals were all male born from synchronized ewes. The animals were weighed twice a month starting from the birth up to 90 days of age when they were slaughtered. When the lambs reached 30 days of age they were divided into two groups and positioned in two similar pastures. The lambs were free to graze and they fed mothers' milk and a pelleted feed with cereals flakes (15 % of crude protein); the pellets were given twice a day. Health status of the flocks was controlled regularly. Lambs were slaughtered by captive-bolt stunning and bled. The following data were recorded: live weight, skin weight (fleece included), feet, head, pluck (heart, trachea, lung, gullet, liver and spleen), full gastrointestinal tract, carcass weight after 24 hours at 4°C. Additionally conformation score and fat score according to EUROP grid were evaluated. The right half carcass was split into the following parts: leg, shoulder, belly, sirloin, kidney and perineal fat. Furthermore the leg has been submitted to dissection separating muscles, subcutaneous fat, intermuscular fat, bones and other tissues. All the parts were then weighed following ASPA method (1991).

Statistical analysis were carried out using the GLM procedure of SAS® (2004). The statistical model used for *in vivo* performance included in turns breed, type of birth and the combination 'breed x type of birth' as fixed effects, according to the following linear model: $Y_{ijk} = \mu + F_i + b_i (X_{ijk}) + c_i (X_{ijk})^2 + \varepsilon_{ijk}$ where Y_{ijk} = observation; μ = overall mean; F_i = fixed effect of: breed or type of birth or their combination; X_{ijk} = k age of the j subject belonging to the i level of the fixed effect considered; ε_{ijk} = error term.

The statistical model used for slaughter characteristics included breed and type of birth effects according to the following linear model: $Y_{ijk} = \mu + R_i + P_j + (RP)_{ij} + \varepsilon_{ijk}$ where Y_{ijk} = observation; μ = overall mean; R_i = fixed effect of the breed (Suffolk or Bergamasca); P_j = fixed effect of the type of birth (single or twin); $(RP)_{ij}$ = breed per type of birth interaction; ε_{ijk} = error term.

Results and conclusions - Figure 1 reported the trend of the live weight; the two breeds presented similar growth rate not significantly different. On average the two breeds showed high body weight reaching 40.33 kg and 37.27 kg at 90 days of age for Suffolk and Bergamasca lambs respectively. The live weight was not different between the breeds whereas single birth lambs were significantly heavier than twin birth lambs (Table 1). Overall it seems that the animals presented a good adaptation capacity to the Tuscan pastures. Similar results were related by Prezioso *et al.* (1999) on Appenninica breed reaching 34 kg at 105 days of age whereas Leymaster *et al.* (1999) reported lower values in Suffolk breed with 45 kg of live weight at 210 days of age.

Suffolk lambs showed best conformation and fat score (EUROP) than Bergamasca lambs probably due to the better meat ability of the former breed. Single birth lambs resulted statistically different from twin birth lambs for cold carcass weight, cold carcass yield and conformation score. As regard meat cuts belly was different between the two breeds (5.6 vs. 5.0% in Suffolk and Bergamasca respectively) whereas single birth lambs showed lower percentage of thigh (31.5 vs. 32.8%).

Table 2 reports the results of the leg dissection. Suffolk lambs presented higher percentage of intermuscular fat whereas the situation for the type of birth effect is more complex. In fact single birth lambs presented higher percentage of subcutaneous and intermuscular fat and on the other side twin birth lambs showed higher percentage of bone and other tissues.

Suffolk and Bergamasca lambs of 90 days of age produced carcasses of similar weight and carcass traits. The results suggested that the two breeds raised with the forage-based feeding system could produce carcasses of good quality even if the carcass traits merit further researches. Suffolk lambs seem to have greater potential for growth than Bergamasca lambs in terms of conformation score that might be used as payment index.

Figure 1. Live weight trend for the two breeds.

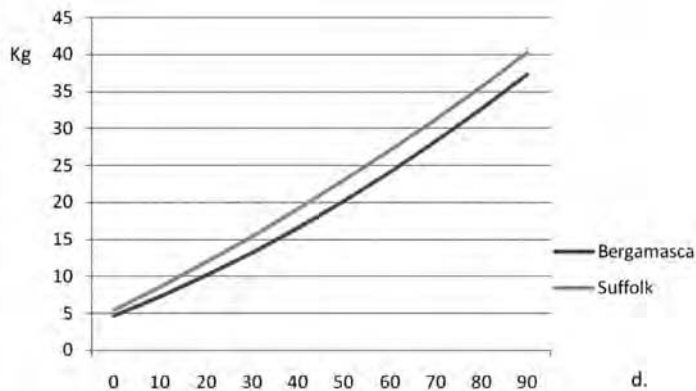


Table 1. Slaughter data.

	Breed		Type of birth		RSD
	Suffolk	Bergamasca	Single	Twin	
Weight, kg	38.4	36.7	41.7 a	33.4 b	5.43
Cold carcass, kg	22.1	20.5	24.2 a	18.4 b	3.27
Cold carcass yield, %	57.3	55.8	58.1 a	55.0 b	2.32
Conformation score (EU)	2.6 a	7.3 b	3.8 a	6.1 b	1.61
Adiposity score (EU)	4.8	5.0	5.0	4.9	0.68
Half carcass, kg	9.2	8.2	10.0 a	7.4 b	3.77
Neck, %	8.3	8.4	8.5	8.3	1.37
Shoulder, %	19.1	19.2	19.2	19.2	1.27
Thigh, %	31.7	32.6	31.5 a	32.8 b	1.13
Sirloin, %	32.8	32.0	32.7	32.1	1.56
Belly, %	5.6 a	5.0 b	5.3	5.3	0.62
Kidney, %	0.8	0.8	0.7	0.9	0.13
Kidney fat, %	1.1	1.0	1.2	0.8	0.49

a, b: p < 0.05. Breed per type of birth interactions were not significant

Table 2. Leg dissection.

	Breed		Type of birth		RSD
	Suffolk	Bergamasca	Single	Twin	
Leg, kg	2.9	2.6	3.1	2.4	1.40
Subcutaneous fat, %	5.1	4.7	6.1 a	3.7 b	1.11
Intermuscular fat, %	3.3 a	2.2 b	3.2 a	2.3 b	0.80
Pelvic fat, %	1.0	1.0	1.0	1.0	0.40
Muscle, %	68.4	68.6	67.9	69.1	2.22
Bone and other tissue, n %	22.1	23.4	21.7 a	23.8 b	1.80

a, b: p < 0.05. Breed per type of birth interactions were not significant

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