A note on the carcass composition of lambs of the Aragonesa breed, and its crosses with prolific and meat breeds

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A note on the carcass composition of lambs of the ARAGONESA breed and its crosses with prolific and meat breeds

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RESUME - ABSTRACT

Carcasses of 28 non castrated lambs of *ARAGONESA* breed and its crosses with prolific breeds *(ROMANOV* and *FINNISH LANDRACE)* and meat breeds *(ILE DE FRANCE* and *FLEISCHSCHAFF)* distributed in two weight groups (15.2 and 13.1 kg.) were evaluated and their left side dissected. At similar carcass weights, total fat percentage in carcasses was lower in *ILE DE FRANCE* as sire breed than in *ARAGONESA* breed and its crosses with prolific breeds. No differences in carcass composition were found between *ARAGONESA* breed and its crosses with prolific breeds when the sire breed used was *FLEISCHSCHAFF.* The fatness score in carcasses *ILE DE FRANCE* was higher as compared with *ARAGONESA* breed and its crosses with prolific breeds.

NOTE SUR LA COMPOSITION DES CARCASSES D'AGNEAUX DE RACE PURE ARAGONESA OU PROVENANT DE CROISEMENTS AVEC DES RACES PROLIFIQUES OU BOUCHERES

On a estimé la qualité et la composition tissulaire (dissection du côté gauche) des carcasses de 28 agneaux non castrés (15,2 ou 13,1 kg) de race *ARAGONAISE* ou issus d'un croisement avec des races prolifiques *(ROMANOV* et *FINNOISE)* ou des races à viande spécialisées *(ILE DE FRANCE* et *FLEISCHSCHAFF).* A poids de carcasse égal les agneaux croisés *ILE DE FRANCE* ont un pourcentage de gras total plus faible que les agneaux *ARAGONAIS* purs ou croisés *ROMANOV* ou *FINNOIS* alors que la note d'état d'engraissement est plus élevée. Lorsque les béliers de croisement sont de race *FLEISCHSCHAFF,* on n'observe pas de différences de composition de la carcasse entre les agneaux de mères *ARAGONAISES* pures ou F1 (races prolifiques × *ARAGONAISE).*

INTRODUCTION

Potential advantages of crossbreeding in the Mediterranean area have been discussed by ESPEJO AND VALLS (1976). Among these, delayed fat development and the improvement of carcass conformation appear to be the most important. These two objectives are met when the sire breed used is of a large mature size of more muscular type than the local dam breed. This is because of the growth and development principles elucitated by HAMMOND (1932).

Studies in the Mediterranean area (SIERRA, 1969;

ESPEJO, VALLS and COLOMER-ROCHER, 1974; ESPEJO and VALLS, 1976) have demonstrated that crossbreeding induces a higher growth rate, better food efficiency and better conformation. However few of these studies include information on carcass composition.

The aim of the study reported was to examine the effect of sire from prolific and meat breeds upon the carcass characteristics and composition of lambs out of Aragonesa ewes.

MATERIALS AND METHOD

Twenty eight non-castrated lamb carcasses of seven genotypes were selected according to carcass weight from the bank of the dissection data from the Department of Animal Production of C.R.I.D.A.-03, which includes the main types of lamb carcasses produced in Spain. Two weight groups were formed. The first group, with an average weight of 15.2±1.44 kg, included four carcasses of each one of the following genotypes:

ARAGONESA pure breed ..... (R.A.)

F_1 *ROMANOV* × R.A. ..... (Ro × R.A.)

F_1 *FINNISH* × R.A. ..... (Fi × R.A.)

ILE DE FRANCE × (Ro × R.A.) ..... IF (Ro × R.A.)

The second group, with an average weight of 13.1± 0.48 kg, included four carcasses of each one of the following genotypes:

FLEISCHSCHAFF × R.A. ..... (F1 × R.A.)

FLEISCHSCHAFF × (Ro × R.A.) ..... F1 (Ro × R.A.)

FLEISCHSCHAFF × (Fi × R.A.) ..... F1 (Fi × R.A.)

After maintaining the carcasses for 24 hours in a cold room at 4° C, they were weighed, and fatness and conformation were visually assessed using 15 point scales. The scoring for fatness ranged from 1 (extremely little fat) to 15 (extremely fat). Scoring for conformation was from 1 (very poor

Table/*Tableau 1*

MEAN VALUES OF CARCASS CHARACTERISTICS AND CONFORMATION FOR THE 15.2 KG WEIGHT GROUP FOR EACH GENOTYPE

CARACTERISTIQUES MOYENNES ET CONFORMATION DES CARCASSES DE 15,2 KG POUR LES DIFFERENTS GENOTYPES

Génotypes	Side Weight (1)	Fatness score (2)	Fat thickness (3)	Conformation score (4)	Side composition % (5)			Fat Partition % (6)			Ratios (7)		
					Muscle	Bone	Total fat	Subcut.	Interm.	KKCF	Muscle: bone	Muscle: tot. fat	Sub. fat: KKCF
R.A.	7.59	6.0^{ab}	5.1	5.2	52.5	19.3	28.2^{a}	12.6	11.5	4.1^{a}	2.7	1.9^{a}	3.4
Ro × R.A.	7.44	5.0^{a}	3.5	6.7	54.1	20.0	25.9^{a}	11.3	10.8	3.8^{a}	2.5	2.1^{a}	3.0
Fi × R.A.	7.67	4.5^{a}	3.1	6.5	55.3	18.9	25.8^{a}	10.0	11.4	4.4^{a}	2.9	2.2^{a}	2.4
I.F. (Ro × R.A.).	7.70	8.0^{b}	3.3	7.0	57.7	21.2	21.1^{b}	9.7	9.0	2.4^{b}	2.7	2.8^{b}	4.2
S.E.	0.39	0.72	0.66	0.55	1.33	0.56	1.17	0.75	0.79	0.45	0.11	0.15	0.47
	N.S.	*	N.S.	N.S.	N.S.	N.S.	**	N.S.	N.S.	*	N.S.	*	N.S.

Means with the same superscript do not differ significantly at $P<0.05$.

N.S. = non significant at $P<0.05$.

* $P<0.05$.

** $P<0.01$.

(1) Poids de la demi-carcasse.

(2) Note d'état d'engraissement.

(3) Epaisseur gras dorsal (mm.)

(4) Note de conformation.

(5) Composition de la demi-carcasse: muscle, os, gras total.

(6) Répartition du gras p. 100 (gras sous-cutané, gras intermusculaire, gras interne KKcf.)

(7) Rapports muscle/os, muscle/gras total, gras sous-cutané/KKCF.

conformation) to 15 (very good conformation). Fat thickness was measured over the m. *longissimus dorsi* at the 12th rib.

The left side of each carcass was jointed using the procedure described by COLOMER-ROCHER, DUMONT and MURILLO (1972). The joints were then dissected into muscle, bone and various fat depots. The fat cleaned muscles, subcutaneous fat, intermuscular fat, pelvic and kidney fat (KKCF) and bones were weighed separately. Trimmings (tendons and aponeurosis, glands, nerves, and blood vessels) were added to the bone weight, as proposed by CUTHBERTSON, HARRINGTON and SMITH (1972). The kidney, testicles, and thymus were not included in carcass weight.

Within each weight group the data were analysed using a completely randomised design. The means were compared by least significant differences.

RESULTS AND DISCUSSION

Means of the main carcass characteristics of the four genotypes analysed in the 15.2 kg weight group are presented in table 1. At similar carcass weight there were siginificant differences in fatness scores. The carcasses of lambs by *ILE DE FRANCE* sires, had higher fatness scores than both the other crossbreds (Ro × R.A.) and (Fi × R.A.), and were of similar fatness to the local breed (R.A.). Fatness scores of *ARAGONESA* breed and its crosses with the prolific breeds *ROMANOV* and *FINNISH LANDRACE* were similar.

Carcasses with *ILE DE FRANCE* as sire breed had, however, lower total fat percentage as compared with the other genotypes studied. This last result could be explained by the larger size of *ILE DE FRANCE* breed. It has been shown that at similar weight, carcasses from animals of large mature weight have less total fat than those from small mature weight animals (BERG and BUTTERFIELD, 1976). Despite the fatness score and total fat percentage results, there were no significant differences in fat thickness and subcutaneous fat percentage between all genotypes analysed. These results show that fatness score does not give sufficient improvement in predicting the amount of subcutaneous fat in the carcass. This suggests, in accordance with KEMPSTER (1980), that fat visual assessment in order to predict total carcass fat could be improved by a combination of visual scoring and fat measurements. This point should be studied in a large scale experiment in our flocks.

No significant differences were found between genotypes in fat thickness and subcutaneous fat percentage. These results are in line with the evidence presented by Starke and JOUBERT (1961), demonstrating a high correlation between fat thickness and subcutaneous fat in sheep.

The KKCF percentage was lower in the I.F. (Ro × R.A.) carcasses than in the other genotypes compared in table 1. The ratio subcutaneous fat: KKCF was not different between them but it was slightly higher in carcasses with ILE DE FRANCE as sire breed. These differences were not statistically significant, probably because of the small number of carcasses analysed. WOOD et al. (1980), in a survey of four pure breeds, reported that the meat sire breeds, *SUFFOLK* and *HAMPSHIRE,* had less internal body fat than the ewe-type breeds, *CLUN* and *COLBRED.* More comprehensive information is now available about this topic from recent Meat Livestock Commission studies, reviewed by KEMPSTER (1980).

Breed performance results demonstrate that *ILE DE FRANCE* has a better conformation than *ROMANOV, FINNISH LANDRACE,* and *ARAGONESA* breeds (ESPEJO, VALLS and COLOMER-ROCHER, 1974; SIMO, 1976). However, carcasses of crosses 50 % *ILE DE FRANCE* only show a slight improvement in conformation, and the differences found by visual assessment as compared with the local breed and its crosses with prolific ones are not significant.

In carcasses from different breeds with similar weight and the same sex, differences in conformation are a consequence of either the level of fatness or the shape of muscles in relation to the underlying bone structure. In this study, the similar conformation scores of, on the one hand, *ARAGONESA* breed and its crosses with prolific breeds, and on the other hand, of those of the 50 % *ILE DE FRANCE* genotype can be explained by the amount of fat: the two-stage cross carcasses have less fat as compared with the other genotypes. Furthermore, the muscle: total fat ratio is higher in this genotype as compared with the others.

The 13.1 kg weight group was analyzed by using the same criteria as in the previous group and the results are presented in table 2. All carcasses compared had *FLEISCHSCHAFF* as terminal breed, and no significant differences were observed between the genotypes studied. This could be due to the fact that carcass characteristics of the local breed (R.A.) are not different from its crosses with *ROMANOV* and *FINISH LANDRACE,* as shown in table 1.

CONCLUSIONS

The terminal cross with *ILE DE FRANCE* as sire breed decreases total carcass fat and KKCF and

increases muscle to fat ratio when compared with *ARAGONESA* pure breed, *ROMANOV×ARAGONESA* and *FINNISH LANDRACE×ARAGONESA* at 15.2 kg carcass weight.

The small number of animals used makes it difficultto conclude about differences between genotypes in visually assessed conformation and fatness.

The terminal crosses of *FLEISCHSCHAFF* with *ARAGONESA* pure breed, *ROMANOV×ARAGONESA* and *FINNISH×ARAGONESA* were similar in conformation, fatness score and carcass composition at 13.1 kg carcass weight.

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Table/*Tableau* 2

MEAN VALUES OF CARCASS CHARACTERISTICS AND CONFORMATION FOR THE 13.1 KG WEIGHT GROUP FOR EACH GENOTYPE

CARACTERISTIQUES MOYENNES ET CONFORMATION DES CARCASSES DE 13,1 KG POUR LES DIFFERENTS GENOTYPES

Genotypes	Side Weight (1)	Fatness score (2)	Fat thick-ness (3)	Confor-mation score (4)	Side composition % (5)			Fat partition % (6)			Ratios (7)		
					Muscle	Bone	Total fat	Subcut.	Interm.	KKCF	Muscle: bone	Muscle: tot. fat	Sub. fat: KKCF
F1×R.A.	6.64	6.0	3.6	7.2	56.0	20.4	23.6	10.6	10.3	2.8	2.8	2.4	3.9
F1 (Ro×R.A.) .	6.63	4.7	2.5	6.2	56.7	20.1	23.1	9.4	10.6	3.1	2.8	2.5	3.1
F1 (Fi×R.A.) ...	6.45	5.5	3.1	7.0	56.5	19.8	23.7	10.1	10.8	2.8	2.9	2.4	3.6
S.E.	0.12	0.46	0.84	0.46	1.07	0.68	1.51	0.67	0.76	0.29	0.09	0.20	0.23
	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.

N.S. = non significant at $P<0.05$.

(1) Poids de la demi-carcasse.

(2) Note d'état d'engraissement.

(3) Epaisseur gras dorsal (mm.).

(4) Note de conformation.

(5) Composition de la demi-carcasse: muscle, os, gras total.

(6) Répartition du gras p. 100 (gras sous-cutané, gras intermusculaire, gras interne KKCF.)

(7) Rapports muscle/os, muscle/gras total, gras sous-cutané/KKCF.

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