Fattening performance and carcass quality of Polish Merino x Romanov crossbred lambs with different proportions of Romanov genotype

Borys B., Mandecka B.

in

Rubino R. (ed.), Morand-Fehr P. (ed.).
Production systems and product quality in sheep and goats

Zaragoza : CIHEAM
Options Méditerranéennes : Série A. Séminaires Méditerranéens; n. 46

2001
pages 71-74

Fattening performance and carcass quality of Polish Merino x Romanov crossbred lambs with different proportions of Romanov genotype

B. Borys* and B. Mandecka**
National Research Institute of Animal Production Cracow,
*Experimental Station Koluda Wielka, 88-160 Janikowo, Poland
**Experimental Station Melno, 86-330 Melno, Poland

SUMMARY – The aim of this work was to establish the influence of different proportions of the Romanov genotype on the fattening results and slaughter performance of crossbreds with Polish Merino. 36 crossbred ram-lambs with 25-75% Romanov genotype were intensively fattened to the 35-40 kg of body weight, and 16 of them were subjected to post-mortem examination of slaughter performance. No statistically significant influence of the proportion of the Romanov genotype on the fattening results and slaughter performance of lambs was observed, while fattening performance (daily gains, fodder consumption, live evaluation of slaughter performance) and carcass fatness were much lower for crossbreds with a high proportion of the Romanov genotype. The investigation has to be repeated using a greater number of animals.

Key words: Lamb, crossbreds, Romanov, Polish Merino, fattening, slaughter value.

RESUME – *"Performances d'engraissement et qualité de la carcasse d'agneaux croisés Mérinos polonais x Romanov ayant différentes proportions du génotype Romanov". L'objectif de cette expérience était de déterminer l'influence de différents pourcentage du sang Romanov sur les résultats d'engraissement et la valeur bouchère d'agneaux croisés avec Mérinos polonais. Les 36 agneaux Romanov x Mérinos polonais avec 25-75% de sang Romanov étaient engraissés intensivement à un poids de 35-40 kg. Les 16 agneaux étaient abattus pour contrôler la valeur bouchère. Les résultats d'engraissement (croissance, consommation) et la valeur bouchère étaient médiocres, indépendamment du pourcentage de participation du génotype de la race Romanov. Les résultats doivent être verifiés sur une bien plus grande population.*

Mots-clés : *Agneaux, croises, Romanov, Mérinos polonais, engraissement, valeur bouchère.*

Introduction

The research was carried out as part of a project evaluating the use Romanov sheep for improving the performance of flock of Polish Merino sheep kept in sheds under average rearing conditions. The research carried out so far both in Poland and abroad (Borys and Osikowski, 1996; Osikowski and Borys, 1996; Young *et al.,* 1996) has shown favourable influence of the Romanov breed on reproductive performance (higher prolificacy, earlier reproductive maturity) and vitality of the lambs, but the crossbreds' slaughter performance was worse, especially during the live evaluation.

The immediate aim of the experiment was to compare the fattening ability and the slaughter value of crossbred lambs Polish Merino with different proportions of the Romanov genotype.

Materials and methods

The fattening performance was estimated on 36 ram-lambs in four genotype groups: (i) RMMM – 25% Romanov (R) + 75% Polish Merino (M); (ii) RBMM – 25% R + 25% Booroola (B) + 50% M; (iii) RRMM – R and M 50% each; and (iv) RRRM – 75% R and 25% M.

The lambs were fattened from the weaning at the age of 3 months until they reached the weight of 35-40 kg. The intensive fattening was carried out according to the standards of the National Research Institute of Animal Production (Osikowski *et al*., 1993) – with all-mush given *ad libitum* and supplemented with hay (70 g per 1 kg all-mush). The lambs were kept in 4 genotype

groups with 3 sub-groups x 3 lambs in each one (1 sub-group = 1 statistical element for traits characterizing consumption per 1 kg gain).

After the fattening had been finished, 16 lambs (4 from each genotype) were slaughtered and partially dissected. The slaughter, the cutting of the carcasses and half-carcasses, and the partial dissection of the right half-carcasses were carried out according to the methods used at the National Research Institute of Animal Production (Nawara *et al.*, 1963). Carcasses conformation and fatness degree were evaluated according to EUROP standards (Anonymous, 1992). The contents of the muscle and fat tissues in the half-carcasses were estimated by means of regression equations elaborated by Osikowski (1977).

The results were analysed statistically using one-factor variance analysis of variance (with significant differences between genotypes estimated by Duncan's test), and the data which did not meet the conditions of the normal parametric system were processed by the chi-square test (Ruszczyc, 1978).

Results and discussion

Although the differences between the groups in respect of the fattening performance turned out to be statistically insignificant, the results indicate that the increasing proportion of the Romanov genotype had an unfavourable effect on the growth rate, fodder consumption and live evaluation of the lambs' slaughter performance (Table 1). While the average birth type of the RMMM lambs was lower than that of the other groups (by 0.4 on the average), the body weights of the lambs were similar at the beginning of fattening. However, fattening performance was the best in the lambs with 25% of the Romanov genotype (RMMM), followed by the groups with 50% of prolific genotypes (RBMM and RRMM), and the group with 75% R. The fattening period of the RMMM lambs was 4 days (7.2%) shorter than for RBMM and RRMM, and 10 days (16.1%) shorter than for RRRM, they had daily 9.4 and 16.7% quicker daily weight gains, and they consumed 21 and 28% less all-mush and nutrients per body weight gain, respectively.

The live evaluation of the lambs' slaughter performance deteriorated with increasing content of the prolific genotype – the proportion of lambs in the best Extra class declined from 56% in the RMMM group to 11% in RRRM (Table 1).

Table 1. Results of fattening

Items	Genotype of lambs							
	RMMM n = 9		RBMM n = 9		RRMM n = 9		RRRM n = 9	
	□	cv %	□	cv %	□	cv %	□	cv %
Average birth type	1.67		2.11		2.00		2.11	
Body weight (kg)								
Start of fattening	21.8	5.3	21.1	10.0	22.0	7.5	21.8	9.4
End of fattening	36.7	1.3	36.4	1.3	36.2	2.0	36.7	1.7
Period of fattening (days)	52	17.6	56	16.7	56	23.9	62	26.4
Daily gain (g)	296	17.5	277	21.3	264	15.4	254	23.6
Consumption per 1 kg gain								
All-mush (kg)	4.2	12.0	5.3	18.0	5.3	7.9	5.8	15.9
NE (MJ)	25.9	11.9	32.9	18.0	32.6	7.9	36.0	15.1
Crude protein (g)	709	11.9	901	17.9	894	7.9	986	15.1
% of lambs in extra class†	56		44		22		11	

†According to standards at sale of live lambs on export (Gruszecki *et al.,* 1995).

Differences in the conformation and fatness of carcasses according to the EU standards were less conspicuous (Table 2). The results obtained with this small material only allow us to conclude that a high proportion of the Romanov genotype is likely to deteriorate conformation and increase

the proportion of carcasses classified as low in fat – the highest proportion of class 0 and II carcasses was observed in the group RRRM.

Table 2. Carcasses classification according to EUROP standards (%)

Criterion/class	Genotype of lambs			
	RMMM n = 4	RBMM n = 4	RRMM n = 4	RRRM n = 4
Conformation: R	50	75	75	25
O	50	25	25	75
Fatness: II	–	–	25	50
IIIL	50	50	75	25
IIIH	50	50	–	25

No statistically confirmed influence of the lambs' genotype on the post-mortem evaluation of slaughter performance was observed (Table 3). However, there is an observable tendency towards lower fatness in the lambs with higher proportion of the prolific breeds, especially with 75% of Romanov (% of fat tissue in the leg and estimated in the half-carcass, as well as the fat layer above the loin "eye" and above the ribs), while the meat tissue content is higher both in the leg and estimated in the whole half-carcass.

Table 3. Slaughter value

Slaughtering items	Genotype of lambs							
	RMMM n = 4		RBMM n = 4		RRMM n = 4		RRRM n = 4	
	□	cv %	□	cv %	□	cv %	□	cv %
Weight of chilled carcass (kg)	16.5	11.0	16.3	5.9	16.5	12.1	15.7	9.9
Dressing (%)	46.7	9.9	47.6	4.8	47.5	8.7	46.4	6.4
Valuable cuts (%)	41.4	3.9	41.5	4.0	42.4	1.3	42.2	2.6
Basic parts of carcass (%)								
Front	40.9	3.0	41.2	2.1	41.2	4.7	40.9	2.9
Middle	26.9	4.8	27.6	1.5	27.4	3.4	26.5	5.3
Hind	32.2	5.9	31.3	1.9	31.5	3.6	32.6	5.3
Leg tissue composition (%)								
Muscular tissue	69.6	3.6	72.4	2.8	71.8	4.5	72.1	2.9
Fat tissue	15.0	25.7	14.4	10.1	13.4	15.0	13.2	10.4
Bone tissue	15.4	10.8	13.2	8.0	14.8	4.5	14.7	12.1
Estimated content in carcass (%)								
Muscular tissue	60.3	7.0	64.1	4.8	63.1	8.2	64.2	3.6
Fat tissue	18.9	17.9	17.4	9.1	18.9	9.6	16.3	11.6
Fat-meat ratio	0.32	23.7	0.27	11.4	0.31	17.4	0.25	11.0
Loin "eye" area (cm^2)	14.0	5.3	13.5	3.6	14.0	6.3	13.3	8.9
Fat thickness (mm)								
Over the loin "eye"	2.4	38.5	1.8	31.7	1.7	35.2	1.6	36.0
Over the ribs	6.6	21.4	5.3	32.2	5.4	41.5	5.4	36.0

More characteristic differences in the variability level (variability coefficients cv %) of the investigated traits depending on the genotype were not observed.

Conclusions

In the research no statistically significant effect of Romanov genotype proportion on the fattening and slaughter performance of Polish Merino crossbred lambs was observed, while the fattening performance (daily gains, fodder consumption, live evaluation of slaughter value) and carcass fatness were much worse in the post-slaughter evaluation of the crossbreds with a high Romanov genotype proportion.

The investigation has to be repeated using a greater number of animals.

References

Anonymous (1992). *Community scale for the classification of carcasses of ovine animals.* Council Regulation No. 2137/92, Official Publications of the European Communities.

Borys, B. and Osikowski, M. (1996). Two-stage commercial crossing of Polish Merino sheep with prolific Booroola and Romanov rams. II. Fattening performance, slaughter value and skin quality in first- and second-stage crosses. *Animal Science Paper and Reports*, 14(1): 45-58.

Gruszecki, T., Knapik, J. and Rant, W. (1995). *Metody oceny jagniat rzeznych. Intensywna produkcja jagniat. Fundacja Pomocy dla Rolnictwa*, Instytut Zootechniki Krakow, pp. 137-151.

Nawara, W., Osikowski, M., Kluz, I. and Modelska, M. (1963). *Wycena trykow na podstawie badania wartosci potomstwa w stacjach oceny trykow Instytutu Zootechniki za rok 1962.* Wyd. Wlasne IZ Krakow, No. 166.

Osikowski, M. (1977). *Badania nad wspolzaleznoscia miedzy pomiarami przyzyciowymi i poubojowymi a wartoscia rzezna jagniat merynosowych.* Instytut Zootechniki, Krakow.

Osikowski, M. and Borys, B. (1996). The use of Prolific sheep into various countries. Eastern Europe. In: *Prolific Sheep,* Fahmy, M.H. (ed.). CAB International, Wallingford, pp. 263-288.

Osikowski, M., Porebska, W. and Korman, K. (1993*).* Normy Zywienia Owiec. In: *Normy Zywienia Bydla i Owiec Systemem Tradycyjnym,* Rys, R. (ed.). Instytut Zootechniki, Krakow, pp. 29-57.

Ruszczyc, Z. (1978). *Metodyka doswiadczen zootechnicznych.* PWRiL Warszawa.

Young, L.D., Fahmy, M.H. and Torres-Hernández, G. (1996). The use of Prolific sheep into various countries. North America. In: *Prolific Sheep,* Fahmy, M.H. (ed.). CAB International, Wallingford, pp. 289-349.