JOURNAL OF AGRICULTURAL SCIENCE IN FINLAND
Maataloustieteellinen Aikakauskirja
Vol. 60: 540—545, 1988

Performance of crossbreds of Polish Merino dams with F_1 rams: Finnsheep × Polish Merino. A. Semi-intensive fattening of ram-lambs up to 40—45 kg

M. OSIKOWSKI, B. BORYS and M. A. OSIKOWSKI

Institute of Zootechnics, Experiment Station Kołuda Wielka
88-160 Janikowo, Poland

Abstract. The investigations were carried out to evaluate fattening ability, carcass quality and wool production of semi-intensively fattened ram lambs — the progeny of F_1 rams: Finnsheep (F) × Polish Merino (PM) mated to PM ewes. Two experiments were performed, on a total of 73 crossbreds and 73 purebred PM lambs. The lambs were housed together in a shed and fed farm-produced roughages, supplemented by commercially available concentrates. The crossbred lambs under semi-intensive feeding were found to have similar fattening ability as the purebreds: daily gains — F × PM × PM 196 g and PM 191 g, energy consumption per 1 kg of body weight gain — 26.1 and 27.0 MJ, respectively. Crossbreeding did not affect slaughter value, but the commercial evaluation of live lambs was poorer in the crossbred groups. The tested crossbreds had generally better wool performance: their clean fleece weight was 1.09 kg, while that of the purebreds was 0.98 kg, rendement respectively 59.3 and 53.0 %, fibre length 6.7 and 5.4 cm, while fibre diameter was similar in the both groups.

Index words: Finnsheep, Polish Merino, crossbreeding, fattening, semi-intensive, carcass quality, prolificacy, slaughter value

Introduction

Studies on two-stage commercial crossbreeding of Polish Merino (PM) using Finnsheep (F) rams showed (6), in the first stage, that F_1 ewes had a much higher prolificacy (by about 50 %), but their wool production was lower than that of purebred PM (by 5.5 % clean yield), and F_1 ram lambs had a lower fattening ability and poorer slaughter value than purebred ram lambs. The positive effect of crossbreeding with F on prolificacy and negative on F_1 ram lambs slaughter value was also found by other authors (1).

Therefore, studies were undertaken on a crossing scheme in which instead of F rams, F_1 F × PM were used in the first stage. It was assumed that the female progeny would have lower prolificacy, but better wool production, and the male progeny better fattening perfor-

mance than the progeny of F rams. Thus using F_1 rams can be more effective than using purebred F rams, especially in large flocks, where at high prolificacy there are problems with lamb rearing.

The immediate objective of the present investigations was to evaluate fattening ability, slaughter value and wool production of ram lambs fed semi-intensively to 45 kg body weight.

Materials and methods

Two experiments were performed, in two replications each. The experimental flock consisted of 73 ram-lambs: progeny of PM dams mated to F_1 rams F × PM. The control group consisted of 73 PM purebreds. The lambs were fed in groups according to the standards of the Institute of Zootechnics for semi-intensive fattening (3); the feed consisted of farm-produced roughage and commercially available concentrates. Feed consumption was recorded every day, and the amount of residues was measured twice a week. The lambs were sheared upon reaching at least 37 kg body weight. Wool samples taken from the side were laboratory analysed for rendement, fibre length and diameter. Slaughter value was evaluated on lambs randomly selected for slaughter (in experiment 1 ten lambs from each group and replication; in experiment 2 eight lambs). The remaining lambs were commercially evaluated live, at the time when they were sold for export. Experimental slaughtering, carcass division and partial dissection of the right half-carcass leg and breast was performed according to the Institute of Zootechnics procedure (2). Muscle and fat tissue content in the half-carcass was estimated using multiple regression equations of Osikowski (5).

Analysis of results was based on means, and significance of differences was estimated by double-factor (breed and replication) variance analysis according to Ruszczyc (7).

Results and discussion

In the first experiment, no significant differences were found in daily gains (DG) and body weight (BW) of the compared genetic groups (table 1). Also nutrient consumption per 1 kg gain (FE) was similar in both groups. In the second experiment the crossbred lambs (F × PM × PM) had better fattening performance: their superiority over purebred PM was 5.5 % in DG and 4.7 % in final BW (both at $P \leqslant 0.05$). FE was lower in the crossbreds; by 6.4 % of energy and 6.1 % of total protein.

In the first experiment, better fattening results were obtained in the first replication; in the second experiment also, but the differences were less pronounced. Considerable differences were only found in FE.

Fattening performance of both crossbreds and purebreds was poorer in the first than in the second experiment; in the latter it was similar to that normally obtained in fattening PM (4). The difference between the experiments and between replications may have been caused by different environmental conditions, which varied with the year of the experiment.

In neither experiment was there any clear difference between the tested groups, as regards their slaughter value (table 2). The only significant difference ($P \leqslant 0.05$) was the superiority of purebreds in the percentage of valuable cuts by 1.1 %. In both experiments the crossbreds tended to have a slightly higher dressing percentage, thicker fat and at the same time greater proportion of muscle tissue in comparison to the purebreds.

More evident differences were found in live evaluation of lambs sold abroad, especially in experiment 2. In experiment 1, although all crossbreds and 95.4 % purebreds were sold, more purebreds were sold as »class extra» (by 6.4 %). The total number of lambs sold in this class from experiment 1 was very small. From experiment 2 the number of purebred lambs sold for export, including those classified as »extra» was high and did not differ from that obtained normally in semi-intensive fattening of PM lambs. The results of the crossbred

Table 1. Results of semi intensive fattening

Experiment	First					Second				
Replication	I + II		I	II	Interaction: breed × replication	I + II		I	II	Interaction: breed × replication
Breed	F × PM × PM	PM × PM	F × PM × PM + PM × PM			F × PM × PM	PM × PM	F × PM × PM + PM × PM		
Number of lambs	37	37	32	42		36	36	36	36	
Body weight (BW) (kg):										
— 2 days after birth	4.9	4.7	5.0	4.7	—	4.3	4.4	4.4	4.2	—
— at the end of fattening	44.0	42.8	44.8	42.4	—	46.7[a]	44.6[a]	46.4	44.9	—
Age at the end of fattening (days)	216	215	204[a]	224[a]	×	205	205	204	205	—
Daily gain (DG) (g)	183	184	198[A]	173[A]	×	109[a]	198[a]	206	201	—
Consumption per 1 kg body weight gain (FE):										
— energy (MJ)	28.9	29.2	26.5	31.6		23.3	24.8	23.0	25.1	
— crude protein (g)	847	859	748	957		634	673	623	684	

aa—$P \leqslant 0.05$
AA—$P \leqslant 0.01$
x—$P \leqslant 0.05$

Table 2. Slaughter value

Experiment	First					Second				
Replication	I + II		I	II	Interaction: breed × replication	I + II		I	II	Interaction: breed × replication
Breed	F × PM × PM	PM × PM	F × PM × PM + PM × PM			F × PM × PM	PM × PM	F × PM × PM + PM × PM		
Number of lambs	20	20	20	20		16	16	16	16	
Body weight before slaughter (kg)	44.3	43.6	44.0	43.8	—	45.8	44.5	45.8	44.4	—
Dressing »cold» (%)	45.5	44.7	45.1	45.1	—	46.4	45.7	45.7	46.5	—
Valuable cuts (%)	44.1	44.7	45.0	43.7	—	43.3[a]	44.4[a]	44.9[A]	42.8[A]	—
Area of the »eye» of loin (cm^2)	13.8	14.2	13.4[a]	14.5[a]	—	16.2	15.8	15.4	16.6	—
Fat thickness over the ribs (mm)	8.1	7.3	8.9[A]	6.4[A]	—	9.5	8.3	10.7[A]	7.2[A]	
Estimated tissue composition of the half carcass (%)										
— muscular tissue	62.9	62.1	63.8[a]	61.2[a]	—	59.7	57.3	58.1	58.9	—
— fat tissue	19.1	19.6	19.3	19.4	—	22.2	22.2	22.8	21.6	—
Classification of lambs sold for slaughter:										
— number of lambs	17	22	17	22		23	24	21	26	
— % of lambs sold for export	100.0	95.4	94.1	100.0		78.3	95.8	71.4	100.0	
— % of lambs sold in extra class	11.8	18.2	11.8	18.2		26.1	58.3	19.0	61.5	

aa—$P \leqslant 0.05$, AA—$P \leqslant 0.01$

group were considerably worse: in percentage of lambs sold — by 17.5 %, and in percentage of lambs classified as »extra» — by 32.2 %.

The reason why the crossbreds had worse results of commercial evaluation of live lambs although their carcass performance did not differ from that of the purebreds, was probably that in the commercial evaluation body conformation is the main factor taken into account, and in this respect some crossbred ram lambs were inferior to the PM — they had flatter trunks and less muscled thigh. On the other hand, many studies have shown (2, 5) that in lambs the correlation between live evaluation and carcass quality parameters is rather low.

Considerable differences were also observed in both slaughter value and live evaluation, between the two experiments as well as between the replications within one experiment. In most cases they were caused by the above mentioned differences in fattening performance, and — in the case of commercial classification — by subjective evaluation.

The investigated crossbreeding scheme had a significant effect on wool production of the lambs (table 3). Although greasy wool production was similar in the both genetic groups, the crossbreds had over 6 % higher rendement ($P \leqslant 0.01$) and thus their clean fleece weight was, in the first experiment 15.4 % (signif.) and in the second experiment, 4.3 % (not signif.) higher than in the purebreds. In both experiments the crossbreds had a greater fibre length (by 27.3 and 18.5 %, respectively $P \leqslant 0.01$), while fibre diameter was similar in both groups.

The significant interaction in rendement and fibre length found in experiment 1 is due to the fact that in the first replication differences between groups were much greater than in the second one (11.7 versus 0.2 respectively in rendement, and 35.7 and 18.5 % in fibre length).

On the whole, the effect of the investigated crossbreeding scheme on wool production

Table 3. Wool production

Experiment	First					Second				
Replication	I+II		I	II	Interaction: breed × replication	I+II		I	II	Interaction: breed × replication
Breed	F×PM×PM	PM×PM	F×PM×PM+PM×PM	F×PM×PM+PM×PM		F×PM×PM	PM×PM	F×PM×PM+PM×PM	F×PM×PM+PM×PM	
Number of lambs	36	36	32	40		36	36	30	42	
Greasy wool[1] (kg)	2.2	2.1	2.2	2.1	××	1.6	1.7	1.5^A	1.7^A	—
Rendement (%)	57.6^A	51.0^A	54.5	55.4	××	61.5^A	55.1^A	58.9	57.9	—
Clean wool[1] (kg)	1.22^a	1.04^a	1.13	1.12	—	0.97	0.93	0.89^a	0.99^a	—
Fibre length[1] (cm)	7.0^A	5.5^A	6.6^A	5.9^A	×	6.2^A	5.4^A	5.6^a	6.1^a	—
Fibre diameter (μm)	23.3	23.3	23.7	22.9	—	23.9	23.2	23.7	23.5	×

aa—$P \leqslant 0.05$, AA—$P \leqslant 0.01$, ×—$P \leqslant 0.05$, ××—$P \leqslant 0.01$

[1] Values adjusted for average growth period: in the first experiment — 198 days, in the second — 182 days.

of semi-intensively fed ram-lambs was positive.

Conclusions

Male progeny of F_1 rams F × PM mated to PM ewes under semi-intensive fattening up to 45 kg body weight, in comparison with purebred PM, had the following characteristics:

1. — similar, and in good environmental conditions even better fattening ability
2. — similar carcass quality (dressing percentage, tissue composition, loin eye area, fat thickness), and a little poorer performance at live commercial evaluation — lower classification results due to flatter trunk and poorer thigh muscle of some the crossbreds
3. — better wool production: higher clean fleece weight and longer fibre but of similar fineness.

References

1. Maijala, K., 1979. Experiences of Finnsheep and its crosses as dams for fat lambs. Symp. Intens. Sheep Prod., Helsinki, 2—9.
2. Nawara, W., Osikowski, M., Kluz, I. & Modelska, M., 1963. Wycena tryków na podstawie badania wartości potomstwa w Stacjach Oceny Tryków Instytutu Zootechniki za rok 1962. Wyd.wł. IZ nr 166. PWRiL Warszawa.
3. Normy żywienia zwierząt gospodarskich 1982. PWRiL Warszawa.
4. Osikowski, M., 1976. Organizacja i technologia produkcji owczarskiej w specjalistycznych gospodarstwach indywidualnych. WOPR Minikowo 1/11.
5. Osikowski, M., 1977. Badania nad współzależnością między pomiarami przyżyciowymi i poubojowymi a wartością rzeźną jagniąt merynosowych. Rozprawa habilitacyjna. Wyd.wł. IZ nr 390.
6. Osikowski, M., Borys, B. & Korman, K., 1981. Dwustopniowe krzyżowanie towarowe owiec merynosowych z trykami ras plennych i mięsnych. Sprawozdanie z realizacji tematu PR-4, 4712.3. IZ Kraków — ZZD Kołuda Wielka.
7. Ruszczyc Z., 1978. Metodyka doświadczeń zootechnicznych PWRiL Warszawa.