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Meat, wool and milk utilization together with comparison of F_1 coming from Finnsheep rams with F_1 coming from other prolific breeds

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Abstract. The effect of crossing of Polish Corriedale (C) sheep with East Friesian, Finnsheep (F), and Polish Heath sheep was analyzed. The utility of F_1 crossbreds coming from C and prolific breed rams (given above) was confirmed. The F_1 crosses of C ewes and F rams were characterized by the best reproductive performance, high level of milk production and the small decrease of wool quality and quantity produced by the ewes, and good carcase quality of ram lambs.

Index words: Finnsheep, Polish Corriedale, East Friesian, Polish Heath, crossbreeding, reproduction, wool production, milk yield, fleece, carcass

Introduction

To increase fat lamb production breeders are forced to use radical methods, from which, crossing with prolific breeds seems to be the most effective. In Poland many authors have evaluated the usefulness of East Friesian (EF) sheep and Finnsheep (F) in commercial crossing (2, 3, 1, 4, 6, 7, 8, 11), taking into account, mainly, reproductive traits and wool productivity of the progeny. Because of that an attempt was made to compare Corriedale type sheep (C) and its F_1 crosses with EF ($C \times EF$), F ($C \times F$) and Polish Heath (Wrzosowka = W), which had not been used before ($C \times W$), according to reproductive traits, milking ability, wool productivity and slaughter value.

Material and methods

The experiments were carried out at the Warsaw Agricultural University Experimental Station in Mianów on the ewes and ram lambs, kept all the time in the barns, rationally fed, according to the norms (10). The reproductive parameters were evaluated on 640 ewes (in the years 1985—1987) at the age of 2—6 years. The following parameters were evaluated: fecundity, prolificacy, number of weaned lambs, and number of lambs weaned per ewe joined to the ram. Differences among the experimental groups were evaluated using χ^2 test.

The *milking parameters* were evaluated on 135 ewes (in the years 1985—1986) at the age of 2, 3 and 4 years, which had 1 or 2 lambs

each, during 12 weeks lactation period. Ewes were mechanically milked once a week after 6 hours secretion of milk and the injection of 5 IU of oxytocine. The following parameters were measured: milk yield, fat, protein, and lactose content using the Milko-Scan apparatus. The influence of the ewe genotype on the milking parameters was tested by an analysis of variance (5), taking into account also following sources of variability: year of experiment, number of lactation, week of lactation, number of suckling lambs and interactions: genotype x year of experiment, genotype x week of lactation, genotype x number of suckling lambs, week of lactation x number of suckling lambs.

The *fleece weight* was evaluated on 175 ewes at the age of 2 years (in the years 1982—1983). The fleece weight and clean wool weight were a basis of the evaluation, but fibre thickness was also measured. According to first 2 parameters the influence of the genotype on them was analyzed by the analysis of variance (5), taking into account (in the model) also a year of experiment and an interaction genotype x year of experiments.

The *slaughter analyses* of fat lambs were made on 82 ram lambs in the years 1985—1987. Animals were slaughtered at 40 kg of live weight and then carcasses were analyzed according to Nawara et al. method (7). To analyze the genotype influence on the slaughter parameters the analysis of variance was made (5), also taking into account year of experiment, type of birth (single, twins etc.) and interactions: genotype x year of experiment, genotype x type of birth year of experiment x type of birth.

According to the milking parameters, fleece weight and slaughter quality, when the genotype influence was found, differences among the experimental groups were evaluated by the Duncan test.

Results

Results of the experiments and the number of animals in every experimental group are in table 1.

According to *reproductive* parameters, high level of fecundity was confirmed. The F_1 crosses with prolific rams were characterized by the highest level of that parameter in comparison to C, but the differences were not significant. The highest prolificacy was observed in the C × F group. The differences were highly significant in comparison with C and C × EF and significant with C × W. The lowest prolificacy was observed in C group. The crosses C × EF and C × W had medium values, and did not differ statistically between themselves. The number of weaned lambs, even though not confirmed statistically, decreased in every F_1 cross group in comparison to C.

The number of weaned lambs per ewe joined to the ram increased in F_1 cross groups in comparison to C. The highest level of that parameter was observed in C × F group.

According to *milking* parameters, the highest milk yield was observed in the C × EF and C × F groups in comparison to other groups, among which C × W group produced the lowest quantity of milk. The analysis of fat content in the milk showed that all differences among the groups were significant and its level from the highest to the lowest was following: C × F, C, C × W and C × EF. The protein content in the milk showed the differences among C × F and C × W groups, rest of the groups differed statistically highly significantly.

The highest fat content was observed in C × F, then C and C × W groups, and the lowest was observed in C × EF group.

There were no differences among the groups according to the lactose content.

The analysis of *wool* productivity showed that the C ewes had the highest fleece weight and the ewes of C × W had the lowest. These groups differed with high statistical significance in comparison to the other groups. The C × EF and C × F crosses did not differ and had medium values of that parameter in

Table 1. Reproduction parameters, milking parameters and wool productivity of C, $F_1C \times EF$, $F_1C \times F$, $F_1C \times W$.

TRAITS		C (A)	$F_1C \times EF$ (B)	$F_1C \times F$ (C)	$F_1C \times W$ (D)
1. Reproductive, n		342	107	90	101
a) fecundity (%)		96	98	99	98
b) prolificacy		126 BCD	145 AC	184 ABd	155 Ac
c) number of weaned lambs (%)		91	86	85	86
d) number of weaned lambs per ewe joined to the ram		110	121	156	131
2. Milking parameters, n		46	42	23	24
a) milk production (ml)	LSM	301 BCD	370 AD	356 AD	269 ABC
	S	6	8	13	11
b) fat content (%)	LSM	6.24 BCD	5.41 ACD	6.57 ABD	5.89 ABC
	S	0.07	0.07	0.14	0.11
c) protein content (%)	LSM	4.29 BCD	4.13 ACD	4.48 ABd	4.40 ABc
	S	0.03	0.04	0.06	0.05
d) lactose content (%)	LSM	5.28	5.43	5.27	5.35
	S	0.07	0.08	0.13	0.11
3. Wool productivity, n		57	44	32	42
a) fleece weight (kg)	LSM	6.49 BCD	4.38 AD	4.26 AD	3.69 ABC
	S	0.40	0.19	0.23	0.24
b) clean wool weight (kg)	LSM	3.73 BCD	2.52 AD	2.32 A	2.17 AB
	S	0.26	0.13	0.15	0.16
c) fibre thickness		58/56's	56/50's	56/50's	50/48's
4. Slaughter quality, n		21	20	20	21
a) age at the slaughter (days)	LSM	196 d	178 D	196 d	221 aBC
	S	8	9	9	8
b) »eye» muscle area (mm^2)	LSM	11.80	12.43 c	11.20 b	11.96
	S	0.41	0.42	0.43	0.39
c) fat thickness over the »eye» muscle	LSM	1.18 BD	0.53 AC	0.97 B	0.78 A
	S	0.11	0.12	0.12	0.11
d) dressing percentage (%)	LSM	41.13 c	41.01 c	42.74 ab	42.18
	S	0.56	0.57	0.53	0.53
e) content of valuable cuts (loin + leg + best end of neck) (%)	LSM	43.02 D	43.06 D	43.43 D	41.19 ABC
	S	0.33	0.33	0.48	0.35

A,...,D — $P<0.01$
a,...,d — $P<0.05$
LSM — Least Square Mean
S — Standard deviation

comparison to the best and to the worst group. The highest level of clean wool weight, in comparison to other groups, was observed in C group. Also the $C \times EF$ and $C \times W$ differed significantly. The lowest fibre thickness was observed in C group and the highest thickness

in C×W group. The other groups did not differ.

The *slaughter* analysis showed that the C×W group needed the longest period to achieve the slaughter weight in comparison to other groups. The »eye» muscle area of the C×EF group was significantly higher only in comparison to C×W crosses. The lowest fat thickness of the »eye» muscle was observed in C×EF in comparison to C×F and C groups and the highest in C group in comparison to C×EF and C×W. The highest dressing percentage was observed in C×F group in comparison to C and C×EF groups. The lowest content of the valuable cuts was observed in C×W group in comparison to other groups, which did not differ among themselves.

Conclusion

The crossing of the C-type ewes with prolific breeds rams influenced:

- an increase in the level of prolificacy and a number of weaned lambs per ewe joined to the ram. The highest level was observed in F_1 group descended from F rams,
- higher milk production during the lactation period in C×EF and C×F groups and lower in C×W group in comparison to C (control group). The C×F group was characterized by the highest concentration of milk ingredients in comparison to other groups;
- decrease of wool quantity and increase of fibre thickness in crosses among which extreme values of those parameters were observed in C×W group;
- increase in the fattening period and decrease in the content of valuable cuts in the carcase in the C×W group; The best fleshed and the lowest fatness of loin was observed in C×EF group. The highest dressing percentage was observed in C×F group.

According to these experiments, the usefulness of 2-breed crosses of C ewes with prolific breeds rams, to produce fat lambs, was confirmed.

Among all experimental groups C×F group was characterized by the best reproductive parameters, high level of milk production and a small decrease of quality and quantity of produced wool, and also a good quality of produced carcases.

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