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# PRELIMINARY RESULTS ON FERTILITY, PROLIFICACY, LAMB PRODUCTION AND CARCASS TRAITS OF ROMANOV SHEEP IN CANADA

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### SUMMARY

Performance of 14 ewes imported from France and their progeny born in Canada over a period of five years are reported. Least-squares means for fertility were 100% for ewes mated in the fall and winter and 42% for those mated in the summer (May - June). Litter size at birth ( $2.86 \pm .15$ ) and at weaning ( $2.10 \pm .15$ ) were significantly affected by season of mating and parity. The most prolific matings were those of the fall (3.18) and of ewes in their 5th parity (3.54). On the average .52 (18.2%) lambs died at birth and a further .25 (8.7%) before weaning. In all, 27% of the lambs born died before weaning. Mortality was particularly high in the first year (40%). Litter weight averaged 7.1 kg at birth total, 6.0 kg alive and 39.0 kg weaned. Romanov carcasses dressed between 43 and 46%; they were slightly shorter and less developed in the hind quarters than the Suffolk carcasses. Significant differences were found between castrated and non-castrated Romanov lambs, particularly in traits related to fat deposition and area of loin-eye muscle. The results showed that the Romanovs adapted well to the Canadian conditions.

**Key Words:** Romanov sheep, Reproductive performance, Carcass traits.

### INTRODUCTION

The Romanov is the second prolific breed to be imported into Canada, the first being the Finnsheep imported in the late sixties. The purpose of both importations has been to improve lamb production from the local breeds by crossbreeding. The objective of this paper is to report on the performance of the pure Romanov sheep during the first five years of their existence in Canada.

### MATERIAL AND METHODS

In October 1980, fourteen ewes and five Romanov rams were imported from France. After their release from quarantine, the sheep were transferred to the Lennoxville Research Station. The animals were kept during the first year continuously indoors in pens of different sizes. In later years they were allowed to exercise outdoors in an adjacent paddock during sunny days. The herd was fed a diet consisting of good quality hay given ad libitum, supplemented with a commercial grain mixture. The ewes were given 500 g of the mixture; this quantity was increased to up to  $1-1\frac{1}{2}$  kg before lambing and during lactation depending on the number of lambs suckling. After weaning, ewe lambs were fed 250 g of the grain mixture, which was increased gradually to 500 g reached half-way through pregnancy.

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Most of the ewe lambs were mated when they reached between 7 and 8 months of age, only a few were mated at 9 to 10 months. The herd was subjected to an accelerated lambing system of 3 lambings every two years. The mating seasons were fall: (September - October), winter (January - February) and spring (May - June). Lambs born in January through March were exposed for the first time in the following fall, those born in October through December were exposed for the first time in the summer season (because many of these matings were not successful the animals were rebred in the following fall season), and finally the lambs born in May - June were bred for the first time in the winter season. At lambing, the lambs were identified and weighed. They were kept the first day with their dams to feed on the colostrum. The number of lambs left to suckle the dam depended on her milking ability, usually up to 3 lambs. The extra lambs in quadruplet and quintuplet litters were fed artificially on milk substitutes. Occasionally lambs were adopted by ewes which had lost their lambs. In few cases, dams with superior milking ability raised their entire litters of 4 or 5 lambs. In such cases half the lambs were kept with the dam during the day while the other half was separated and bottle fed. During the night the two groups changed positions. In the present study dams were credited with all their lambs whether they actually raised them or not.

The traits related to reproduction reported in the present study were: fertility, i.e. whether a ewe exposed to a ram produced a litter or not, prolificacy, expressed as litter size at birth (total and alive) and at weaning, litter weight at birth (total and alive) and at weaning, proportion of lambs which died at birth and before weaning and percentage total preweaning lamb mortality.

To study carcass quality, two groups of male lambs were fed from weaning until slaughter at 42-45 kg liveweight, a ration based on grain mixture and hay offered free choice. In the first study, 18 lambs were left intact whereas in the second, 6 lambs were castrated soon after weaning and 6 others were left intact. The carcasses were cut and dissected according to the routine procedure described in details by Fahmy (1979). To compare the Romanov carcass with carcasses of a standard breed, carcass evaluation of 6 Suffolk lambs from a different study but subjected to the same feeding management and dissection procedures were included.

The data on reproduction were analyzed by the least squares method of fitting constants using SAS procedures. The model used included the effects of birth type and season of birth of the dam, year of record, season of mating and parity. The model used to analyse carcass traits included the effect of castration.

## RESULTS AND DISCUSSION

### Fertility.

Of the 309 matings, 81.6% were fertile (Table 1). For no apparent reason, ewes born as triplets had lower fertility rates ( $P < 0.05$ ) than ewes born in smaller or larger litters. Season of mating was the most important factor affecting fertility. Only 42.5% of the ewes exposed during the summer conceived compared to 100% of the ewes exposed in the fall and winter. On the other hand, year of mating, season of birth or age of the ewe had little effect on fertility.

Fertility of the Romanov breed in France was reported by Tchamitchian et al. (1973) for ewes and yearlings mated in the summer and the fall. All yearlings mated in the fall conceived whereas the percentage was only 3.3% for those mated in the summer. In the following fall mating season 86.2% of the ewes conceived. The performance of the ewes was similar to that of the yearlings; i.e. summer matings were mostly infertile. However in Spain, Gabina and Vallz Ortiz (1984) found no difference in fertility between summer (80%) and fall - winter (83%) matings. The high fertility rate of Romanov ewes in the normal breeding season was also reported by Ricordeau et al. (1976) at 96%.

### Prolificacy.

Average litter size at birth was  $2.86 \pm .15$  lambs. Ewes born in large litters produced larger litters ( $P < 0.05$ ) than those born single. This difference disappeared however, at weaning as a result of higher lamb mortality rates in larger litters. Season of birth of the ewe had little effect on litter size, whereas season of mating was highly significant. The largest litters at birth were those born following winter or fall matings, and at weaning were those following fall matings. Litter size at birth increased progressively with advance in parity, the largest litters being born to ewes in their 5<sup>th</sup> parity (3.54). Litter size at weaning was also highest in litters of ewes in their 5<sup>th</sup> parity (2.64) despite the higher preweaning lamb mortality (36.8%), of ewes in this category.

Table 1  
Reproductive performance of Romanov ewes according to season of mating and parity.

	Fertility		No.	Litter size		Litter weight (kg)		Lamb mortality		Total		
	No.	Mean		Birth	Weaning	Birth	Weaning	at birth	before weaning			
±	309	81.6	249	2.86	2.38	2.10	7.08	5.98	39.0	.52	.25	26.7
SEM		5.4		.15	.15	.15	.32	.36	2.2	.11	.05	
<u>Season of mating</u>												
W	65	101.5	61	2.92	2.26	1.94	6.66	5.28	36.1	.66	.31	36.3
S	76	42.5	34	2.50	2.10	1.86	6.59	5.77	35.5	.40	.24	26.4
F	168	100.7	154	3.18	2.68	2.50	7.99	6.90	45.3	.49	.19	22.5
<u>Parity</u>												
1st			122	2.07	1.79	1.65	4.50	4.12	29.8	.28	.14	21.3
2nd			46	2.69	2.26	2.10	6.48	5.65	42.2	.43	.16	23.1
3rd			38	2.92	2.47	2.20	7.45	6.43	41.2	.45	.27	26.3
4th			22	2.89	2.42	2.10	7.49	6.44	38.3	.47	.32	29.5
5th			13	3.54	2.64	2.34	8.25	6.15	43.1	.90	.30	36.8
6th			8	3.07	2.49	2.21	8.32	7.12	39.2	.58	.28	30.4

W = Jan. - Feb., S = May - June and F = Sept. - Oct.

Overall, slightly more than half of a lamb (18.2%) was either born dead or died shortly after birth. Mortality at birth was positively associated with litter size at birth, the highest rates occurred in large litters. Of the average 2.38 lambs born alive, 2.10 lambs were weaned indicating that a further 8.7% ( $100 \times .25/2.86$ ) of the lambs died before 70 days of age. Mortality at

birth in the present study is much higher than those reported in France (10.9% by Bosc and Cornu, 1976 and 4.2% by Ricordeau et al., 1977). Part of the reason for the high mortality in Canada may be lack of exercise in the first year (40%), lamb mortality decreased drastically when the ewes were allowed to exercise outdoors.

Desvignes (1971) reviewed the Russian literature on prolificacy of Romanovs in USSR and showed that the estimates range from 1.84 to 3.20 lambs. In some studies in USSR, lamb mortality reached 40 to 50%. On the other hand, Selianine (1957) reported a mortality rate of only 4.7%. Prolificacy of Romanovs in France was reported at 2.86 (Bosc and Cornu, 1976) and 2.62 lambs with preweaning mortality rate of 10.3% (Ricordeau et al. 1978). Adult Romanov ewes kept in open-air system with fall matings in France gave on the average 3.06 lambs of which 17% died before weaning. (Marin and Peyraud 1975). Reporting on Romanov performance in Spain, Gabina and Valls Ortiz (1984) estimated prolificacy of yearlings at 2.6 lambs of which 11% died at birth and 31% died from 1 to 150 days of age.

#### Litter and average lamb weights.

Average litter weight at birth was 7.1 kg total and 6.0 kg alive (Table 1). Lamb weight at birth averaged 2.47 kg. Lambs born alive were slightly heavier than those which died (2.51 vs 2.11 kg) indicating that the weaker lambs are those more likely to die at birth or soon after. At weaning, the average litter weight was 39.0 kg and weight of individual lambs averaged 18 kg. Litters born as a result of fall matings were the heaviest at birth and at weaning ( $P < 0.01$ ) and those born to older ewes were heavier than those born to younger ones ( $P < 0.01$ ).

Kovnerev (1963) cited by Desvignes (1971) reported an average weight at birth of 2.36 for male and 2.24 for female Romanov lambs in USSR. Kovnerev et al. (1967) showed that season of mating had an effect on weight of lambs at birth and at weaning, the weights being heavier (2.76 and 18.4 kg) following matings in April - May than those following matings in August - September (2.24 and 15.3 kg respectively).

#### Carcass evaluation.

Carcass characteristics of 30 Romanov male lambs slaughtered at 41 to 43 kg liveweight are presented in table 2. For comparisons with a standard meat breed, carcass evaluation of 6 Suffolk lambs (3 ♂ and 3 ♀) fed a similar ration to that fed to the Romanovs and slaughtered at  $41.9 \pm .83$  kg liveweight is also presented in table 2. Romanov carcasses were generally shorter, fatter and had less lean tissues than those of the Suffolk. A higher percentage of fat (3.1 to 5.6%) accumulated around the kidneys, a characteristic mostly noticed in other prolific breeds such as the Finnish Landrace.

Romanov carcasses are characterized by relatively higher proportions of the anterior parts as compared to improved mutton breeds. This observation was also reported by Theriez and Tissier (1975) in France. Of all the characteristics reported by Theriez and Tissier (1975), only percentage of leg (32.2%) and percentage of kidney fat (2.18%) are common in the two studies.

Dressing percentages in the present studies averaged 42.8 and 45.7% in the two non-castrated groups and 44.7% in the castrated group which compare fairly

well with the 45.7% calculated for the Suffolk group. Dressing percentages for Romanovs in Russia ranged between 42 to 49% for lambs slaughtered at 7 to 8 months of age (Zamorychev, 1963 and Iadrilev and Stepanova, 1965). Selianine and Koulikov (1964) working on lambs slaughtered at 5 to 6 months of age reported dressing percentage of 39.8% which is much lower than the present estimates for lambs of similar age.

Table 2.  
Carcass characteristics of Romanov and Suffolk lambs.

	STUDY # 1		STUDY # 2			STUDY # 3	
	Non castrated		Non castrated	Castrated	Error Mean Squares	Suffolk	
	Mean	S.E.M.	Mean	Mean		Mean	S.E.M.
Number	18		6	6		6	
Chilled carcass wt (kg)	18.07	.27	19.5	18.55	0.86	19.2	0.44
Carcass length (cm)	64.7	.44	65.2	63.8	2.07	68.8	0.36
Heart girth (cm)	70.2	.52	73.1	71.4	5.54	71.8	0.69
Leg circumference (cm)	37.2	.27	38.3	37.3	1.87	39.3	1.08
Dressing percentage	42.8	.38	45.7	44.7	1.59	45.7	0.91
% leg	33.0	.51	32.3	33.3	2.19	34.9	0.49
% loin-rack	28.6	.41	29.1	31.3	1.73	27.8	0.47
% shoulder	38.4	.25	39.0 <sup>a</sup>	35.0 <sup>b</sup>	1.08	36.6	0.51
% kidney fat	3.0	.11	3.6 <sup>a</sup>	5.0 <sup>b</sup>	0.49	1.8	0.10
Area of loin-eye (cm <sup>2</sup> )	12.0	.26	12.2 <sup>a</sup>	11.0 <sup>b</sup>	0.80	14.0	0.95
Color of loin-eye	7.8	.17	7.5	7.0	2.15	9.0	0.45
Fat depth over loin-eye (mm)	3.1	.21	3.9 <sup>a</sup>	5.6 <sup>b</sup>	1.18	4.7	0.49
12th rib { % lean	41.3	.67	44.3 <sup>a</sup>	38.5 <sup>b</sup>	3.96	46.5	1.96
% fat	36.8	.67	34.4 <sup>a</sup>	43.3 <sup>b</sup>	5.41	32.1	2.67
% bone	17.5	.38	17.5 <sup>a</sup>	14.4 <sup>b</sup>	1.65	21.9	0.90

a - b : significantly different

In the present study, many significant differences were found between castrated and non-castrated lambs, especially in traits related to fat deposition. The castrated lambs were generally fatter, with smaller area of loin-eye muscle and smaller proportion of shoulder. In three Russian studies cited by Desvignes (1971), no differences were observed between non-castrated, castrated or vasectomised lambs.

#### CONCLUSION

It can be concluded from these preliminary results that the performance of the Romanov breed in Canada is comparable to its performance in its country of origin and in other countries where it was imported, indicating that it adapted well to Canadian conditions.

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