EFFECTS OF BREED AND MANAGEMENT SYSTEM ON LAMB PRODUCTION OF EWES

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ABSTRACT

Productivity data were collected on flocks of ¼ Romanov ¾ Rahmani (R. VR) and ¼ Finn ¾ Rahmani (R. FR) ewes kept under farmer conditions for a period of 4 years. Meanwhile, date was collected over the same period on R.VR ewes raised in state farm to investigate the effect of difference in management systems (farmer vs. state farm systems) on crossbred ewes performance.

Quarter Romanov ewes gave birth to 0.12 more lambs (P< 0.05), had 0.19 more lambs alive at 4 months of age (P< 0.01), and had 3.11kg more total lamb weight at 4 months of age than R. FR ewes.

Reproduction records obtained on farmer flocks had quite favourable performance compared with those obtained on state farms.

Keywords: Finnsheep, Romanov, crossbreeding, prolificacy traits , lambing interval.

INTRODUCTION

A crossbreeding programme with Romanov and Finnsheep was carried out, on an experimental basis, by the Ministry of Agriculture to improve prolificacy in local breeds. For justification of sheep production towards planning for breeding strategies it is necessary to evaluate crosses under farmers managerial and environmental conditions. At the same time, comparing exotic breeds and their crosses with local breeds were preliminary carried out at the farm level to determine which best fit the producers needs.

In Egypt, more than 90% of livestock are raised under small- holder production system. Thus, it seems imperative that any substantial national improvement in livestock will have to come from the small- holder, at least in the short and medium terms (Galal *et al.,* 1996)

The ¼ temperate ¾ local grade seems to be suitable for the prevailing subtropical conditions. They have better marketability in local market and can be easily propagated in large-scale development programmes. Therefore, the objective of this study is to compare lamb production of ¼ Romanov ¾ Rahmani and ¼ Finn ¾ Rahmani ewes raised under small holder production system. Lambing interval of each genotype was also compared. The effect of management system on the crossbred performance was estimated.

MATERIALS AND METHODS

Sample: A total of 880 farmers were picked at random in four villages in Sharqia Governorate, east of the Nile Delta. Out of those farmers, 98% had 4

ha or less. All farmers had access to areas of irrigated lands in an integrated cropping system with livestock as a supplementary enterprise. The average number of small ruminants (SR) per farmer was 3.4 heads, where 42% of all farmers had less than five heads of SR while 33% had no SR. Out of the total number of farmers surveyed, 77 small holders were chosen.

Animals: A total of 62 ewes of the genotype ¼ Romanov ¾ Rahmani (R.VR) and 191 ewes of the genotype ¼ Finnsheep ¾ Rahmani (R.FR) were sold to farmers. Eighteen farmers had R.VR ewes and 59 farmers had R.FR ewes. Analysis of the data included both ewes distributed plus those produced on the farm. Regular field visits were conducted biweekly to collect data for a period of 4 years (1994 to 1997). Data was collected over the same period from 330 R.VR ewes raised on state farms to be included in the analysis.

System of production and management of animals

Small-holder: The average land area per participating farmer (rented or owned) was 1.12 ha beside an average of five to six small ruminants and one or two large ruminants (cattle and buffaloes).

Rams ran with the ewes all year round while lambing were more frequent within February-March and November-December from both genotypes.

Ewes were served by rams of the same genotype. Culling ewes was practised irrespective of age where it was commonly either for need for cash, unsatisfactory production, health reasons or to avoid anticipated losses due to prevailing diseases.

Sheep were fed on berseem during winter and berseem hay, concentrate and wheat straw in summer. They also grazed stubble and scavenged around village dwellings during the whole year.

State farm: Ewes were first exposed to rams at an average age of 18 months. They were managed in an accelerated lambing scheme. They were exposed to rams for approximately 40 days in January, May and September and therefore lambed in May, October and February.

Sheep were fed according to a local feeding standards assigned by APRI, MOA which represent 85% of the NRC allowances (MOA, 1968). All lambs suckled naturally until weaning at two months of age.

Statistical analysis: The CLM procedure of SAS (1987) was used to perform all analysis. Ewes prolificacy traits included in the analysis were: litter size at birth, LB, litter size at 4 months of age, L4W and litter weight at four months post lambing / ewe lambed (K4 M). The mathematical model for all analysis, with appropriate degrees of freedom is shown in table 2.

Age of ewe was that at the beginning of the lambing season to the nearest whole year where five age categories were developed, being 2, 3, 4, 5 and = 6≥ 6 –yr. A similar model was used to analyze lambing interval (LI) except that year effect was not included in it. Another analysis was conducted for R.VR ewes raised in State farm in which breed of ewe was not included in the model.

RESULTS AND DISCUSSION

Least squares means and standard errors of LB, L4W and K4M are presented in table (1). Results of the analysis of variance for the same traits are presented in table (2).

Table (1): Least squares means (M) and standard error (S.E.) for ewes prolificacy traits.

Factor	LB	L4W	K_4M
	M ± S.E	M ± S.E	M ± S.E
Breed of ewe			
R. FR	1.36 ± .02[b]	1.13 ± .02 [b]	20.75 ± .6 [a]
R. VR	1.48 ± .05[a]	1.32 ± .06 [a]	23.86 ± 1.6 [a]
Lambing season			
Dec. - Feb.			
Mar. - May	1.34 ± .04 [a]	1.20 ± .04 [a]	24.54 ± 1.2 [a]
June - Aug.	1.50 ± .03 [a]	1.32 ± .04 [a]	24.91 ± 1.1 [a]
Sep. - Nov.	1.37 ± .05 [a]	1.16 ± .06 [a]	18.78 ± 1.6 [b]
	1.47 ± .04 [a]	1.21 ± .05 [a]	20.99 ± 1.4 [a]
Year of lambing			
94			
95	1.27 ± .04[c]	1.10 ± .04 [b]	23.05 ± 1.2 [a]
96	1.38 ± .04 [b]	1.21 ± .05 [b]	24.13 ± 1.3 [a]
97	1.43 ± .04 [b]	1.18 ± .04 [b]	22.34 ± 1.2 [a]
	1.59 ± .05 [a]	1.40 ± .05 [a]	19.71 ± 1.5 [a]
Ewe age			
2	1.27 ± .04 [b]	1.12 ± .04 [b]	17.74 ± 1.2 [b]
3	1.35 ± .04 [b]	1.17 ± .04 [b]	22.09 ± 1.2 [a]
4	1.48 ± .05 [a]	1.25 ± .05 [a b]	23.56 ± 1.4 [a]
5	1.54 ± .05 [a]	1.35 ± .05 [a]	24.59 ± 1.5 [a]
≥=6	1.46 ± .06 [a b]	1.22 ± .07 [a b]	23.54 ± 1.8 [a]

LB= litter size at birth; L4W= litter size at 4 months of age and K4M= litter weight at 4 months of age.
Means within traits with the same letter are not significantly different.

The least squares means of LB, L4W and K4M were estimated as 1.36 *vs*. 1.48 lambs, 1.13 *vs*.. 1.32 lambs and 20.75 *vs*. 23.86 Kg in R. FR and R.VR, respectively. The present estimates are higher than those reported for local sheep by Metawi and Shehata (1994) being 1.23 lambs, 1.03 lambs and 21.4 Kg, respectively, under the same production system.

Quarter Romanov ewes gave birth to 0.12 more lambs ($P< 0.05$), had 0.19 more lambs alive at 4 months of age ($P< 0.01$), than R.FR ewes. Meanwhile, an insignificant increase was recorded for the total lamb weight at 4 months of age (3.11 Kg more only) a matter due to that the lighter weights of twin lambs commonly start to be compensated at later ages than that involved in this study. . The superior prolificacy of Romanov vs. Finnsheep crosses is in agreement with the findings of other studies. In Spain, Valls Ortiz *et al.* (1976) cited by Jackubec,1977, reported ovulation rates of 1.73 and 1.6 for Romanov x Rasa Aragonesa and Finnish Landrace x Rasa Aragonesa

crossbred ewes, respectively. Vesely and Swierstra (1986) reported that Romanov additive genetic effects on ovulation rate and litter size were higher than those of Finnish Landrace. Superior litter sizes have also been reported for Romanov vs. Finnish Landrace crosses with mutt~~ati~~on Merino (Jakubec, 1977) and with DLS (Fahmy, 1990). Gallivan *et al.* (1993) found that Romanov x Targhee crossbred ewes gave birth to 0.42 more lambs per ewe lambing (P< 0.01) and had 0.39 more lambs alive at weaning per ewe lambing (P< 0.01) when compared with Finnish Landrace x Targhee crossbred ewes. They referred the superior prolificacy for an increase in triplet births. Fahmy (1990) reported similar survival rates for offspring of Romanov and Finnish Landrace crosses, with and without adjustment for litter size, with DLS breed and Galliven *et al.,* (1993) on their crosses with Targhee breed. However, Gabina and Valls Ortiz (1985) concluded that Romanov x Rosa Aragonesa crossbred ewes were superior to Finnish Landrace x Rasa Aragonesa ewes by 5 to 15% for all reproductive traits measured.

Lambing seasons had significant effect on K4M, while had insignificant effect on LB and LW traits, reflecting that seasonal differences were clearer in traits related to growth rate. There was a trend toward having lower K4M for ewes lambed in summer than other seasons. Such trend may be due to the lack of green fodder during summer season.

Ewe age significantly affected all prolificacy traits studied. Litter size increased with increasing ewe age at lambing. Litter size was at lowest level for 2 years old ewes and at the highest level for ewes aged 5 years.

Non-significant effect of all interactions on all prolificacy traits are found in the present study (Table 2). The non-significant interaction between ewe breed and lambing season indicates the similarity of the two genotypes to withstand the variation among seasons.

Lambing interval was similar for the R. FR and R. VR ewes (9.68 vs. 9.63 months; Table 3).

Table (2) : Analysis of variance of ewe prolificacy traits

Source	d.f.	Mean squares for		
		LB	L4W	K4M
Breed of ewe (B)	1	1.11*	2.71**	364.9
Ewe age	4	1.54**	0.95*	1091.4**
Year of lambing (yr)	3	2.54**	1.49**	452.1
Lambing season (B)	3	0.48	0.59	619.9*
B X S	3	0.18	0.26	153.5
yr X S	9	0.38	0.30	318.0
Residual	661	0.22	0.30	189.6

LB= litter size at birth; L4W= litter size at 4 months of age and K4M= litter weight at 4 months of age.

*** P < 0.05 ** P < 0.01**

Season, in which the pervious lambing occurred, had a significant effect on lambing intervals. The findings of the present study (Table 3 and 5) show that longer intervals resulted when the previous lambing occurred in winter, while those lambed in summer recorded the shortest. These results are in harmony with the seasonal variation recorded previously on oestrous activity.

Table (3).: Least squares means (M) and standard errors (S.E.) for lambing interval, mo

Factor	M ± S. E.
Breed of ewe	
R. FR	9.68 ± 0.18 [a]
R. VR	9.63 ± 0.49 [a]
Previous lambing season	
Dec. - Feb.	10.45 ± 0.37 [a]
Mar. - May	9.87 ± 0.34 [ab]
June - Aug.	8.81 ± 0.42 [c]
Sep. - Nov.	9.49 ± 0.45 [bc]
Age of ewe	
2	10.01 ± 0.39 [a]
3	10.05 ± 0.34 [a]
4	9.84 ± 0.43 [a]
5	9.49 ± 0.44 [ab]
>6	8.88 ± 0.55 [b]

Means with the same letter are not significantly different.

Table (4): Reproductive performance of ¼ Romanov crossbred ewes under State farm and farmer flocks

Production system	LI	LB	L2W	K2W
State farm	300.3±5.8	1.40±.03	1.19±.04	15.31±0.53
Farmer flock	288.9±14.7	1.48±.03	1.29±.05	17.63±1.32

LI = Lambing interval; LB= litter size at birth; L2W= litter size at 2 months of age and K2W = litter weight at 2 months of age.

Aboul Ela and Chemineau (1989) concluded that most sub-tropical sheep breeds and their crosses with temperate breeds normally show a decline in their oestrous activity in spring months. Therefore, ewes lambing in winter have a postpartum period that coincides with the period with lowest oestrous activity in spring resulting in the longest lambing interval. On the other hand, ewes lambing in summer season will be ready for breeding in autumn, a season shown to be the highest in ewe fertility.

Table 5: Least squares means of lambing intervals of ¼Romanov ewes raised in state farm, by previous lambing seasons

Previous Lambing Season		
January	**May**	**September**
327 ± 7.0	278.6 ± 8.11	295.2 ± 8.5

Reproductive performance identified for farmer flocks is quite comparable with those obtained for State farm (Table 4).

Lambing interval, under free mating system applied with farmers flocks, was 11 days shorter than that under the controlled mating system applied in state farms.

CONCLUSION

Quarter Romanov gave higher litter size than quarter Finsheep which could give it better priority in the process of improving local sheep production. Quarter Romanov sheep also kept the same production performance recorded in the research farms when distributed to farmers.

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تأثير سلالة النعجة ونظام الرعاية على الكفاءة الإنتاجية للنعاج

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أجريت هذه الدراسة لتقييم أداء خلطان 4/1 رومانوف 4/3 رحمان و 4/1 فنلندى 4/3 رحمانى تحت ظروف صغار المربين بمحافظة الشرقية.

وكان عدد الأغنام المستخدمة فى الدراسة 62 نعجة 4/1 رومانوف و 191 نعجة 4/1 فنلندى تم متابعة أداؤهم لمدة 4 سنوات لدى المربين. وذلك بالإضافة لعدد 330 نعجة 4/1 رومانوف اخرى مربأة بالمحطات البحثية تم المقارنة معها لمقارنة نظامى التربية.

أظهرت نعاج 4/1 رومانوف تفوق معنوى عن نعاج 4/1 فنلندى وتمثل ذلك فى زيادة عدد الحملان المولودة لكل نعجة والدة بمقدار 0.12 حمل وعدد الحملان عند 4 شهور بمقدار 0.19 حمل. بينما كانت الزيادة فى وزن الحملان عند أربعة أشهر من العمر غير معنوية وقد أرجع ذلك لأن معظم التعويض فى نقص الوزن للحملان المولودة توأم يتم فى مراحل متأخرة عن العمر الذى شملته هذه الدراسة.

وقد اظهرت النتائج أن أداء النعاج 4/1 رومانوف لم ينخفض تحت ظروف المربين مقارنة بالمزارع البحثية، مما يدعم التوصية بحث المربين على التهجين بهذه السلالة لتحقيق التحسين السريع فى زيادة كفائة إنتاج الأغنام.