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SOME FACTORS AFFECTING SELECTION IN THE OSSIMI AND RAHMANI FLOCKS

By

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SUMMARY

A study of the effect of breed type of birth sex and sire on the body weight of lambs in the Rahmani and Ossimi flocks belonging to the Ministry of Agriculture, Egypt, was carried out using records of body weights of lambs at birth, 120,180 and 365 days of the 1957/58 lambing season.

The Rahmani lambs were significantly heavier than the Ossimi lambs at all ages, except at birth. The effect of sex was highly significant at the four studied ages in the Rahmani and only at birth and 180 days in the Ossimi. The percent differences between males and females increased with the advancement age.

Type of birth caused higly significant differences in the two flocks at all ages. The percent differences between single and twin lambs decreased with the advancement of age.

Data corrected for sex and type of birth effects were used to study the effect of sire on body weights of lambs. The effect of sire was not significant at any of the ages in the two flocks.

The necessary number of progeny in each sire group to cause significant differences between sires was found to be between 20 and 100 lambs. As the size of each of the two flocks is round 100 ewes. With the existing differences among individuals this will mean the testing of not more than two rams in each flock while the negative estimates of heritabilities expected from the study indicate that a higher rate of progress could be attained from testing a larger number of rams. It is also suggested that the size of the two flocks should be increased.

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INTRODUCTION

The Rahmani and Ossimi are the two main breeds of sheep in Egypt. Both are fat tailed with coarse wool differing from brown in the former to white in the latter. The Egyptian Ministry of Agriculture has been maintaining since 1940, a flock of each breed with the aim of improving the productive qualities together with the study of the proper managemental practices.

It was decided lately to apply a selection plan to the two flocks that allows the use of family averages in combination with the individual rating of the animals. However the efficiency of such plan depends largely on the assessment of the genetic and environmental parameters partaining to the flock with basic information about the vital flock statistics.

Previous studies on the two breeds by Badreldin (1951), Ragab et al (1953) Asker et al (1953) and Karam (1955) have pointed to large variation among the flocks so that the use of parameters obtained from a certain flock in the selection operations of other flocks would seriously affect the accuracy of the results.

Consequently the present work was carried out with the aim of studying the effect of breed, sex, type of birth and sire on the body weights of lambs in the two flocks along with some aspects of importance in selection practices in the two flocks.

MATERIAL AND METHODS

The data used in this study comprised records of lamb body weights at birth, 120, 180 and 365 days of the 1957/58 lambing season. Since it is the actual practice in the flocks to dispose of most of male lambs at about 6 months of age, it was decided to retain all the lambs born in that season until the yearling weights are recorded. Birth weights are obtained about 12 hours after partiurition. Weights of lambs at constant ages of 120, 180 and 365 days were obtained by adjusting the actual weights after the method reported by Phillips and Brier (1940). The analysis of variance method reported by Snedecor (1955) was used in the study of the effects of sex, type of birth, and sire on the body weights of lambs.

RESULTS AND DISCUSSION

Breed

The body weights of the Rahmani lambs are shown in table 1 to be heavier than those of the Ossimi at all ages expect at birth.

TABLE 1

MEAN BODY WEIGHTS OF THE TWO FLOCKS AT THE DIFFERENT AGES

Sex and type of birth	Birth		120 days		180 days		365 days	
			Rahmani					
Male singles	28	8.2	28	64.3	28	78.3	27	95.7
Male twins	24	6.6	24	49.7	23	64.8	23	85.2
Female singles ..	24	8.2	24	55.7	24	66.5	23	80.5
Female twins... ...	27	6.2	27	45.4	27	58.5	26	74.8
Total & Average ..	103	7.3	103	53.9	102	67.2	99	84.3
Standard Deviation		1.7		10.8		12.0		13.3
Coef. of Variability.		22.7		20.1		17.9		15.8
			Ossimi					
Male Singles ...	43	8.9	35	48.5	34	63.7	26	69.9
Male twins	18	7.3	17	39.9	16	54.2	11	59.0
Female singles ...	33	8.5	31	46.9	31	59.0	28	64.0
Female twins... ...	12	6.2	12	33.7	12	47.6	9	54.9
Total & Average ...	106	8.3	95	44.6	93	58.4	74	64.4
Standard Deviation		1.6		9.1		11.0		12.8
Coef. of Variability.		18.7		20.4		18.9		19.9

The differences of 1.0, 9.3, 8.8 and 19.9 lbs at birth, 120, 180 and 365 days respectively are all statistically significant at the 5 percent level. Ragab et al (1953) working on the same two flocks reported significant breed differences of 1.3, 11.6 and 16.0 lbs in favour of the Rahmani at the Respective ages of birth, 15 and 27 weeks. On the other hand, Badreldin (1951) and Asker et al (1953) working on other two flocks did not find such marked differences. Badreldin reported differences between the two breeds of 0.18, 1.96, 2.55 and 3.11 lbs. at 1.94, 184 and 364 days of age respectively while Asker and his co-workers found differences of 0.29, 1.08, 0.94 lbs at birth, weaning and marketing ages respectively. The variation between the two magnitudes of differences is explained by the fact that all the results presented in these studies are obtained from only four flocks that are kept under, more or less, different environmental conditions besides whatever genetical differences that is most likely to exist between the flocks of the same breed.

Sex

Various investigators, Phillips and Dawson (1940), Winters et al (1946) Terrill et al (1947) and Morely (1950) have shown that sex is an important cause of variation in body weights of lambs. In the present work the effect of sex on the body weights of lambs, as shown in the analysis of variance table 2, was found to be highly significant in the Rahmani flock at all ages except at birth. In the case of the Ossimi, sex caused significant differences only at birth and at 180 days at the 5 percent and 1 percent levels respectively.

TABLE 2

MEAN SQUARES OF DEVIATIONS DUE TO SEX AND TYPE OF BIRTH AT DIFFERENT AGES

Source of Variation	Age in days							
	Birth		120		180		385	
	d.f.	m.s.	d.f.	m.s.	d.f.	m.s.	d.f.	m.s.
Rahmani :								
Sex	1	1.95	1	1373.13	a	2514.90	1	4414.59
Type of birth	1	87.95	1	4243.09	1	3328.06	1	2047.82
Remainder	100	1.93	100	83.80	99	88.51	96	
Ossimi :								
Sex	1	8.19	1	139.87	1	542.09	1	399.78
Type of birth	1	73.93	1	2196.71	1	1991.59	1	1412.54
Remainder	103	1.65	92	59.30	90	96.03	71	144.05

Male lambs in the two flocks are constantly heavier than female lambs either for the total data or within type of birth groups as shown in Table 3.

The percent difference between the two sexes are shown to increase by the advancement of age. This result is, however, most pronounced in the case of the Rahmani flock. Similar findings were reported by Asker et al (1953 on the Rahmani and Ossimi breeds. Badreldin (1951) found highly significant differences due to sex in the weights of the Ossimi at three of the four studied ages while in the case of the Rahmani sex differences were significant only at the age of 274 days. Karam (1955) found no significant differences between sexes at birth although some lambs male were 0.18 kg. heavier than ewe lambs.

Type of Birth

Previous studies by Phillips and Dawson (1940), Winters et al (1946) Karam et al (1953) have shown that the type of birth of lambs is a significant cause of variation among the body weight of lambs. In this work variation due to type of birth, as shown in Table 2, was found to be highly significant in the two flocks at all studied ages. Single lambs taken as a whole or within sex groups, were constantly heavier than twin lambs, Table 4. Although the percent differences decreased with the advancement of age yet that decrease was most pronounced in the case of the Rahmani.

This result is in close agreement with the results of Asker et al (1953) Ragab et al (1953). However, Badreldin (1951) reported highly significant differences between singles and twins in the case of the Ossimi but not in the Rahmani. Karam (1955) found highly significant differences of 0.44 kg. between birth weights of single and twin lambs of the Rahmani.

TABLE 3

SUPERIORITY OF MALES OVER FEMALES, AT DIFFERENT AGES

Breed	Within singles			Within twins			Total		
	Female wt.	diff.	percent	Female wt.	diff.	percent	Female wt.	diff.	percent
Rahmani :									
Birth	8.2	.0	0.0	6.2	.4	8.8	7.2	0.3	4.2
120 days ...	55.7	8.6	15.4	45.4	4.3	9.5	50.3	7.3	14.5
180 days ...	66.5	11.6	17.7	58.5	6.3	10.8	62.3	9.9	15.9
365 days ...	80.5	15.2	18.9	74.8	10.4	13.9	77.5	13.4	17.3
Ossimi :									
Birth	8.5	0.4	3.5	6.2	1.1	17.7	7.9	0.5	6.3
120 days ...	46.9	1.6	3.4	33.7	6.2	18.4	43.2	2.5	5.8
180 days ...	59.0	4.7	8.0	47.6	6.6	13.9	55.9	4.9	8.8
365 days ...	64.3	5.6	8.7	54.9	4.1	7.5	62.0	4.7	7.6

TABLE 4

SUPERIORTY OF SINGLES OVER TWINS AT DIFFERENT AGES

Breed	Within males			Within Females			Total		
	Twin wt.	diff.	percent	Twin wt.	diff.	percent	Twin wt.	diff.	percent
Rahmani :									
Birth	6.6	1.6	24.2	6.2	2.0	32.3	6.4	1.8	28.1
120 days ...	49.7	14.6	29.4	45.4	10.3	22.7	47.5	12.8	26.9
180 days ...	64.8	13.5	20.8	48.5	8.0	13.7	61.4	11.4	18.6
365 days ...	85.2	10.5	12.3	74.8	5.7	7.6	79.7	9.0	11.3
Ossimi :									
Birth	7.3	1.6	21.9	6.2	2.3	37.1	6.9	1.8	26.1
120 days ...	39.9	8.6	21.6	33.7	13.2	39.2	37.3	10.5	28.2
180 days ...	54.2	9.5	17.5	47.6	11.4	23.9	51.4	10.1	19.6
365 days ...	59.0	10.9	18.5	54.9	9.4	17.1	57.2	9.8	17.1

Sire

Since sex and type of birth were found to cause significant variation among weights of lambs in the two flocks, the effect of sire was worked out after correction for the two factors. The effect of sire as shown in Table 5 was, however, not significant at all ages. This result do not agree with the findings in various studies on different sheep breeds which revealed that sires do affect significantly the body weight of lambs at different ages.

Phillips (1940 found highly significant sire differences in only 20 of 72 comparisons between rams. Ensiminger et al (1943) reported highly significant effects of sires at birth and weaning time, but after making allowance for year to year variation the sire effect did not prove to be significant except in the case of birth weights of the shorpshires

Kincaid (1943) found significant sire variation in the birth weights of lambs. Morely (1950) also found significant sire variation in body weights of lambs at 10 months age in the Australian Merino. Karam et al (1953) did find highly significant variation due to sires after adjusting for the effects of sex, type of birth, year and flock.

The failure of the variation between the sires in the present work to reach levels of significance is mainly due to factors pertaining to the two flocks under study. However, an important point revealed by the analysis of variance table No. 5, is the negative values of heritabilities that is expected from the small sire mean squares. Since heritability estimates for body weight by previous investigators run between 20 and 40 percent, relatively large sampling errors must have been envolved in the present study. Obviously such negative estimates will have its implications on the selection plans in the two flocks and suggest more emphasis should be put on the use of pedigrees and progeny testing. The problems in such case will be the optimum structure of

TABLE 5

MEAN SQUARES OF DEVIATION OF SIRE EFFECT AT DIFFERENT AGES

Source of Variation	Age in days							
	Birth		120		180		365	
	d.f.	m.s.	d.f.	m.s.	d.f.	m.s.	d.f.	m.s.
Rahmani :								
Total	102	259.44	102	9653.44	101	16194.09	98	13724.61
Sires	5	18.25	5	670.24	5	1436.18	5	782.95
Remainder	97	241.19	97	8983.20	96	757.91	93	12941.67
Ossimi :								
Total	106	188.40	94	6186.88	92	10031.30	73	11694.04
Sires	5	7.14	5	a39.20	5	727.70	5	270.72
Remainder	101	181.26	89	6047.68	87	9303.60	68	11423.32

the flock that allows most progress. It is obvious from the work of Lush (1931), (1945) and Stonaker (1963) that in the present situation the highest expected progress would be attained from testing as many rams up to a point where the decreasing accuracy of selection reverses the increasing trend of expected gains. By this method it is hoped that among the relatively large number of rams tested some individuals of decidedly higher merit will be located.

Necessary Number of Lambs in Sire Progeny Groups.

As the number of lambs in sire progeny groups is a contributing factor in attaining the required levels of significance, it was of much interest, though of more or less a theoretical nature, to estimate the necessary number of lambs in sire groups in the two flocks under study. The method used for this purpose was that reported by Knapp and his co-workers (1942) This method is based on the determination of the necessary differences between sires by the use of the standard deviation derived in the present work from the total mean squares reported in Table 5. The results obtained are presented in Table 6 for the different ages in the two flocks. Data presented in the table indicate that the necessary differences between sires needed to be significant at the 5 percent level decreases with the increase of the number of lambs in the sire group.

In the present work the actual mean differences between sire groups presented in Table 7 are used to find, the corresponding number of lambs in each sire group using Table 6. These required numbers are included in Table 7 and are shown to run between 70 and 100 lambs.

TABLE 6

NECESSARY DIFFERENCES BETWEEN SIRE GROUPS OF VARIOUS NUMBERS AT THE 5 PERCENT LEVEL OF SIGNIFICANCE

No. of offspring from each sire	Rahmani Age in Days				Ossimi Age in Days			
	Birth	120	180	365	Birth	120	180	365
1	4.5	27.3	35.5	33.2	3.7	22.8	29.3	35.7
2	3.2	19.3	25.1	23.5	2.7	16.1	20.8	25.2
3	2.6	15.7	20.4	19.1	2.2	13.1	16.9	20.5
4	2.2	13.6	17.8	16.6	1.9	11.4	14.7	17.8
5	2.0	12.2	15.9	14.9	1.7	10.2	13.1	16.0
10	1.4	8.6	11.2	10.5	1.8	7.2	9.3	11.3
20	1.0	5.9	7.7	7.2	0.8	4.9	6.4	7.7
30	0.8	5.0	6.6	6.1	0.7	4.2	5.4	6.5
40	0.7	4.3	5.6	5.3	0.6	3.6	4.7	5.7
50	0.6	3.9	5.0	4.7	0.5	3.2	4.2	5.0
60	0.6	3.5	4.6	4.3	0.5	2.9	3.9	4.6
70	0.5	3.3	4.3	4.0	0.5	2.7	3.5	4.3
80	0.5	3.0	4.0	3.7	0.4	2.6	3.3	4.0
90	0.5	2 9	3.7	3.3	0.4	2.4	3.1	3.8
100	0.5	2.7	3.6	3.3	0.4	2.3	2.9	3.6

TABLE 7

MEAN ACTUAL DIFFERENCES BETWEEN SIRE GROUPS

Age in days	Rahmani		Ossimi	
	Mean actual Difference	Necessary Number	Mean actual Difference	Necessary Number
Birth	0.5	70	0.4	80
120	3.2	70	1.7	100
180	2.9	100	3.8	60
365	3.5	80	2.4	100

Since the size of each flock in the present study runs to about a hundred breeding ewes, it mean that, at most, two rams will be tested in each flock and clearly this would appreciably slow the improvement work that otherwise could be acheived from testing a much larger number of rams. As shown by Lush (1931), the accuracy of selection might be higher with the increasing number of progeny from each sire but the expected progress will be, at the same time, smaller with the present situation in the two flocks. An expansion of the flock size will certainly help in accelerating the rate of genetic progress.

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الملخص

بعض العوامل التى تؤثر على الانتخاب
فى قطعان الأوسيمى والرحمانى

درس تأثير النوع وحالة الفرد عند الولادة والجنس والأب على وزن الجسم فى حملان الأغنام الرحمانى والأوسيمى فى قطعان وزارة الزراعة . وقد شملت الزراعة أوزان الحملان عند الولادة وفى عمر ١٢٠ و ١٨٠ و ٣٦٥ يوماً فى موسم ١٩٥٨/١٩٥٧ .

وقد تبين من هذه الدراسة أن هناك فروقاً معنوية بين الرحمانى والأوسيمى فى كل الأعمار ما عدا الوزن عند الميلاد وكانت أوزان الرحمانى أكبر من أوزان الأوسيمى . كما تبين أيضاً أن للجنس تأثير معنوى فى أوزان الأغنام الرحمانى وفى الوزن عند الميلاد والوزن عند ١٨٠ يوم فى الأوسيمى . كما اتضح أيضاً أن النسبة المئوية للفروق بين الذكور والأناث فى الأوزان تزيد كلما تقدمت الحملان فى العمر .

أما بالنسبة للحالة عن الوضع فقد تبين أن هنـاك فروقاً معنوية وعالية بين وزان الحملان التوأمية والحملان الفردية فى كل الأعمار وفى كل من الأوسيمى والرحمانى إلا أن هذه الفروق كانت تقل نسبتها المئوية كلما تقدمت الأغنام فى العمر .

وعند دراسة تأثير اختلاف الآباء على الأوزان المعدلة لتأثير الحالة عند الوضع والجنس لم يتضح أن هناك فروقاً معنوية بين سلالات الآباء المختلفة فى القطيعين وفى كل الأعمار .

ولما كان حجم كل قطيع يبلغ حوالى المائة نعجة فقد تبين أن عدد النسل اللازم توفره لـكل أب يجب أن يتراوح بين ٢٠ — ١٠٠ حمل إذا ما أريد

الحصول على فروق ذات دلالة معنوية ، الأمر الذى يعنى عدم إمكان اختبار نسل أكثر من كبشين فى كل قطيع بينما تشير القيمة السلبية للقيمة الوراثية المنتظر الحصول عليها من هذه الدراسة إلى إمكان الحصول على نجاح أكثر إذا ما أتيحت الفرصة لاختيار أكبر عدد ممكن من الكباش . لذلك كان من الضرورى العمل على زيادة حجم هذه القطعان للحصول على نتائج أكثر إيجابية فى التربية والتحسين .