

The Effect of some Factors on Oestrous Cycle Length in Sheep

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THIS INVESTIGATION was carried out in order to estimate oestrous cycle length (EL), and to study some factors influencing it in sheep living in the North Western coastal desert of Egypt. Data representing records on 697 ewes were collected over a period of five years from 1962/63 to 1966/67 inclusive, at Ras El-Hekma Desert Research Station. Ewes used represent three pure breeds ; Barki (B), Merino (M) and Awassi (A) ; five crosses between M and B ranging from $\frac{1}{4}$ M $\frac{3}{4}$ B to $\frac{3}{4}$ M $\frac{1}{4}$ B and the first cross between A and B. The overall mean length of the oestrous cycle was 16.10 days. Year effect had a marked influence on E.L. while age and weight of ewe, breed and age of ram and number of ewes/pen did not have any significant effect. The breed of ewe had a significant effect on E.L. Awassi ewes exhibited the longest cycle (21 days), then followed by AXB ewes (18.5 days), Merino ewes (17.0 days) and Barki (16.6 days). Crossing M and B decreased the oestrous cycle length, with $(\frac{5}{8}$ M - $\frac{3}{8}$ B) exhibiting the shortest cycle (12.0 days).

While several estimates are available on oestrous cycle length in the different sheep breeds, few of them have been simultaneously corrected for the factors known to affect them. It was therefore thought that estimates less based by the disproportionality of subclasses would be of interest.

This investigation aimed at estimating oestrous cycle length and to study some factors thought to influence it in some pure breeds of sheep and their crosses under semi-arid environment.

Material and Methods

Data used in the present study were recorded on 697 ewes maintained over a period of five seasons, from 1962/63 to 1966/67, inclusive. Sheep were raised at Ras-El-Hekma Desert Research Station of the Desert Institute, located in the north cost of the western Desert.

There, a sheep breeding project was initiated in the year 1954/55 with the objective of improving the productivity, in terms of wool and lamb, of the local barki breed of sheep by means of selection. A fair description of the project was given by Fahmy *et al.* (1969) and Mabrouk (1970).

A crossbreeding program was started in 1958 by introducing the Hungarian Merino (M) with the objective of improving fleece weight and grade of the Barki (B) sheep. A number of the Syrian Awassi (A) breed of sheep, a well known breed in the Middle East, was introduced in an attempt to improve milk production. In addition to the three pure breeds, six crosses among them with varying degrees of breed blood ratios were also included in this investigation.

Mating was detected by means of coloured grease on the ram brisket (colours used were changed weekly).

Ewes were checked daily and the service date was then recorded. Oestrous cycle length was estimated as the number of days between first and second service. All cycles outside the range 6-28 days were discarded. It is worth mentioning here, that no estimates of cycles were made on ewes served after conception, or those being served more than twice. The oestrous cycle length was estimated in 697 ewes.

Least squares procedures (Harvey, 1960) were used to study the environmental effects thought to influence E.L. The additive mathematical model used was:

$$Y_{ijklmno} = M + S_i + b_j + d_k + t_l + a_m + g_n + BX + e_{ijklmno}$$

which included the overall mean (M) and the effects of year (s), breed of ewe (b), age of ewe (d), breed of ram (t), age of ram (a), number of ewes per pen (g) and weight of ewe at the beginning of the breeding season. Difference among least squares estimates were tested according to the Duncan's new multiple range test (Duncan, 1955).

Results and Discussion

Table 1 shows the least square estimates, their standard errors, tests of significance and analysis of variance of E.L. The overall mean of E.L. among all breeds of ewes was 16.14 ± 0.67 days.

The observed variation in E.L. from year to year may be partially explained by differences in setting up the breeding season and individual variation in recording the service in different years. Also, under desert conditions year to year variation is the result of many uncontrollable factors including rainfall temperature, humidity, sandstorms and the amount of feed.

Egypt. J. Anim. Prod. 20, No. 2 (1980)

TABLE 1. Least squares constant, their standard errors (S.E.), tests of significance (DMRT) and analysis of variance of factors affecting oestrous cycle length.

Classification	No.	Constant	S.E. ±	DMRT 1,2	d.f.	Mean squares
General mean : <i>d</i>	697	16.14	0.67			
Year : 1962-63	116	-0.28	0.80	ab		
1963-64	200	-2.97	0.55	c		
1964-65	123	-0.74	0.62	b		
1965-66	148	2.17	0.66	a	4	3.825**
1966-67	110	1.82	0.71	a		
Breed of ewe						
B	290	0.47	2.27	bc		
M	172	0.86	2.28	bc		
A	66	4.88	2.57	a		
1/4 M	23	-0.02	2.44	bc		
3/8 M	4	-1.84	7.80	ac		
1/2 M	82	-0.48	2.58	bc		
5/8 M	3	-4.16	8.67	ac		
3/4 M	19	-2.27	2.73	bc	8	0.828*
AB	38	2.37	2.65	ab		
Age of ewe :						
2 yr-old	193	0.52	0.51	a		
3 yr-old	167	-0.65	0.46	a		
4 yr-old	121	0.33	0.52	a	3	0.413
Over 4 yr	216	-0.20	0.48	a		
Breed of ram						
B	146	-0.22	0.74			
M	265	1.29	1.19	a		
A	91	-1.21	1.51	a		
1/4 M	34	2.56	1.82	a		
1/2 M	87	1.29	1.27	a		
5/8 M	37	-0.75	8.04	a		
3/4 M	36	-0.19	2.43	a	7	0.543
AB	31	-2.77	1.99	a		
Age of ram :						
1½ yr-old	107	-0.73	1.09	a		
2½ yr-old	230	0.56	0.50	a		
3½ yr-old	188	0.19	0.68	a	3	0.095
Over 3½ yr	172	0.18	0.59	a		
NO. of ewe per pen :						
10-	44	0.49	1.38	ab		
20-	145	-1.12	0.95	ab		
30-	253	-1.50	0.68	b		
40-	230	-0.44	0.69	ab	4	0.701
50	25	2.57	1.51	a	1	0.015
Weight of ewe :		0.001	+0.00	a	666	0.431
Residual						

1. Duncan new multiple range test (1955).

2. Within the same classification every two constants bearing at least one letter in common differ significantly, otherwise they do.

Breed of ewe was a significant source of variation in E. L., the longest E.L. was observed in Awassi ewes with a mean of 21.02 days. This estimate was about three days longer than that estimated by Amir and Volcani (1955) and about six days longer than that estimated by Ghanem *et al.* (1963). A \times B crossbred ewes ranked the second highest in their E.L. with a mean of 18.15 days followed by Merino ewes (17 days) which was very much similar to the estimates reported by Hunter (1962) and Timariv (1963), while it was one day less than that given by Ghanem *et al.* (1963).

Barki ewes exhibited the shortest E.L. among the three pure breeds studied with a mean of 16.6 days, which was one day longer than that reported by Ghanem *et al.* (1963). Crossing Merino with the Barki resulted in a decrease in E.L., with 5/8 M 3/8B ewes exhibiting the shortest E.L. (11.97 days). However, the differences among the Barki, the Merino and their crossbreds were nonsignificant. It should be pointed out that the estimates obtained for 5/8M - 3/8 and 3/8M - 5/8B ewes come from only 3 and 4 ewes respectively; which greatly reduces their reliability.

Age of ewe seemed to have no influence on E.L. No meaningful trend could be detected. However, Steklev (1967) indicated that E.L. tend to decrease with age of ewe.

Breed and age of ram, number of ewes per pen and weight of ewe did not seem to have any detected influence on E.L. of course, information on the ram is not expected to be physiologically related to E.L. However, it was included in the model, due to its bearing on the method of measuring the E.L. For instance a younger ram may be different inactivity than an older one, thus changing the chance of marking ewes, therefore, affecting E.L. as measured in this study.

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تأثير بعض العوامل على طول دورة الشبق في الأغنام

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أجريت هذه الدراسة لقياس طول دورة الشبق ، ولدروسة العوامل التي تؤثر عليها في الأغنام التي تعيش تحت الظروف الصحراوية الساحلية في مصر . وتمثل هذه الدراسة سجلات ٦٩٧ نتجة في خمس سنوات في الفترة من ١٩٦٣/١٩٦٢ الى ١٩٦٧/١٩٦٦ في محطة أبحاث رأس الحكمة . والنعاج المستخدمة في هذه الدراسة تتبع ثلاث سلالات هي : البرقي (ب) والمريئوم (م) والعواس (ع) وخمس درجات من الخليط بين البرقي والمريئوم متدرجة من (١/٤ م - ١/٤ ب) الى (١/٤ م - ١/٤ ب) والخليط الأول بين العواس والبرقي . وأظهر البحث النتائج الآتية :

١ - كان المتوسط العام لطول دورة الشبق ١٦١ يوما . وقد كان تأثير السنة ممنويا على طول دورة الشبق بينما لم يكن للعمر ووزن النعجة ونوع وعمر الكبش وعدد النعاج في حظائر التلقيح تأثيرا ملحوظا .

٢ - كان لنوع النعجة تأثيرا حقيقيا على طول دورة الشبق وقد كان أطولها في النعاج العواس (٢١ يوما) يتبعها خليط العواس × برقي (١٨٥ يوما) والبرقي (١٦٦ يوم) . ويبدو أن خليط المريئوم مع البرقي قد قلل من طول دورة الشبق وأظهرت النعاج (٥/٨ م × ٣/٨ ب) قصر دورة شبق (١٢ يوم) .