

The Libyan Barbary Sheep

I. Reproductive Traits

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ABSTRACT

A total of 180 Libyan Barbary ewes were divided into six groups of 30 ewes each and mated with rams at two monthly intervals throughout the year to identify the breeding and lambing season and to study some other reproductive traits. The results indicated that maximum fertility following mating was obtained in the period of May-June (94%), July-August (88%), September-October (80%) and January-February (46%). Lower fertility was obtained in the periods of November-December (22%) and March-April (22.7%). Lambing rate followed the same trend of fertility and there were no differences in prolificacy. Considering the performance of the breed in other government farms with the result of this study, it is concluded that the Libyan Barbary breed may be reported a non-seasonal in its breeding and this phenomenon can be exploited both biologically and economically in this breed. However, other studies such as ram fertility in relation to the time of mating and the ovulatory activities of ewes using other means should be considered. Lambing periods had significant effects upon lambing difficulty (LD) and lamb vigor (LV) scores but had no effect on survival of lambs to weaning. Lambs born in the period of October-November had better LD and LV scores while those born in the period of April-May and June-July had the worst scores.

There were no differences in lamb survival to weaning in relation to lambing period. However, the results of lamb survival need to be combined with those of growth rates to assess relative importance of lambing season. The effect of age of ewe on the reproductive traits and the effects of sex, type of birth and age of ewe on LD, LV and survival of lambs were also studied.

INTRODUCTION

Some 95% of the sheep in Libya belong to the fat-tailed, coarse-woolled Barbary breed. It is believed that the Libyan Barbary is derived from the fat-tailed sheep of the Far and Middle East. In general, the breed is multi-coloured, large framed, with a sim-

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ple pendulous fat-tail. It is very hardy, resistant to drought and poor nutrition, and is well adapted to the semi-arid and desert conditions of Libya. The physical characteristics of the breed were reported by Mason (15) and Ghanem (6).

To the best of the authors' knowledge, there are no previous reports in the scientific literature on the performance characteristics of the Libyan Barbary breed. An experiment was, therefore, initiated at the University of Al-Fateh, Tripoli, to document the basic characteristics of the breed. The work reported here deals with breeding and lambing season and other reproductive traits for groups of ewes mated at two monthly intervals throughout the year.

MATERIALS AND METHODS

Location

The University of Al-Fateh Experimental Station is located near Tripoli, at a latitude of 32°52'N and a longitude of 13° 13' E, and an elevation of 25m above sea level. The meteorological data are: Mean monthly temperature 19.8°C, mean annual rainfall 362mm, and relative humidity 62%. The station was established in 1979 with a foundation flock of some 500 sheep. The flock is thought to be typical of the Barbary breed.

Experimental procedure

A total of 180 ewes were randomly selected on January 1, 1981 from the flock. The ewes were divided into six groups of 30 ewes each. The ewes of each group were then mated with rams for a period of two months during the year of 1981 according to the following schedule: January-February, March-April, May-June, July-August, September-October, and November-December. The ewes of each group were raised essentially in confinement and were fed barley or wheat straws and about 0.5 kg of mixed concentrate ration (14% protein) per head daily year-round. During the green season (November-March), the animals were pastured for about three hours daily.

Traits studied:

Reproductive traits of each group were estimated as % ewes lambing of ewes mated (fertility), % lambs born of ewes lambing (prolificacy), % lambs born of ewes mated (lambing rate), survival of lambs to weaning (120 days), lambing difficulty (LD) and lambs vigor (LV). LD scores were 1 = normal; 2 = required some assistance; 3 = very difficult; and 4 = ewe or lamb died at birth. LV scores at birth were 1 = strong; 2 = weak; 3 = very weak; and 4 = lamb died. Survival of lambs to weaning was scored as 1 = alive at weaning; and 0 = dead at weaning.

Statistical procedures

The traits of reproductive performance were analysed by the least squares procedures for data with unequal subclass numbers (8). The statistical model used for the analysis of fertility, prolificacy and lambing rate included the fixed effects of groups (mating periods) and the age of ewe. The model used for the analysis of LD, LV and survival of lambs included the fixed effects of groups, age of ewe, sex and birth type of lambs. No interaction of these factors was found to be important. Tests of significance for individual means were also made (3, 12).

RESULTS AND DISCUSSION

Breeding season and fertility

Table 1 shows lambing results for each mating group. Time of mating had significant effect ($P < .01$) on fertility and lambing rate. Maximum fertility was obtained through the periods May-June (94%), July-August (88%) and September-October (80%). Lower fertility was obtained following mating in November-December (22%) and March-April (22.7%). The fertility estimate during January-February was 46%, However, it was not statistically different from those obtained in the periods of May to October. Lambing rates followed the same trend of fertility during the different periods. The twinning rate was low.

Table 1 — Least squares means and standard errors by group (mating periods) and age of ewe for the reproductive performance traits.

Source	Number of ewes	Fertility % ewes lambing of ewes mated	Prolificacy % lambs born of ewes lambing	Lambing Rate % lambs born of ewes mated
Mean	178	58.8	104.0	59.0
Groups (mating periods)		**	NS	**
1 Jan-Feb	30	46.0 (7.3) ac	100.0	46.1 (7.1) ac
2 Mar-Apr	29	22.7 (6.9) a	100.0	23.0 (6.9) a
3 May-June	29	94.4 (7.1) b	100.0	94.1 (7.0) b
4 July-Aug	30	88.0 (6.9) bc	112.0	90.1 (7.0) bc
5 Sept-Oct	30	80.1 (6.9) bc	112.0	82.1 (7.0) bc
6 Nov-Dec	30	22.0 (6.9) a	100.0	22.0 (7.0) a
Age of Ewe		**	NS	**
3 years old	52	77.0 (5.3) a	100.0	76.9 (5.0) a
4 years old	19	61.0 (8.6) ab	100.0	60.9 (8.0) ab
5 years old	31	58.7 (6.7) ab	100.0	58.7 (6.0) ab
6 years old	20	64.9 (8.4) ab	109.0	66.9 (8.0) ab
7 years old	34	58.9 (6.6) ab	109.0	60.1 (6.0) ab
8 + years old	22	32.4 (8.0) c	100.0	32.4 (8.0) c

NS = not significant

** = $P < .01$

abc - Those means followed by same letter do not differ significantly from each other otherwise they differ significantly ($P < .05$)

() Values in brackets are the standard error of the mean.

Taking into consideration the performance of the breed in some government farms where ewes were mated at periods coinciding with periods of low fertility in this study (Table 2), the fertility estimate was never less than 78%. It seems very reasonable to take this with the information obtained here as evidence that the Barbary breed is a polyestrous sheep; i.e they can be bred anytime of the year. Nevertheless, they manifest maximum activity in the period from May to October, which is characterized by longer days, higher temperature and less availability of feed. This also may suggest that the Barbary sheep is not affected by the photoperiodism factor as sheep of British origin (7, 14, 22, 24).

Table 2— Reproductive performance of the Libyan Barbary Sheep in other government farms.

Mating Period	Fertility %	Lambing Period	Lambing %
Feb-Mar	80.5	July-Aug	86.3
May-June	81.5	Oct-Nov	85.8
Oct-Nov	87.9	Mar-Apr	101.9
Jan-Feb	78.8	May-June	85.0

Obtained from the Sheep Improvement Project, Sidi El-Masri, Tripoli-Libya.

Number of ewes exceeded 300 in each mating period.

These findings are in agreement with the information available from other workers for different fat-tailed breeds of the Middle East and the Far East. A breeding season greater than seven months was reported in the Ossimi and Rahmani sheep of Egypt (4). Similar findings were reported (2) in the Awassi sheep of Iraq. Sefielbakht *et al.* (18) reported a breeding season of 10 months in the Karakul, Mehraban, Naeini and Bakhtiari breeds of Iran. A non-significant difference between months in the incidence of estrus was reported (16) in the Marwari sheep of India, that was observed over a period of one year.

Effects of age of ewes at mating on the reproductive performance traits are also shown in Table 1. There were substantially significant effects ($P < .01$) on fertility and lambing rates but not prolificacy. In general, 3-year old ewes were the most fertile and the eldest age group (8 years +) were the least fertile. The same trend was observed for lambing rate. Many workers have established that yearling ewes and very old ewes always have the lowest reproductive figure as compared with the middle aged ewes of 2 to 6 year olds (10, 19, 20).

Lambing Season, LD, LV and Survival

Lambing periods (groups) had significant effects upon LD ($P < 0.01$) and LV ($P < 0.05$) but had no effect on survival of lambs to weaning. Lambs born in the period of April-May and June-July had the worst scores for LD and LV. Evidence from the literature suggests that lower birth weight of multiple-born lambs substantially reduces dystocia, but that dystocia is a major cause of mortality in single births (9). However, Other studies on the factors affecting dystocia and preweaning survival in sheep indicated a low heritability estimates for dystocia ($.13 \pm .03$), lambs survival ($.06 \pm .03$) and lambs vigor ($.10 \pm .03$) and recommended direct selection for increased size and growth rate with little concern about dystocia and pre-weaning survival (21). The impact of lambs survival becomes of particular importance when lambs are raised under less favorable conditions.

Age of the ewe and type of birth had no noticeable effects upon LD, LV or survival of lambs to weaning (Table 3). Although not significant, lambs from 5-year old ewes had the highest survival (84%), better LD (1.0) and LV (1.0) scores as compared with other age of ewe classes. Evidence from the literature indicates a curvilinear effect of age of ewe on survival of lambs to weaning (5, 19, 20). Lambs born to 3 and 4 year old ewes survived better than those born to ewes of younger and older ages. Single born lambs had better survival, LD and LV scores compared with twin born lambs. Type of birth could exert its influence on lamb survival during the first weeks of lamb age via

its effect on birth weight. However, at later ages, as lambs become more independent of their mothers, the effect of type of birth decreases.

Sex of lambs affected LD ($P < .01$) and LV ($P < .05$) but not survival of lambs (Table 3). Ewe lambs had better LD and LV scores and consistently survived better than ram lambs. This finding is in agreement with those obtained by others (1, 5, 11, 13, 17).

Table 3 — Least squares means by group (lambing period), age of ewe, sex and type of birth of lambs for lambing difficulty (LD), lamb vigor (LV), and survival of lambs.

Source	No.	LD	LV	Survival %
μ	116	1.19	1.45	70.4
Groups (Lambing period)		**	*	NS
1 June-July	16	1.11	1.36	62.3
2 Aug-Sept	7	1.05	1.25	75.3
3 Oct-Nov	28	1.00	1.00	80.0
4 Dec-Jan	29	1.01	1.25	76.8
5 Feb-Mar	29	1.34	1.66	60.3
6 Apr-May	7	1.63	2.18	67.8
Age or Ewe		**	*	NS
3 years old	37	1.12	1.35	80.8
4 years old	11	1.17	1.47	55.6
5 years old	18	1.06	1.19	83.6
6 years old	18	1.15	1.36	66.8
7 years old	24	1.31	1.66	77.0
8 + years old	8	1.35	1.65	58.7
Sex of lambs		**	*	NS
Males	61	1.29	1.60	65.8
Females	55	1.09	1.30	75.0
Type of Birth		NS	NS	NS
Single	102	1.14	1.26	75.3
Twin	14	1.24	1.64	65.5

NS = not significant

* = $p < .05$

** = $p < .01$

Based on the results presented here and the authors' observations, it may be concluded that the Barbary sheep of Libya may be reported as non-seasonal in its breeding and this phenomenon may be biologically and economically exploited for regulating an increased number of lambings, i.e. three lambings per two years or out of season lambings. It is worth mentioning here that the general practice in Libya is to breed sheep during early summer in order to have one lamb crop a year in the autumn. The results also indicated non-significant difference in lamb survival to weaning due to lambing period. However, the results of lamb survival by lambing period need to be combined with those of growth rates by season to assess the relative importance of lambing season.

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أغنام البربري الليبية

1 - الصفات التكاثرية

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المستخلص

قسّمت مجموعة من نعاج أغنام البربري الليبية وعددها 180 رأساً إلى ست مجموعات بحيث شملت كل مجموعة 30 نعجة. وقد وزعت هذه المجموعات على ست فترات تزاوج، كل فترة تزاوج تستمر لمدة شهرين وذلك من بداية السنة حتى نهايتها، كي يتسنى دراسة موسم التزاوج وموسم الولادة وبعض الصفات التناسلية بالأغنام الليبية. وقد دلت النتائج على أن أعلى نسبة خصوبة (94%) حدثت بموسم مايو - يونيو ثم موسم يوليو - أغسطس (88%)، تلاهما موسماً سبتمبر - أكتوبر (80%) ثم يناير - فبراير (46%). وقد وجدت أقل نسبة خصوبة بموسمي نوفمبر - ديسمبر (22%) ومارس - أبريل (22.7%). وقد لوحظت نسب قريبة من الخصوبة فيما يخص نسبة الولادات بالفترات المختلفة ولم توجد أي فروق معنوية بالنسبة لوفرة النتاج بالفترات المختلفة. عندما أخذ في الاعتبار نسبة الخصوبة ببعض مشاريع تحسين الأغنام بالجماهيرية، خصوصاً بمواسم التزاوج المطابقة للفترات منخفضة

نسبة الخصوبة بهذه الدراسة، أمكن استخلاص أن سلالة البربري الليبية تعتبر من السلالات غير الموسمية وبذلك يمكن تزواجها على مدار السنة، ويمكن الاستفادة من هذه الظاهرة واستغلالها بيولوجياً واقتصادياً لتحسين إنتاجية هذه السلالة.

كان لموسم الولادة تأثير معنوي على درجات عسر الولادة ونشاط الحملان، أما نسبة النفوق فلم تتأثر بموسم الولادة. ولا توجد أي فروق معنوية بالنسبة لنفوق الحملان من الميلاد إلى الفطام بفترات الولادة المختلفة مما يتطلب دراسة نمو الحملان وعلاقته بمواسم الولادة المختلفة حتى يتسنى تقييم موسم الولادة. وقد ورد في الدراسة تقييم لتأثير عمر الأم على الصفات التناسلية، وكذلك تأثير الجنس ونوع الولادة وعمر الأم على نفوق الحملان.