# Reproductive Characteristics of Local Sheep Breeds in the Saharan Region of Béchar in Algeria

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**Abstract**
The objective of this study was to investigate the reproductive characteristics of local sheep breeds farming in a Saharian region of Algeria. The method used was a questionnaire to assess general information about sheep breeding for 65 local breeders, 12 of whom were following monthly over one year in order to determine some reproductive parameters including fertility, prolificacy, and lambs mortality. Our results revealed that the reproductive management was characterized by free mating, early age at first lambing, and non-seasonal distribution of lambing. For the reproductive parameters of the flocks monitored, the fertility, prolificacy, and lambs mortality were respectively: 91.69%, 110.51%, and 14.35%. These results allowed us to conclude that the local sheep breeds raised in the Saharian region of Béchar has a high reproductive potential, but the reproductive management of flocks is still relatively traditional and not well developed.
the abstract itself.

**Keywords** free mating, local sheep breeds, non-seasonal, reproductive characteristics, Saharian region.

## 1. Introduction

Reproduction is the key to survival for farm animals. Therefore, the understanding of its characteristics and parameters is very important to improve the profitability and productivity of livestock farms. Multiple factors affect the values and rates of these characteristics and parameters such as genetic of animals, age, health status, the plane of nutrition and management system, and geographical location.
In Algeria, sheep farming occupies an important place, with a total population of about 28.40 million which puts Algeria in the first rank in North Africa [1]. Also, in addition to its contribution of more than 50% in the national production of red meat and 10 to 15% in the agricultural gross domestic product, sheep farming plays an important socio-cultural role [2]. The present article aims to shed light on the reproductive characteristics of local sheep breeds farming in a Saharian region, which is the Wilaya of Béchar.

## 2. Materials and Methods

### *Region of study*

The study has been conducted in Béchar. This region is located in the South-west of Algeria between latitudes of 28°15'N and 32°20'N and longitudes 0°20'E and 5°17'W. It is characterized by a desert climate with very low and irregular rainfall, very hot summers, and cold winters. The day length varies from 09 hours 56 minutes in December to 14 hours 04 minutes in June.

### *Animals and Management*

In this Saharian region, the most common livestock system is extensive to semi-intensive. Indeed, three farming methods can be distinguished:

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- The nomadic method: in this type, breeders have larger herds, generally mixed sheep and goats with more than 100 head. In most cases, the flocks are entrusted to shepherds paid in cash for looking after them. Livestock moves from place to place depending on the season and the availability of feed and water.
- The sedentary pastoral system: Livestock raising is generally practiced in combination with agriculture. Feeding systems were mainly based on the use of natural pastures throughout the day.

In both these two systems, animals were receiving a concentrated feed supplement which was varied from 200 to 500 g per head and per day depending on the actual status of the pastures, which was strongly affected by fluctuations in rainfall. The most abundant species found in these pastures were: *Euphorbia guyoniana, Helathmum lipii, Retama retam, Anvillea radiate, Pituranthos chloranthus, Panicum turgidum, Stipagrostis pungens, Rhantherium adpressum.*

- The oasis system: Sheep farmers in oasis are characterized by small numbers and the absence of pastures around most oasis. Fed rations made up of hay, concentrates, and on-farm crop residues.

In most cases, the animals received adequate veterinary care including vaccination against the plague of small ruminants or sheep pox, which were totally covered by the state.

***The breeds of animals***

It's often difficult to determine the breed of a herd due to the crossbreeding practiced. But, it is sometimes interesting to find the dominant breed in the flock. In the flocks surveyed, the Ouled Djellal breed is the main breed exploited. The rest is composed of the Rembi breed, D'man breed, and the cross-breed products.

***Data collection***

The method used was a questionnaire to assess knowledge about sheep breeding for 65 breeders, 12 of whom were followed monthly over one year, in order to determine some reproductive parameters including fertility, prolificacy, and lambs mortality, which were calculated using the following formulas [3]:

$$\text{Fertility} = \frac{\text{number of lambing}}{\text{number of ewes mated}} \text{ x } 100$$

$$\text{Prolificacy} = \frac{\text{number of lambs born}}{\text{number of lambing}} \text{ x } 100$$

$$\text{Lambs mortality} = \frac{\text{number of lambs died}}{\text{number of lambs born}} \text{ x } 100$$

The obtained data were subjected to descriptive analysis of percentages, mean, and standard deviation using IBM SPSS Statistics.

## 3. Results and discussion

**The conduct of reproduction**

The mating system used is usually free mating method. This system has the advantage of simplicity, but by contrast, it is almost impossible to determine the paternal ancestry of newborns, resulting in lower selection [3]. Also, in 92.31% of the cases, the rams are permanently present in the flock. For each small flock, one ram was used, while in the larger flocks the ratio of ewes per one ram varied from 15 to 30 ewes. In this regard, Ridler et al. [4] reported that the appropriate mating ratio (number of male to female animals) for any situation would vary depending on the numbers, ages and nutritional status of the animals involved, the mating management, the time of the year, terrain and feed availability. According to Jainudeen et al. [5], one adult ram is normally assigned to 30 ewes.

Furthermore, in all breeders surveyed, we remarked the absence of technological interventions such as hormonal synchronization of estrus and artificial insemination.

**Age at first lambing**

Age at first lambing is one of the essential traits owing to the exploitation of sheep for meat production in Béchar, like the other regions of Algeria. It was generally reported by farmers that the age at first lambing varied from 12 to 18 months, with an average of 14.5 months. In effect, the first fertilizing mating occurred at about 9.5 months in average. This indicates that the females were precocious in this region.

The average age at first lambing included in this study is lower than those showed by Lahlou-Kassi [6], who reported that all breeds in the North African region except the D'Man have a late first lambing, with an average age being 22 months. Also, Niare [7] reported that the mean age at first lambing in the Sudano-Sahelian zone of Mali was 16.6 ± 1.4 months.

**Distribution of lambing**

According to the enquiries with breeders, in herds with permanent presence of rams, lambing is distributed throughout the year, without seasonality in the frequency of parturition. This clearly indicates that ewes can come in oestrus at any time of the year. In this respect, pastoral breeders indicated that lambing periods were directly affected by rainfall, and the status of the pastures.

This important aspect of the reproductive characteristics was recently reported by Niar et al. [8] in Algerian sheep. Also in this respect, Gani and Niar [9] have concluded that local breed's ewes raised under difficult climatic conditions of the south-west of Algeria, are relatively non-seasonal with sometimes only a slight decrease in reproductive activity. This characteristic was supported by the study of Rosa and Bryant [10], who reviewed that in tropical and sub-tropical environments, ewes are either completely aseasonal or intermittently polyoestrus, with the quality and availability of food dictating breeding activity.

**Fertility, prolificacy and lambs mortality**

The results of descriptive statistics of the studied traits are given in Table 1.

**Table 1.** values of some reproductive parameters for each herd

| Flock No. | Number of ewes | Fertility (%) | Prolificacy (%) | Lambs mortality (%) |
|---|---|---|---|---|
| 1 | 21 | 61.90 | 123.08 | 37.5 |
| 2 | 125 | 82.4 | 104.85 | 32.41 |
| 3 | 12 | 100 | 116.67 | 21.43 |
| 4 | 20 | 65 | 100 | 7.69 |
| 5 | 53 | 87.5 | 111.42 | 12.82 |
| 6 | 80 | 92.5 | 101.35 | 5.33 |
| 7 | 20 | 65 | 115.38 | 20 |
| 8 | 120 | 75.83 | 107.69 | 5.10 |
| 9 | 160 | 73.12 | 100.85 | 9.32 |
| 10 | 680 | 111.18 | 111.90 | 9.69 |
| 11 | 130 | 119.23 | 112.90 | 10.86 |
| 12 | 9 | 166.67 | 120 | 0 |
| Mean ± S. D | | 91.69 ± 29.91 | 110.51 ± 7.66 | 14.35 ± 11.37 |

**Fertility**

The average fertility rate through an annual monitoring cycle was of 91.69 ± 29.91%. This rate seems to vary from one flock to another. It was 61.90 % for Flock No.1 and 166.67 % for the Flock No.12. This difference between flocks may be justified by the breeding system and management. In the northeastern region of Algeria, Benyounes et al. [11] have found a mean of fertility rate higher for Ouled Djellal (98.9%) and lower for Taâdmit breed (75%). Whereas, in the semi-arid zone of Kayes (Mali), Kouriba et al. [12] have obtained a close rate (92%) in Toronké breed.

**Prolificacy**

Prolificacy is an economically important trait of any flock. It is influenced by several factors such as ovulation rate, fecundity, fetal mortality and environmental factors. In the herds monitored, the means of prolificacy came up to 110.51 %, with a standard deviation of 7.66%. This rate was similar or close to those found by Benyounes et al. [11] in Ouled Djellal (110%) and Taâdmit (102%), or by Otte and Chilonda [13] in the pastoral systems of sub-Saharian Africa and under arid climate conditions (107%).

**Lambs mortality: pre-wean (Birth - 90 Days)**

The average pre-weaning mortality for the whole flocks reached 14.35%, with a standard deviation of 11.37%. The effects of weather that produce either cold stress or heat stress and poor nutrition are important factors conditioning pre-weaning mortality in the study area.

The calculated mean pre-weaning mortality in the present study seemed lower than that observed by Otte and Chilonda [13] under arid climate conditions in the pastoral systems of sub-Saharian Africa (28.7%), but much higher than that observed by Thieme et al. [14] in Central Anatolia (6.9%). Whereas Solomon et al. [15] have reported a pre-weaning mortality proportion (16%), close to our obtained results.

## 4. Conclusions

From the above study, it can be concluded that the local sheep breeds raised in the Saharian region of Béchar has a high reproductive potential, but the reproductive management of flocks is relatively traditional and not well developed, with minimum intervention. A tight planning and effective strategies are necessary to improve the performance of reproduction and consequently optimize the productivity of local sheep in the study area.

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