

**PRENATAL REPRODUCTION EFFICIENCY IN F<sub>1</sub> LACAUNE X TURCAN  
CROSSBRED PRIMIPAROUS DAIRY SHEEP**

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**Abstract:** Aim of the current preliminary research trial was to evaluate the effects that crossbreeding the French Lacaune breed with Romanian native Turcana sheep has on prenatal reproduction efficiency in F<sub>1</sub> Lacaune x Turcana crossbred primiparous genotypes, when put to ram as maiden-ewes or as yearling ewes. When crossbred ewes were introduced to reproduction at the age of 10 months, the average conception rates were of 45.4%, compared to 26.0% in Turcana purebreds, differences between the two groups being significant ( $p \leq 0.01$ ). When F<sub>1</sub> Lacaune x Turcana crossbreds were first put to ram at the age of 18 months, the conception rates were on average of 90.0%, compared to 95.8% for the Turcana controls, differences between the two genotypes being significant ( $p \leq 0.05$ ). The F<sub>1</sub> Lacaune x Turcana proven to be more precocious when reproduction onset is concerned, compared to indigenous Turcana ewes.

**Key words:** sheep, dairy breeds, Lacaune, Turcana, reproduction efficiency

## INTRODUCTION

After cattle sheep are the most numerous of the domestic ruminant species, with over 1 billion heads. Sheep milk production has an estimate of 9,272,700 tonnes / year and accounts for 1.3% of the global milk production.

In many countries and regions of Europe, the sheep production systems vary greatly. The lamb meat has become a major product in Central, Eastern and Northern Europe, while sheep are predominantly reared in the less favoured areas with low soil fertility. With a total of 83,971.00 sheep being raised in the European Union for milk and meat productions.

The discrepancies of milk yields are cause, in particular, to the administration of food and the different genetic improvement schemes. In addition, the considerable phenotypic variation in milk production is widely known among the most dairy breeds. Some breeds, due to proper selection and nutrition, can produce yields greater than 600 kg of milk / lactation, taking into account the heritability of milk production, ranging from 0.20-0.30 with individuals who have produced under experimental conditions 1,400 kg of milk / lactation.

Turcana sheep breed is the Romanian native breed with over 6 million heads (Ilișiu et al., 2010), is one of the most representative breeds belonging to the Eastern European group Zackel. Zackel sheep are currently found in 14 countries of Europe C, E and S (Draganescu & Grosu, 2010). It is considered to be a three-purpose breed (meat, milk and wool), being routinely managed in an extensive production systems.

Different geographic conditions and large numbers of animals have led to a high phenotypic heterogeneity. In adult sheep weights range between 30 and 60 kg and in rams between 50 and 120 kg, growth rates in un-weaned lambs of 110 to 275 g / day, fecundity rates ranging between 103 and 140% (Georgescu et al. 2000; Voia, 2005; Padeanu, 2010)

The Lacaune breed is the most important dairy breed in France, with over 800,000 sheep breeding in the country. Lacaune in France has three types, Lacaune "lait" being selected for the production of milk, Lacaune "viande" being selected for the production of

lambs with a major gene for prolificity. The body weight of the Lacaun breed is 70-75 kg in adult sheep and 90-100 kg in males.

Aim of the current preliminary research trial was to evaluate the effects that crossbreeding the French Lacaune breed with Romanian native Turcana sheep has on prenatal reproduction efficiency in F<sub>1</sub> Lacaune x Turcana crossbred primiparous genotypes, when put to ram as maiden-ewes or as yearling ewes.

### MATERIALS AND METHODS

At the Research and Development Station for Sheep and Goats in Caransebes, the study was conducted (45°25'N/22°13'E), south-western Romania, starting September 2016 until October 2017. In the Caransebes area the average annual temperature is 12.9 ° C, the altitude of 280 m above sea level.

Two groups experimental groups were set-up for the study as follows: experimental group I, with the production of the crossbred lambs and their rearing under extensive (traditional system), with no access to concentrates feed and the admission to reproduction at the age of 18 months of the nulliparous; experimental group II, with the production of the crossbred lambs and their rearing under semi-intensive conditions, with access to concentrates feed and the admission to reproduction at the age of 8 to 10 months of the nulliparous females.

**Table 1.**

**General data of the experimental design and rearing conditions in intensive and semi-intensive production systems**

Trait/ Production system	Extensive	Semi-intensive
Age at first mating	18 months	8-10 months
Reproduction onset	September	October
Concentrates during grazing	no	200 g/day
Concentrates during whinter	no	300 g/day
Pasture type	Natural, unimproved	Cultivated
Stoking rate	10-12 heads/ha	7-9 heads/ha
Indoors housing in whinter	60 days	90 days

Two genotypes have been used in the implementation of the research, such as F1 Lacaune x Turcana females and control groups, consisting of nulliparous Turcana gimmers. Both groups were kept in the same flock, feeding and living habits being identical in a semi-intensive production system (see Table 1), the experimental lots were in the number of 25 animals. In mid-September, nutritional flushing was practiced for three weeks before the breeding season onset. In addition, during the whole year the animals had access to the drinking water and the mineral blocks.

During winter the sheep were kept in shelters for a period of 120 days, with a space of 1.8 m<sup>2</sup> / sheep with a deep straw bedding. For feeding, the sheep received high quality pasture hays *ad libitum* and 200 g concentrates during late gestation and fresh forages during the lactation period. After the lambs were weaned, the sheep were fed exclusively on pastures, with two milking's per day (starting 6:00 to 17:00).

Data were statistically using MiniTab14<sup>®</sup> software, in the differences of analysis between the two groups were analysed by non-parametric Mann–Whitney–Wilcoxon test. At the significance level (0.05) statistics were made on rejection or acceptance of decisions. In accordance with the European Union Directive on Animal Experiments (Directive 2010 63 / EU) research activities have been carried out.

The current study is part of the project ADER 5.1.8., and further details on the experimental set-up were described and published by Tartareanu et al. (2017) in the article [ Effects of using Lacaune rams in crossbreeding schemes with Turcana breed on body

development in F<sub>1</sub> Lacaune x Turcana yearling ewes – preliminary results, Scientific Papers: Animal Science and Biotechnologies, 19(3), 89-93

### RESEARCH RESULTS

Data on the effects of crossbreeding the Lacaune sires with indigenous Romanian Turcana ewes on the body development in crossbred nulliparous are being presented in Table 2, based on the production system applied.

Under extensive production system, with the admission of the nulliparous at the age of 18 months, the traditional system practiced in Romania, the F<sub>1</sub> Lacaune x Turcana gimmers registered an average body weight of 48.2±0.31 kg, compared to the Turcana purebred counterparts (control group), which had on average 45.6±0.24 kg at the same age. Differences between the two genotypes were significant statistically (p<0.05).

Both genotypes had body weights higher than the threshold set for Romanian indigenous breeds to be put to ram, respectively 35-40 kg [6, 7]. Although, differences were in favor of the dairy specialized genotype (Lacaune sired females), taking into consideration that the crossbred was produced in order to be reared for milk production.

In the future, both genotypes will be further reared under experimental conditions (research station conditions) in order to test the reproduction efficiency and their potential to produce milk.

**Table 2.**

**Means (±SE) on conception rates of primiparous F<sub>1</sub> Lacaune x Turcana and Turcana purebreds reared in extensive and semi-intensive systems (preliminary data)**

Genotype	Extensive system (18 months)	Semi-intensive system (8-10 months)
F <sub>1</sub> Lacaune x Turcana	90.0±2.04	45.4±3.38
Turcana (control group)	95.8±1.11	26.0±5.08
Statistical differences	*	**

*P: NS > 0.05; \* < 0.05; \*\* < 0.01*

Under semi-intensive production system, with the admission of the nulliparous at the age of 8 to 10 months, the F<sub>1</sub> Lacaune x Turcana ewe-lambs registered an average body weight of 36.6±0.19 kg, compared to the Turcana purebred counterparts (control group), which had on average 32.9±0.31 kg at the same age and reared under identical feeding conditions. Differences between the two genotypes were significant statistically (p<0.01).

Current results are in accordance with previous reports concerning the body development of the replacement ewes in the Romanian indigenous sheep breeds [6, 7, 8].

### CONCLUSIONS

Current results show that by using Lacaune rams for crossbreeding with the long coarse wool mountain Turcana belonging to the Eastern European Zackel group breeds, the resulting progeny females will have a significantly better reproduction outputs when put to ram as yearling ewes at the age of 8 to 10 months, and as a result, the farm returns could be much improved in commercial dairy sheep farms that practice the semi-intensive production, throughout the introduction to reproduction with one year earlier compared to the traditional system of 18 months, and obtaining one lactation more in the crossbred animals compared to purebred Turcana.

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