Study on the Incidence of Twin Lambings in a Lacaune Sheep Population

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Abstract
The Lacaune sheep breed was started to be recently imported and in small numbers on the Romanian territory, and the number of animals of this breed is still low, so, it was considered necessary to carry out a study on a sheep population from the NE area of the country, where a herd of 382 Lacaune sheep was imported from France. The aim of the paper was to study the adaptability of the breed in this area using prolificacy as its main criterion. The study was made in the period between 2020, September to 2021, April, including the 2020 September-October mating campaign and the 2021 February-March lambing campaign, the period in which the factors that could influence the reproductive indices were studied, but also the overall development of the flock. After the lambing period, the collected data were processed and it was concluded that the prolificacy index registered values that fall within the values recorded in the specialty literature and that are considered as standard values of the breed. There were 282 females studied, 186 of them lambed twins and out of this number, 48 of the females were primiparous and 138 were multiparous. In the studied farm, the prolificacy had values of 144,4% for primiparous and 179,3% for multiparous females, like as the specialty literature data, where the "Lacaune du lait" sheep breed has an average prolificacy of 145% in primiparous and 170% in multiparous. These data reveal that the breed has adapted well to the conditions in the area, not negatively influencing the prolificacy index, which indicates that animals of this breed can fully express their genetic potential and could even improve their performance if a good management is applied.

Keywords: Lacaune breed, sheep, twin lambings.

1. Introduction

According to INSSE (National Institute of Statistics) data, on December 1, 2019, Romania ranked 3rd among EU member states, after the United Kingdom and Spain in terms of the number of sheep and goats, with a population of 11.9 million heads [1]. However, the diversity of the breeds is small, the main breed bred for milk production being the Turcana, which is a native Romanian breed, reared especially in conventional system and which yields small quantities of milk compared to other breeds specialized on this production. This breed is now registered for performance testing by the Romanian National Agency for Genetic Improvement and Reproduction [2] and the aim is to increase the milk production using the national breeding programs. There are also farms that have adopted the intensive rearing system or the semi-intensive one, these farms have acquired specialized breeds on milk production originating from other parts of Europe (France, Italy, Spain) and have tried to adapt them to the specific conditions of Romania.
The studied farm purchased from France two "Lacaune du lait" sheep flocks. The Lacaune is a breed native to the south of France area which was officially recognised in 1893 as a result of the mixed of many local breeds. As time has passed,

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the breed has split into two lines, one for milk and one for meat. [3, 4, 5] In the area of acquisition of the breed, as well as in other areas of Europe where this breed is reared, the management of reproduction and breeding consists in the intensive use of the reproductive capacity of the sheep by using artificial insemination and oestrus synchronization. The Lacaune breeding system is characterized by out-of-season lambing, from October to January for adult ewes. The ewes are milked after a 1-month-long suckling (plus milking) period and dried off in July or August. [6, 7].

Animals raised in an intensive production system during the lactation period did not go out to graze and are fed in the installation with a mixture of forage and concentrates, established by differentiating three qualities, according to the lactation period as follows: high production (first two months postpartum), medium production (three months later), and low production at the end of the lactation period (last two months) [8, 9].

According to ANZ (National Agency for Animal Husbandry) data, in 2019 there was a total number of 1852 sheep in the Lacaune breed existing in Romania [10] and which are included in breeding programs. Knowing this fact, the aim of the paper was to study some of the reproductive indicators (especially the prolificacy rate) for the studied flock and to compare the values obtained with the values recorded in the literature. The aim was also to compare the growth and reproduction management of the flock with the management implemented in the area of acquisition of the breed (also in other areas of Europe) and also the influence that the geo-climatic environment has on the growth and development of the breed. This was also highlighted by studying the mortality rate among lambs in the study year.

2. Materials and methods

The study was conducted in a flock of 380 sheep of the breed Lacaune du lait, they were purchased in two tranches from France. The first part, 170 animals, was purchased in 2018 and included 165 females and 5 males. The second segment numbered 117 females and 5 males. At present, the farm has a total of 282 ewes, 10 rams, 100 young females from the previous year and 12 young males from the previous year. The entire flock of rams purchased has zootechnical certificates for pure-bred breeding sheep. In the case of females, they do not have breeding certificate of origin but are phenotypically matching the breed standard and are included in a national breeding program. The time period in which the study took place included the months of September 2020 to April 2021, including the September-October 2020 mating campaign and the February-March 2021 lambing campaign. The management of the studied farm is different from that of other areas of Europe, where this breed is reared. This is due to the fact that in the Carpathian-Danubian-Pontic area, and more precisely in the NE area of the country, the climate is temperate-continental and the winter periods extend up to 4 months and extremely low temperatures can be recorded which can endanger the health of lambs and ewes. The animals are kept during the cold periods in a complex consisting of a shelter measuring 50 meters long, 10 meters wide and 3 meters high and in three related annexes measuring 20 meters long, 8 meters wide and 2 meters height. Both the shelter and the annexes have feeding alleys in the middle and are compartmentalized, in each compartment the females are subdivided according to age and physiological condition.

Winter feeding is done exclusively with quality hay, mash, grains and concentrates which are administered on the feed alleys located in the middle of the shelter and annexes. In the shelter, the feeding is done manually and the annexes have a conveyor belt for feeding. During the summer, the forage is of mixed type, so in the hot and rainless periods, the animals are grazed on the plots intended for this purpose which are fenced with electric fence and in the cold and rainy periods the sheep are fed with hay and mowed green grass. Another aspect regarding foraging is the fact that due to the location of the pasture (on either side of two ponds), the grazing is done rationally; while one part of the pasture is used by animals, the other is irrigated with water from ponds through pumps and after a certain period the rotation is done. The fodder base is represented by the fodder obtained from the 55 hectares of arable land, on which mash, triticale, alfalfa, vetch, spring barley and barley are cultivated. The use of the feeding method, which consists in alternating grazing with shelter feeding, was a first factor that determined the achievement of a high percentage of prolificacy.

Also, outdoor exposure facilitated the growth and development of animals in the best conditions by giving them access to free movement, exposure to sunlight, selective grazing and also improved hygiene.

The electricity from the farm is provided by the solar panels installed on the roof of the shelter but also by the electric generators that run on fuel.

Manure evacuation is done mechanically and manually, once a week and their storage are done on the manure platform, to then be used as natural fertilizer on the land owned by the farm.

During lambing period, the mother sheep are watched very carefully and when the parturition approaches, they are separated in individual boxes. After lambing, the lambs are helped to feed and then separated from their mothers after a week and reared artificially. Milking on the farm is carried out in stages due to the need to separate the lambs from the mothers because their dentition develops at a fast pace and a long period of suckling can cause damage to the nipples of the females. Thus, the females from whom the lambs have been separated are introduced for milking, this is done with the portable milking system. As the number of sheep to which the lambs have been separated increases, they are milked at the mobile milking parlour. After weaning the entire flock and starting control of milk production, milking takes place in the fixed milking parlour provided with separation stands and administration of concentrated feed. Following the control of milk production, values between 900 and 1400 grams of milk per animal were recorded at the evening milking.

Providing a large space for movement allowed good development of muscles and organs, so the healthy female could express to the maximum the morpho-physiological capabilities specific to the breed standard and even exceeding them.

Exposure to sunlight also had a beneficial effect on animal health, and selective grazing allowed the animals to use beneficial and necessary nutrients in normal development and welfare.

Feeding with the best fodder and concentrates has also ensured a good development capacity.

3. Results and discussion

Using the farm data, the data registered by the zonal veterinarian and the data on the certificates of origin and the sale-purchase documents, a distribution of the number of females studied according to age and parity was made.

At the time of the study, 19 of the females were born in 2013, being at the 7th lambing, 26 were born in 2014, being at the 6th lambing, 33 in 2015 (5th lambing), 30 in 2016 (4th lambing), 66 in 2018 (2nd lambing) and 108 in 2019 being at the first lambing (Table 1).

The data regarding: the category of sheep and their number, the type and number of lambs for each category and the percentage of lambs related to the total of each category are presented in the Table 2.

Table 1. Ewes repartition according to the year of birth

Year of birth	2013	2014	2015	2016	2018	2019
Number of females	19	26	33	30	66	108
Parity (Number of lambings)	7	6	5	4	2	1

Table 2. The number of lambs for each category of ewes and type of lambing

Ewe category	Total number ewes/category	Number of lambs			
		Single lambing (SL)		Twin lambing (TL)	
		Nr.	%	Nr.	%
Multiparous	174	36	11.54	276	88.46
Primiparous	108	60	38.46	96	61.54

The total number of lambs lambed for the category of multiparous females was 312 and in the case of primiparous females it was 156 lambs. The number of lambs was also distributed according to the type of lambing. Thus, 36 lambs (11.54% from total) were obtained from multiparous females that lambed a single product and 276 lambs (88.46%) were obtained from the

same category of females but that ones who lambed two products. In the case of primiparous animals, 60 lambs (38.46%) were obtained from females with a single product and 96 lambs (61.54%) were obtained from primiparous females that lambed two lambs.

The values for prolificacy were calculated using the calculation formula for this index, comparing them with the values from the literature.

P%=(Number of lambs)x100/(Number of ewes)[11,12]

The prolificacy registered values of 179.3% in the case of multiparous and 144.4% in the case of primiparous, being close to the values in the specialized literature. The total number of lambs registered on the farm following the lambing campaign in 2021 was 468.

In the studied flock, no abortion was registered, instead, there was a large number of deaths among lambs from twin lambings but also in the case of lambs from single lambings.

The number of dead lambs was expressed according to the category of sheep and the type of lambing. Thus, out of the 36 products obtained from multiparous females that lambed a single lamb, 3 (8.33%) died and out of the 276 lambs obtained from twin lambing, 14 (5.07%) died. In the case of primiparous animals, out of the 60 lambs obtained from lambing with a single lamb, 8 (13.33%) died and out of the 96 obtained from twin lambing, 28 (29.17%) died. The percentage values of deaths from the total number of lambed lambs on each category of sheep were also calculated, obtaining for multiparous a percentage of 5.44% and for primiparous 23.07%. Therefore, a much higher incidence of lamb mortality can be observed in the category of primiparous sheep.

Table 3. Prolificacy comparison

Ewe category	Total number /category	Number of lambs	Prolificacy (%)	
			Determined values	According to literature*
Multiparous	174	312	179.3	170
Primiparous	108	156	144.4	140
Total	282	468	165.9	

Table 4. The mortality situation of lambs in the flock

Ewe category	SL (lambs)			TL (lambs)			Total/farm (lambs)		
	Total	Dead	%	Total	Dead	%	Total	Dead	%
Multiparous	36	3	8.33	276	14	5.07	312	17	5.44
Primiparous	60	8	13.33	96	28	29.17	156	36	23.07
Total	96	11	11.45	372	42	11.29	468	53	11.32

**SL- Single lambing*
TL- Twin lambing

According to the data obtained, the mortality rate on the entire number of lambs studied was 11.32%, which is higher compared to data from other scientific sources: [13] which specifies a percentage of lamb mortality up to weaning of 5-10%. The reason for this high percentage is due to the fact that the temperature fluctuations in the lambing season were quite high and the adaptation of the lambs to these conditions was difficult. Another factor was the change of the breeding season for multiparous. Also, in the case of primiparous, climate change has led to low fertility, 20% of this flock not becoming pregnant after the first breeding.

4. Conclusions

The conclusions drawn from the study are as follows:

The values obtained regarding the prolificacy index (179.3 % for multiparous and 144.4% for primiparous) of the studied flock were close to the values recorded in the specialized literature (170% for multiparous and 140% for primiparous [11]).

It can be concluded that the breed has adapted very well to the soil and climate conditions in the NE area of Romania and that ensuring a proper diet and a favourable climate correlated with an alternate system of grazing and intensive feeding

in the shelter can make the animals to highlight to the maximum the reproductive and productive potential specific to the breed standard, even to exceed it.

The value of the mortality rate of lambs was higher than the rate for the specifics of the breed, recording values of 11.32 % compared to 5-10% as in specialty literature [13].

The mainly cause for this high mortality rate is due to poor management in terms of breeding period which led to the lambings in cold weather.

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