TECHNOLOGICAL METHODS OF QUANTITATIVE AND QUALITATIVE STIMULATION OF SHEEP MILK PRODUCTION

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Abstract: *The milk obtained from the sheep species has a double importance, biologically, being the only source of food for lambs in the first weeks of life and commercially, as it represents an important source of profit for farms through the production of milked milk and the commodity milk distributed on the market as products processed. Extending the lactation period by ensuring the nutritional needs for maintenance and production, contributes to the increase in total milk production and the increase in the amount of milk produced can be stimulated by moving calvings in February as a beneficial solution and increasing the number of milkers. Improving the quality of sheep's milk can be done by controlling genetic and internal and external environmental factors using the most efficient methods of directing selection and improvement actions through nutrition management, based on individual variations in the amount of fat and protein content, but also the control by managerial measures of the sheep exploitation factors in different production systems.*

Key words*: sheep, exploitation system, management, production, milk*

INTRODUCTION

Because Sheep are exploited to produce milk, meat and wool in farms of different sizes, the intensity of production highlights the efficiency of exploitation and among farm animal breeders in Romania their exploitation is an opportunity, which breeders can take advantage of because they are among the most efficient in the use of plant resources. Unlike bulls, swine and birds, sheep are adapted to the most extreme environmental conditions, being very agile and easily exploited on the most rugged mountain terrain, where other species, especially bulls, avoid feeding. Sheep have a high capacity to convert fodder from natural pastures into milk and meat proteins, necessary for human nutrition. [1,2,5,18]

Sheep specialized for milk, meat or mixed production can use practically all types of forage, including residues from large crops and even grass from the edges of emissaries, mountain lakes and ditches. The abundance of fodder resources, we believe, is the key to a profitable production of milk obtained from sheep. The successful farmer must also have a genuine business interest, management skills and skilled human resource for raising and operating sheep on specialist professional dairy, meat, or mixed farms. Raising sheep in different production systems using different feed resources presents several advantages and disadvantages that make the operation efficient or less efficient. [5,8,10,13] The main advantages of raising and exploiting sheep in different production systems reside from the fact that sheep (Figure 1):

- convert roughage as primary feed into milk, meat and wool;
- helps to combat some weed species on natural meadows;
- contribute to the protection and preservation of the natural environment;
- for good milk production, sheep require a minimum amount of additional feed;
- provides at least three sources of cash income: meat, milk and wool;
- sheep, due to the short period between generations, can provide a quick profit for farmers;
- requires few inputs for efficient exploitation for milk production;

• sheep milk production does not require sophisticated facilities and equipment for processing;

• the demand for sheep products on the market is high, there is a tradition in the consumption of products obtained from sheep. [4,7,9,12]

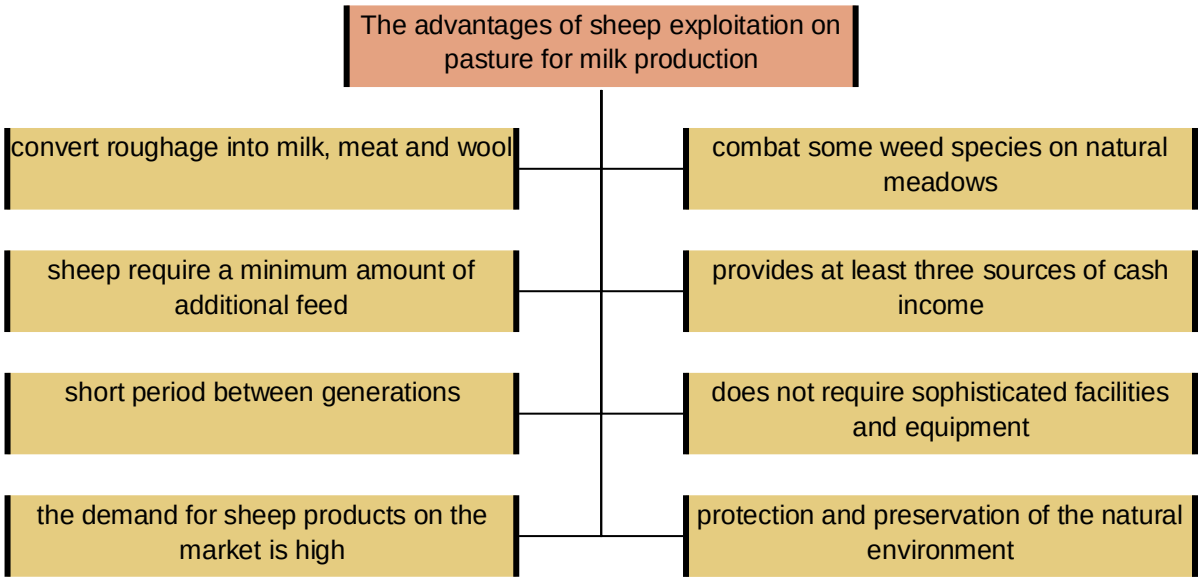

Figure 1. The advantages of sheep exploitation on pasture for milk production

The breeding and exploitation of sheep in professional farms that concentrate large herds to obtain constant production throughout the year also has disadvantages because:

• a sheep farm must be well managed and have a certain type of management depending on the production specialization;

• sheep require, for a good use of the meadows, investments in fences to delimit the plots;

• sheep exploited on alpine pastures require increased assistance to avoid being victims of predators;

• internal parasites can create health problems when sheep are grazed on irrigated pastures;

• dairy sheep can contribute to the degradation of meadows, through irrational exploitation. [3,11,16,17]

As far as Romania is strictly concerned, the Ministry of Agriculture and Rural Development emphasizes that the exploitation of this species (MADR, 2022) represents a traditional activity that lends itself to different exploitation systems, classic or alternative on pastures and at the national level there are enough resources to contribute to the profitability of sheep production. In order to obtain accelerated productions, it would be advisable to exploit three breeds in integrated professional farms in order to be able to develop flocks of sheep that present acceptable levels of desired traits for the type of production expected to be achieved. [6,14,15]

MATERIALS AND METHODS

Practice shows that although the same environmental conditions are ensured, within each farm and the same breed or flock of sheep, there are individuals that produce small quantities of milk for lambing and marketing and females that produce quantities of milk close to potential and even more much during a lactation period. Sheep's milk compared to the one obtained from bull meat is twice as nutritious, being rich in iron and vitamins and can be consumed raw without the risk of transmitting diseases. For these

reasons, in order to increase the quantitative production of milk, we carried out research in professional breeding and exploiting sheep farms of the Turcana breed, in Gorj County, where we have analyzed the factors that contribute to the non-achievement of individual and total milk production at the potential of the breed, with the aim of finding new solutions and methods for increasing the quantitative and qualitative production of milk, depending on the production system implemented in each farm studied.

RESEARCH RESULTS

1. Genetic factors influence the amount of milk obtained from lactating sheep because in each flock of Turcana breed there are individuals with different productive potential, according to research undertaken on the control of milk production in sheep with:

- minimum productions below the breed's genetic potential of only 35.00-37.80 kg per lactation;
- maximum productions of 260.6-278.0 kg per lactation;
- average productions per lactation between 38.70-261.20 kg.

We believe that this great variation between individuals from the same herd is due to the lack of:

a. sustained selection to increase milk production;

b. great diversity of genotypes;

c. high variability;

d. insufficient involvement of specialists in this improvement activity.

We find that within the Turcana breed and in certain flocks of sheep studied in the research area, there are isolated individuals that show greater than average variability that can be used for:

- exploitation to increase the quantitative production of milk;
- selection to obtain products that improve total milk production on herd and lactation;
- crossbreeding with specialized milk breeds to improve milk quality.

We believe that to increase the quantitative production of milk in the studied herds, depending on the genetic value of the individuals from the herd, crossings with specialized breeds for milk are recommended.

2. Because some internal factors have a major influence on milk production in sheep, nutrition management, by controlling feed rations, can be one of the most effective managerial methods to increase milk production for Figure 2.:

• increase milk secretion, through stimulating feeding starting from the second part of pregnancy;

• the production of large quantities of milk through managerial measures, for 1 liter of milk predicting 0.75-080 UN and 85-90 grams of digestible crude protein above maintenance needs;

• the use of sheep's ability to convert roughage into protein/milk and the decrease of concentrated feed in milk production, during the exploitation period on natural pastures, as it is not effective in the classic exploitation in stables because it causes the decrease of milk production by 12.70%;

• extending the lactation period from the second half of February to the first week of October, which contributes to:

a. increase in total milk production;

b. due to the positive correlation between total production and lactation period;

c. the relatively constant correlation over the productive life cycle between total production and lactation periods.

We conclude that the lactation period should not be reduced before the period of estrus manifestation depending on the length of the daylight hours because increases the number of non-productive days:

- early calving's in the alternative exploitation system produce production reductions;
- failure to ensure optimal maintenance conditions can reduce milk production;
- early calving in February are beneficial, if the maintenance is appropriate, because after weaning sheep benefit from lactogenic green fodder resources.

• maintaining an optimal weight at insemination in sheep because:

- sheep with a body weight of 35.0-37.0 kg produce 2.80-3.20 kg of milk per unit of live weight;
- sheep with a body weight of 50.9-53.0 kg produce only 1.80-2.20 kg of milk per unit of live weight.

• the increase in milking stimulates milk secretion:

a. what grows with teats or the number of milkings if there are possibilities for mechanic milking;

b. the transition to a number of 3 milkings through managerial measures to control nutrition;

c. the use of lactogenic feed during the peak periods of milk production, contributes to increase in milk production 18.50-22.30%.

• increasing the duration of use for reproduction (lactations) - from the third to the sixth or even the seventh lactation in some individuals, the production is higher than the productive average;

• stimulating multiple births, although farmers do not encourage it, can contribute to increasing milk production, if the lambs are weaned early and raised through artificial lactation.

3. External environmental factors have a major influence on milk production both quantitatively and qualitatively if the production management implemented in farms does not ensure:

- quality water in sufficient quantities;
- balanced nutrition associated with lumps of salt;
- production conditions necessary for the physiological state of lactation.

The temperatures favorable for normal milk secretion are between 5.5-20.0°C and the calving season contributes to:

• increase in quantitative milk production if parturitions are scheduled in mid-February because:

a. prolongs lactation by 22-25 days;

b. efficiently uses the abundant plant resources from the spring;

c. the lactation curve reaches maximum values in the period with a high intake of green fodder;

d. milk production costs are lower because the amounts of concentrates are small.

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- increasing the quantitative and qualitative production of milk by diversifying well-managed manual or mechanical milking systems have a positive influence on the quantitative production of milk by:

a. mechanical milking in the morning and evening during periods with abundant vegetation;

b. manual milking after lambs are weaned.

The qualitative improvement of sheep milk can be done by controlling genetic and environmental factors internally and externally through the following managerial measures depending on the production degree of intensification through:

- methods of directing selection and improvement actions, based on individual variations of characteristics:

a. milk fat (h2 = 0.38);

b. milk proteins (h2 = 0.72).

- nutrition management, which involves:

a. optimal energy level according to:

- the productive potential of the herd;

- the control of the energy supply, because over the need determines the reduction of the quantity of milk proteins;

b. optimal protein level;

c. optimal energy: protein ratio.

- controlling the period between milkings and their number, to maintain a fat ratio in milk because at:

a. in the case of morning milking, the percentage of fat is lower in the milk;

b. in the case of midday milking, the percentage of fat is higher than the herd average;

c. evening milking, the milk fat percentage is intermediate.

- tracking the level of chemical compounds in milk depending on the evolution of lactation because:

a. the percentage of fat increases progressively with the evolution of lactation;

b. the highest total amount of proteins and fats is achieved in a percentage of over 60% in a normal lactation in the second part.

- the control through farm management of the technological exploitation factors because it determines:

a. deviations from optimal exploitation with stagnation or reductions in production;

b. changes in the composition of the milk;

c. fragile balance between the organism and the operating environment;

d. adaptability to the production system.

In addition to managerial methods and modern technologies for quantitative and qualitative increase of milk production, for the professional farms researched we also propose other methods for implementation that contribute to improvement through:

- ensuring a good maintenance management according to the exploitation system;

- to identify sheep with characteristics that will form future selection cores;

- homogeneous pairings for the formation of lines and families with high lactogenic potential;

- improving milk production through hybridization;

- use as breeding breeds that considerably improve precocity and prolificacy.

CONCLUSIONS

The improvement of quantitative milk production through technological methods of sheep exploitation can be carried out by controlling production according to the genetic value of the herd from each farm, through controlled selection activities, crosses with specialized breeds and by balancing fodder rations, through modern methods of management of nutrition. Management measures can contribute through balanced stimulating feeding after lambs' weaning, to increasing milk secretion and obtaining a quality milk if the optimal energy-protein ratio is respected in the fodder rations, but also by extending the duration of lactation which contributes to increasing the total milk production per lactation.

To increase milk quality, we propose moving calvings in February as a management method and increasing the number of milkers, after weaning the sheep can benefit from lactogenic green fodder resources that stimulate the quantitative secretion of milk and improve its quality by paying more attention through integronic management implemented in farms, the quality of the sheep from flocks, maintenance systems, nutrition and the prevention of adverse effects caused by genetic, internal and external environmental factors by implementing the best technological management according to the potential of the breed.

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