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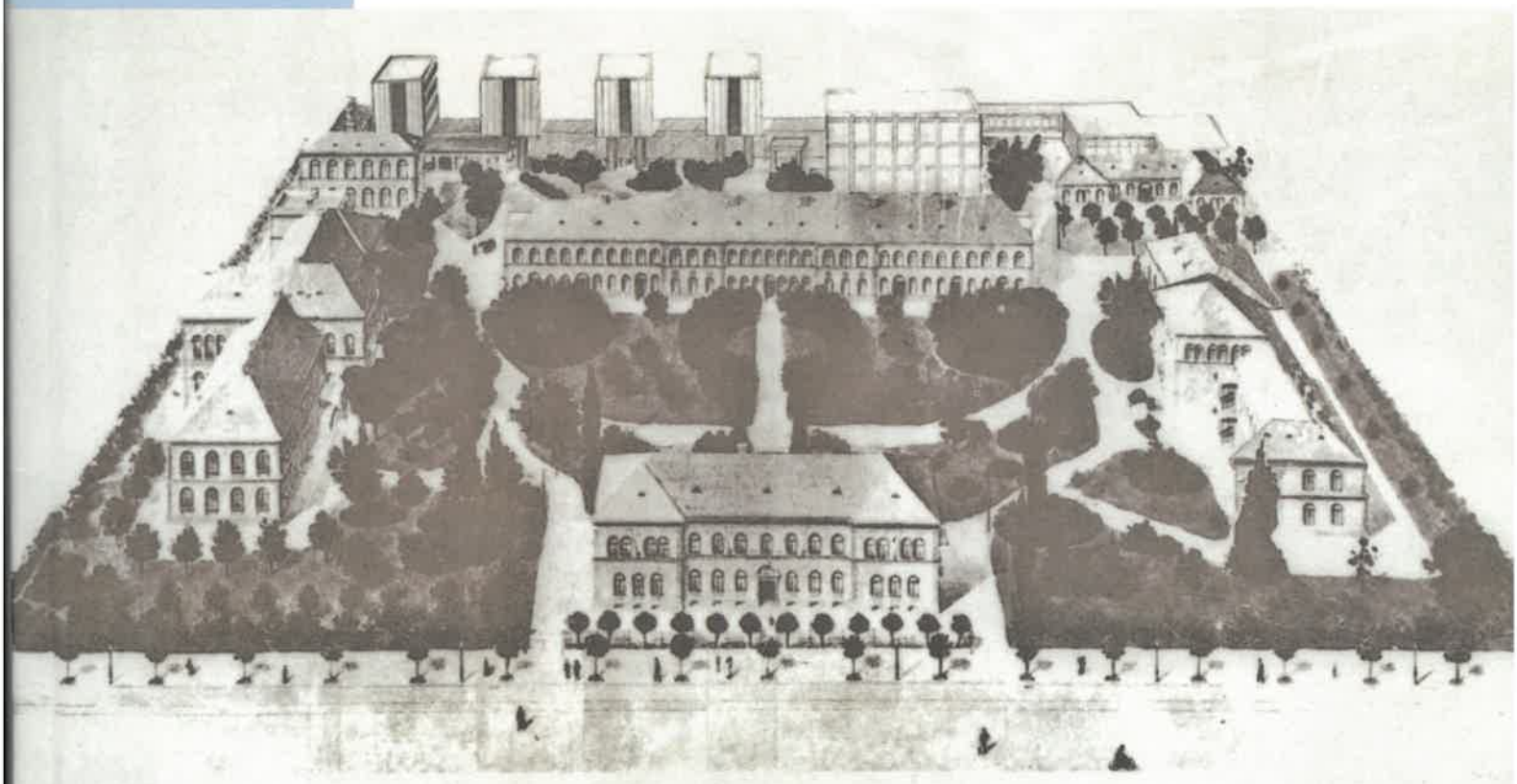

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The use of methods and technologies to improve the performances of reproduction and production in goats

Különböző módszerek és technológiák alkalmazása a termelési és szaporodásbiológiai mutatók javítása érdekében kecskékben

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SUMMARY

At the end of 2013, the total number of sheep and goats, placed Romania on the fourth place among the member states of European Union, after the United Kingdom, Spain and Greece.

With regards to the density of 100 ha, Romania is currently ranked 6th in the European Union after: Greece, United Kingdom, Spain, Portugal, the Netherlands and Italy.

The total number of goats in Romania suffered a sharper decrease between 1990 and 2002, and after this time the trend was kept on increase and reached in 2012 the total number of goats higher than 1,2 million individuals.

In order to increase the economic efficiency of breeding goats it is very important to be based on the identification and implementation of the most appropriate techniques for reproduction, breeding youth goats for replacement, maintenance, feeding and breeding of goats according to their productive level.

Key words: Romanian goat, breeding, reproduction, management

ÖSSZEFOGLALÁS

Románia 2013-ban, a területén található kecskék és juhok összlétszáma szerinti rangsorban a negyedik helyen állt az Európai Unió országai között az Egyesült Királyság, Spanyolország és Görögország után.

Száz hektáronkénti állománysűrűség alapján Románia jelenleg a hatodik az Európai Unióban Görögország, az Egyesült Királyság, Spanyolország, Portugália, Hollandia és Olaszország mögött.

Romániában a kecskék összlétszáma 1990 és 2002 között erősen lecsökkent, majd ezt követően folyamatos emelkedés volt megfigyelhető, aminek az eredményeképpen 2012-re a kecskeállomány nagysága elérte az 1,2 millió állatot.

Annak érdekében, hogy a kecsketenyésztés gazdasági hatékonysága javuljon nagyon fontos, hogy az állomány ellátása a legmegfelelőbb szaporodásbiológiai technológia kiválasztásán és

alkalmazásán, valamint az utánpótlásként használt növendékek tenyésztésbe vételén, az állomány fenntartásán, és a termelési szintnek megfelelő takarmányozásán és tenyésztésbe vételén alapuljon.

Kulcsszavak: romániai kecske, tenyésztés, szaporodásbiológia, menedzsment

Introduction

Worldwide, the interest in the species represented by goats knows new valences, and on this fond in Romania and in other European States goat livestock has increased lately. At the bases of this trend there are the quality of the productions and the interest of the market for them. In these circumstances, the farmer is obliged to identify and apply some technological options so that the management can use them. In defining the technological variants in raising goats will take account of the specific features of the function of reproduction as well as the level proposed for the major productions.

In defining the methods and technologies used to improve the performance of reproduction and production shall take account of the biological particularities, whereas the correct delineation of these can give a great capacity of adaptation and a good acclimatization and a high degree of adaptation to new and diverse environmental conditions. That explains why the individuals belonging to these breeds have managed to have a wide spread area. In addition to all this is added the fact that their productive characteristics make it possible to obtain extremely valuable products under the nutritional aspect and economically.

Of the productive qualities of goat, lies in first place, the superior lactogenic ability, and from the reproduction characteristics, fecundity and prolificacy, namely this breed have a good capacity for multiplication. After these qualities meat production and commercial productions of hair, lint, or wool income. The secondary productions may be also included the hides, pelts, horns, intestines, manure, etc.

Results and discussions

In recent years in Romania there have been significant progresses in terms of the field represented by the increase of goats, in particular in areas where this activity is a traditional one. These areas are found in the areas of hills and foothills and offer greater possibilities of exploitation of some large areas of pastures that cannot be recovered in a more efficient way by other breeds of animals.

At the same time with the increased number of goats in Romania there are also in progress actions focused on improving the primary production and reproduction characteristics. Also, the development of better technologies represent a very important goal and has the roleto facilitate the recovery, in a more efficient way, of the production potential of goats bred in various operating systems and maintenance.

In raising small ruminants, since 2006 major herds have risen from 10.1 million heads in 2009 to over 12 million in 2013. Analyses on the data indicate a slight decline in 2009, after which the trend went towards a positive and was relatively constant in each period of the time.

Over the whole period considered and presented in Table 1 it can be seen a slight growth trend of small ruminants in late 2013, the increase in the herd number was with about 25% higher than the overall population recorded at the end of 2010.

At the end of 2013, the total number of sheep and goats in Romania was on the fourth place among the member states of the European Union, after the United Kingdom, Spain and Greece. In terms of density per 100 ha, Romania is after: Greece, United Kingdom, Spain, Portugal, the Netherlands and Italy.

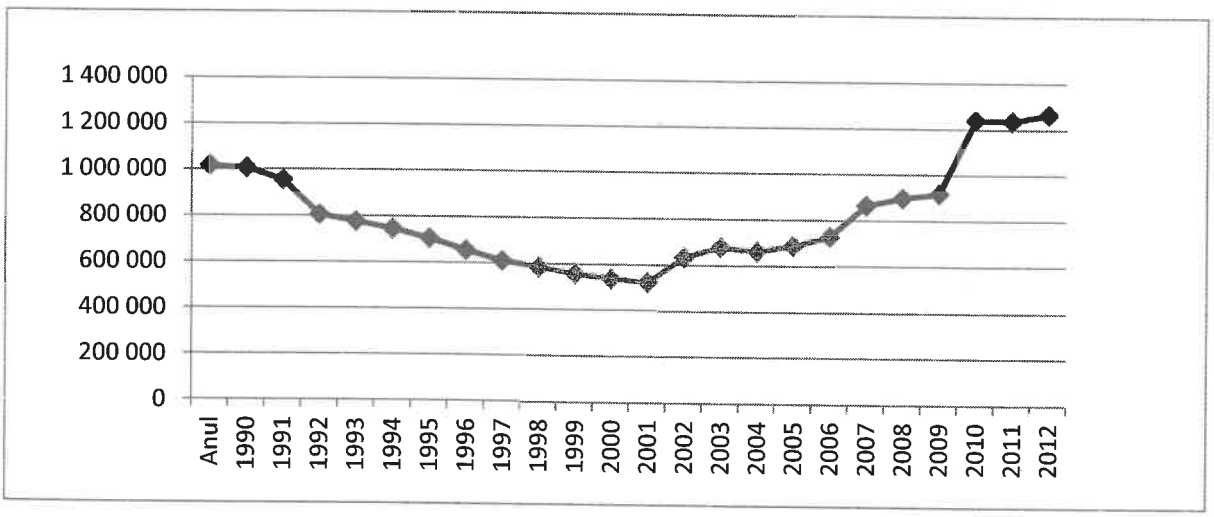
In terms strictly of goats in evolution in Romania can be seen that after 1990 based on the transformations that have occurred in agriculture and economics, the trend was of reduction, the minimum being recorded in 2001 when the number of goats was very close to 500 thousands (Figure 1).

Table 1. Dynamics of population and production in Romania in the period 2001 – 2013

SPECIFICATION	UM	2001	2006	2009	2010	2011	2012	2013
Total sheep and goats	thousands head	7.776	8.406	10.059	9.623	11.331	12298	12710
Total live meat production	thousand tons	114	101	104	100	150.0	107	171
The average weight at slaughter	kg/head	23	18	17	16	21	18	24

Source: MADR Bucharest

Figure 1. Dynamics of goat population in Romania, between 1990-2012 (nr. heads)



From the data presented in Figure 1 it can be seen that the total number of goats suffered a sharper drop between 1990-2002 (almost halving the livestock, from 1,017,200 heads in 1990 to 525,100 heads in 2002), and after this year there is rising trend and in 2012 a total of 1.26 million heads were recorded.

All this is a consequence of the fact that in Romania the breeding of goats enjoys a real interest among animal producers, trend which was induced by the valuable qualities of specific productions of these breeds. The economic interest granted to the breeding of goats is due to the lactogenic capacity enhancement, but also to some biological features such as:

- high prolificacy;
- precocity;
- high degree of adaptability to different climate conditions, relief and vegetation.

The performance management depends primarily on the synthesis of information and the methods available to breeders which can provide the financial satisfaction by reducing financial costs and increasing productive and reproductive performance.

Methods and technologies applied in the breeding activity. To defining specific activities of breeding will take account of the basic biological material. In the case of breeding improved breeds there can be applied specific reproduction methods of intensive or semi-intensive type, and a more efficient reproduction is done by the semitardive and tardive breeds in the natural mating season.

The main reproduction season is autumn, when the light decreases until the 1:1 ratio between day and night, and the secondary one is spring when the light increases as length to reach the same report. Goats can be mounted for the first time, starting at the age of 7 to 10 months when the body weight reaches 60-70% of the adult goat. The average length of the oestrous cycle is 20-21 days with a variation between 17 to 24 days. The oestrous manifests itself in a period of time which varies between 24-48 hours *(sometimes up to 72 hours).* Ovulation occurs at 30-33 hours after the beginning of oestrous.

The main measure that it is necessary to be taken in order to raise the profitability of farming of this species is the increase in the number of kid goats resulting from every female of the jelly core, achievable through the intensification activities of reproduction by using at mounting the young goats.

The use as early as possible for reproduction of the female goat, without affecting further the body development, a special attention will be given to technologies of growing applied to young offsprings to establish puberty as early as possible knowing that this occurs at the age at which reproduction is possible for the first time, and is due on the following conditions:

- ovulation to be present;
- oocyte to be fertile;
- the product of conception can be carried to term.

With regard to the optimum age and weight of the young goats at first breeding, there is a wide variation between breeds. The range is between 6-8 months, but it may be delayed for up to 18 months, but there may be also situations in which some young female goats from late kidding, can conceive in the first autumn, meaning at the age of 4 months.

In this species, the reproductive activity of the most breeds has a seasonal nature, the scorching heat beginning in the fall, there is a close correlation with the light during the day, the number of females who exhibit sexual cycles when the light is lower, increases. The duration of oestrous is 36-48 hours, these being repeated at 17 (10-23) days.

In the case of reproduction based on natural mating, the quality of breeding animals is extremely important in terms of getting some breeding indices with higher values. The male goats reach puberty at the age of 4-6 months and can be used for reproduction at 7-10 months of age.

Very young males may breed 10-12 goats/season, youth ones 25-30 goats/season in a year and adults 40-50 goats/season, respectively. The normal developed testicles have a weight of 100-150 grams and a girth to the scrotum of 20-25 cm. The copulatory act has a length of approx. 10 seconds. An adult male goat can perform about10 matchings/day.

Young goats under 2 years will be used to a maximum of two mounts per day, morning and evening, to avoid physical and sexual exhaustion, and an increase in the sterility of goats. The use of the service of the young goats may be exhausted and can obtain some mortalities or rendered non-viable products.

Male goats without horns, regardless of the reproductive system (natural or artificial), will be carefully checked for quality of breeding and breeding skills. By proceeding in this way, we avoid the cases of sterility and hermaphrodite individuals, etc.

For breeds with low productive performance, and where the percentage of returns, of goats which have been mated, record high values it is recommended that the breeding activity rely on a natural reproduction.

In the case of an increase of improved breeds and specialized ones, characterized with high values of the basic selection, the pressure exerted by the use of male goats which have proven qualities of improvements and reproduction based on artificial insemination is a more effective way of development.

This method provides very important genetic advantages but presents a risk of lower fecundity. A male goat has an ejaculatory volume of 0.5-1.5 cm^3 with a high concentration of sperm during mating season, of 3-5 billion sperm cells/cm^3.

Under normal circumstances an ejaculation is sufficient to inseminate 3-5 goats, with rough sperm using doses of 0.2 cc. Of sperm, each providing a concentration of 600 million to 1.2 billion sperm cells. At body temperature, the rough sperm can be kept up to three hours. If longer store is needed we have two choices: refrigeration *(24-48 hours)* or freezing.

In both cases the sperm must be diluted. Artificial insemination with diluted semen is done with doses of 0.5 cc. The dilution shall be made on the basis of laboratory analysis. If the necessary equipment is not available the dilution must be done accordingly: if the raw fresh sperm has a yellow colour, a dilution of 5 times of its volume is applied, and if the colour is white a dilution of 10 times of the volume is performed.

Methods and applied technologies in order to increase productive performance are different and like application techniques, as well as the level of expression. The development of uniform methods is not possible since the variability in genetic material is high and the maintenance and feeding conditions existing in each farm are extremely varied. However the constant application of a plan of technical measures can yield a significant improvement in the productive level.

Breeding youth for reproduction is a technical activity which has a permanent character. It is an activity on that the farmers do not often give proper attention, and consequences are seen when the youth is passed on to the basic herd.

By applying a more efficient management after the age of 14-16 days post partum, we have to apply a separate breeding technology for the young goats. In this regard, a special compartment is arranged in which the microclimate will be provided at the appropriate level, with clean bedding, separated from the rest of the shelter from a fence/mobile grate.

In this compartment only kid goats are who can move from side to side. Here they must feed the best quality, grounded concentrate and drinking water is at discretion.

For getting used, for 3-4 days, the separation of the kid goats must be accompanied by a noise to create the reflex. Daily consumption of concentrated nutrients for a kid goat is 20-30 g and will have legume hay at discretion.

Doing this it will create extra time to the dams dedicated to a normal behaviour and a better diet, and the consequences can be seen easily by the increasing of the level of milk production.

An artificial nursing of the kid goats may represent an effective method by which it can increase the amount of milk harnessed. This method consists in separating kid goats from the mothers after 4 days of birth and their feeding with milk substitutes and mixed feeding. Doing it this way, every breeder will be able,for the whole milk production obtained in the first three months, when the lactation curve reaches the maximum level, to be harnessed.

The generalized system in Italy, France, Spain and Switzerland, has many advantages:

- closer supervision of the kid goats;
- eliminate the stress of weaning;
- boost prolification;
- recover orphan goats or underweight ones;
- plan the youth female well developed for an early mount;
- mechanization and automation of work.

Breast feeding kid goats with placeholders is done with the bucket or bottle, or with the help of automated systems in special cabinets with 10-12 kids, where there can be: alfalfa hay, feed and drinking water at discretion.

Figure 2. Artificial feeding and the supplementary feeding of kid goats

Specific feeding for goats. Due to the specific biological particularities this breed takes advantage of superior feeding of all categories, as follows:

- vegetable-green meal, flour, husk, straw, silage, roots, foliage, concentrates, technical waste etc.;
- animals-dairy or fish waste, etc.;
- industrial meal - bran, microbiological residues, etc.;

Feed requirements depend on the production of milk traced by the physiological or maintenance condition of the animals and quality of the feed. The goats are not demanding but are greedy and have a pronounced bias towards certain nutrient sorts and even parts of these very whimsical toward the hygiene state of the feed.

Applying different maintenance technologies. According to a number of features of the area, or existing conditions within each holding, the application of maintenance can be accomplished in two technological ways :

- in permanent sheltered indoors;
- in seasonal division with summer maintenance on pasture and shelter in winter

Maintenance of permanent keeping hroughout the year can be applied in many technological variations. In the case of breeding goats for milk production the best results are obtained when the breeding technologies are running a maintenance of shelter throughout the year. By doing it this way we can control the ingestion rate, we can develop the fodder rations in relation to production, we can apply breeding of goats in homogeneous groups after the productive performance. In any of the situations in relation to the type of food, the proposed options are described below.

Permanent keeping with feeding based on administering a unique blend, is actually an extension of the terms and conditions provided throughout the winter and in the summer. And during this technological variants, depending on the conditions of maintenance, two sub-variants may occur: *maintenance on the ground in the paddock* or *in shelter* and in *the slatted floor sections*.

The permanent keeping with a nutrition based on green feed during the summer and stock feeding in winter. It can be applied throughout the warm season and consists of mowed green mass management, taking place so during the period of plant vegetation. Of the advantages they confer such variants including: ensure full use of the production of green mass, eliminates the consumption of selective plant; favours an increase in the coefficient of consumable plants; limited parasitic infestations. Using this variant of maintenance presents some disadvantages because they induce an increase in feeding costs and reductions in consumption of food, and thus the possible negative effects in expressing the production potential.

Feeding the goats in the grazing period in case of application of traditional technologies. The maintenance of permanent pasture, grasses and foliage on the high peaks and cliffs are the preferred food of goats. However, avoid feed sources from low places, puddled and persistent scents and aqueous residues and too juicy grass.

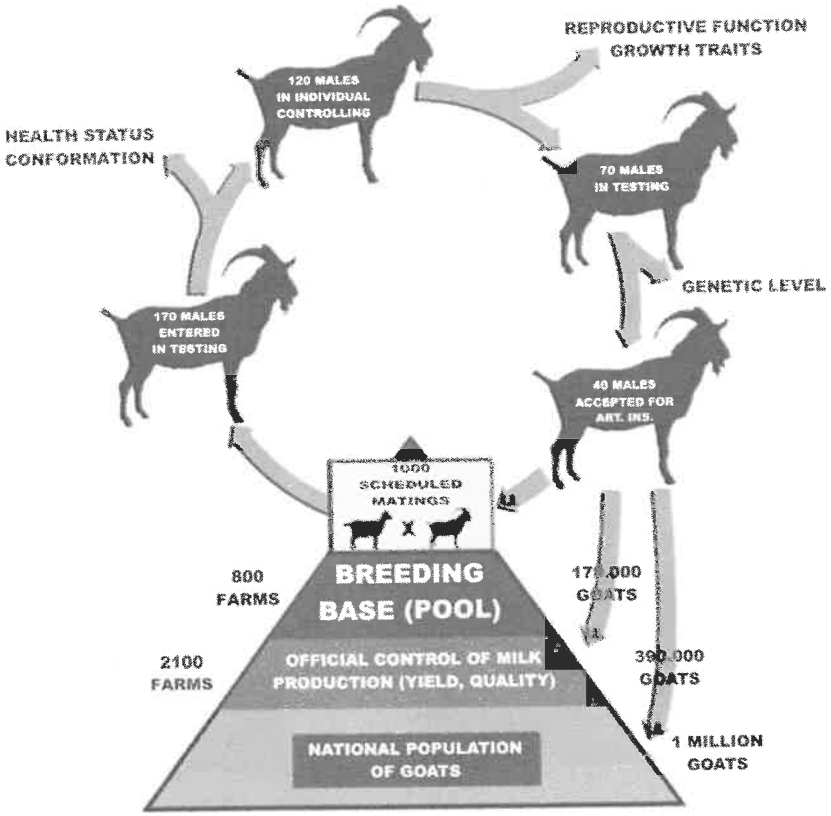
Figure 3. Goats which eat shrubs

According to the extensive exploitation of this species, eating grass ranges between 5-8 kg/day/goat, the plants being used, whether in whole or in part. Depending on their quality, the plants can be selectively eaten or to the root, but only if they are maintained for a long time on the same surfaces. Grazing period can last long and mild autumns until the fall of snow.

Improvement of goats. Issues related to improvement of goats have not been performed in Romania, until the year of 1990. The growth and exploitation of goats was empirical with methods and criteria specific to the traditional system. Moreover, neither currently there are not established objectives to improve the structure of the breed or of the productive potential.

Currently there are farms which have as their primary objectives also activities to improve local populations of goats. An efficient scheme to increase the productive performance, based on the application of constant improvement programmes is shown in Figure 4.

Figure4. The improvement scheme for goats



Constant application of genetic improvement programmes will generate an increasing genetic gain obtained in the following generations. In order to strengthen the cohesion it is enough to remind the fact that this species has very large variability in terms of productive potential. However, in many countries, there are now developed advanced technologies of breeding and exploitation and, year after year, more and more goats participate in the official control of milk production. Thus, in France among the objectives testing male goats for the reproductive activity and the protein fraction content of milk are also involved to enhance the yield in traditional processing, or industrial milk.

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