ABSTRACT

The thesis entitled, ***RESEARCH REGARDING REPRODUCTION PECULIARITIES IN GOAT, UNDER CONDITIONS OF BREEDING INTENSIFICATION***, reads norms in force and contains two major parts: general part and the special part.

This paper consists of 11 chapters. The first part of the thesis consists of 6 chapters: CHAPTER I - WORLDWIDE AND NATIONAL GROWTH SITUATION IN GOATS, CHAPTER II - GOAT BREEDS, CHAPTER III – GENITAL MORPHOLOGY IN GOAT, CHAPTER IV - GENITAL MORPHO PHYSIOLOGY IN FEMALE GOAT, CHAPTER V - REPRODUCTIVE PARTICULARITIES AND SEXUAL CYCLE IN FEMALE GOAT, CHAPTER VI - FACTORS AFFECTING REPRODUCTION ACTIVITY.

Part II consists of 5 chapters: CHAPTER VII - COLLECTION AND EXAMINATION OF GOAT SEMEN DESTINATED FOR PRESERVATION, CHAPTER VIII - OESTRUS SYNCHRONIZATION IN GOATS IN NATURAL BREEDING SEASON, CHAPTER IX - OESTROUS STIMULATION IN GOATS IN SPRING BREEDING SEASON, CHAPTER X - USE OF ULTRASONOGRAPHY FOR GESTATION DIAGNOSIS IN GOATS, CHAPTER XI - DYNAMICS OF PROGESTERONE CONCENTRATIONS IN GOATS DURING SYNCHRONIZATION AND OESTRUS.

Chapter 1 describes, using adequate bibliographic consultation, worldwide and national growth situation in goats. Biomorfoproductive characteristics are described and also the underlying profitability of goat growth, such as physiological capacity, particular physiological species, milk production, factors affecting milk production, meat production, particularities of conformation and body development.

Goats are a species enjoying great interest among livestock farmers. They have been exploited by man since ancient times. However because the animal is considered a lively, restless, capricious, wasteful, greedy and corruptible,it is not enjoying too much sympathy from the vast majority of the rural population. Although many of the qualities that characterize the breed not place before other species of livestock. Goat, in many countries, every day earns increasingly wide spread area. Countries in Europe, Africa and Asia, where socio-economic factors favor the growth of goats, the livestock branch has made real progress.

At the base of the spreading and economy growing in this branch are the qualities of adaptability and productivity especially pronounced. In terms of chemical composition, goat milk is

composed of 3.6 to 4.6% protein; 3.8 to 5.1% lactose; 3.5 to 5.5% fat, with maximum of 8% in November-December; from 0.70 to 0.90% minerals, various enzymes and vitamins in number of 12. The special quality of milk is reflected in the flavor and nutritional value of very popular and different types of cheese, especially in some countries with a long tradition in this area.

In Chapter 2 are presented goat breeds. Particular attention is paid to goat breeds raised in our country as well as inland goat breeds. In this chapter are reviewed the major goat breeds in the world. Breeds were grouped into categories: dairy breeds, meat breeds and breeds for wool and hair. Carpatina, is the oldest and most widespread, primitive, rustic, strong and very heterogeneous in terms of color and exterior development and production of milk and goat kids. Is medium size, elongated body, sharp spine, its narrow, tight chest, different colors, long hair, high variability udder. Conformation and size are based exclusively on the characteristic of the area where it lives. It is most common in mountainous and hilly areas of the country and and represents about 75-80% of the total number of goats.

Banat White breed results from the crossing of the Carpathian goat from the Banat region with Saanen and German Noble goats. Body conformation is typical for dairy animals, elongated pear-shaped torso and medium-sized and the color is predominantly white. Improved feeding conditions and maintenance of Banat White breed can be further improved by selection, while being a good breeder material for the Carpathian race.

Saanen breed originated in Switzerland and is currently 20% of Swiss cattle. It can be used with good results in crossings with the Carpathian race. Udder well developed, symmetrical presents aptitudes for mechanical milking.

Alpine breed is exploited especially around Lyon and the Alps. Average milk yield is 600-700 liters with a maximum of 2000 liters in 270 days of lactation and 3.5 to 4.09 fat.

German Noble breed is the result of crossbreeding of local German breeds with Saanen breed hence the body conformation, color, increased milk production and prolificacy.

Is found in two colour varieties: white and pigmented (brown). Has a high capacity for transmitting characters in descent.

Anglo breed Nubier is found mainly in the UK. Occurred after crossing UK breeds with those from Africa and India. Are large, long-legged and have horns but can be also hinds. The hair is short, smooth and fine. All combinations of brown, black and white are possible.

Kiko goat is widespread in New Zealand. Formed from crossing wild goat breeds with Nubian, Saanen and Toggenburgh breeds. It is common in hilly areas, raised in pastoral conditions. It is a large animal weighing, with large bones, goats with 50-75 kg.

Boer breed reach up to 160 kg and not milked. Important to know is that calves 3 times in 2 years and can have up to 4 goat kids at birth.

No claims for food, Boer breed goats can be used to improve the Romanian breeds.

Wool goats are a brand new chapter for Romania. They are bred for thousands of years but mostly in Kashmir. Goat wool is highly appreciated and is called mohair. Wool goats are very sensitive, they must be protected from moisture.

Chapter 3 describes the anatomical peculiarities of the goat genitals and aspects of genital physiology in this species. Male genital acts as the lead of producing male gametes (spermatozoons) and produce androgens hormones and the copulatory organ - to deposit semen in the genital tract in female goats. The main function of a breeding goat is to produce semen, which contains fertil spermatozoons.

In Chapter 4 are described the morphological and physiological aspects of female goat genital system. The goat genitals generally resembles that of sheep and cow. Ovaries have a length of 1.5 - 2.5 cm and are easily flattened. Uterine horns of the same orientation as the cow, being proportionately reduced. Uterine body has a length of 2 cm and cervix of 2 to 3 cm. Abundant flower has two folds, the upper being more developed than the lower and covering as a flap the lumen. Uterine wattles are in number from 88 to 96 and have a slightly concave surface. The vagina has a length of 6-8 cm and vaginal vestibule of 2 to 5 cm. No Gäertner channels are present.

Genital physiology in goat is represented by the process of oogenesis and folliculogenesis. Functionality of female genitalia is characterized by a rhythm that begins at puberty and ends at climacterium. Sexual cycle represents all gametogenic and endocrine changes, through which are release one or more eggs suitable for fertilization.

Chapter 5 describes the peculiarities of reproduction and sexual cycle in goats.

Goat is a polycyclic female, it presents seasonal sexual cycle manifested dependent of the climatic conditions, food, maintenance, race and degree of improvement. Sexual manifestations in goats are obviously dependent on the ratio of light/dark, which explains that although ovarian activity is not blocked during the summer, ovulation is not accompanied by obvious characteristic heats signs.

Sexual cycle lasts between 14-19 days, estrogic phase lasts approximately 4-6 days and the progesteronic phase for 13 days. Average sexual cycle in goats is 17 days. Libido manifests less externalized compared with other species: anxiety, capricious appetite, the female allows it to be mated. Ovulation takes place towards the end of heat, with 12-24 hours before their completion.

Given the intensive growing of goats diestrus appear no because sexual cycles have almost in an uninterrupted succession. Heats lasts 24-36 hours, in this time of ovulation and fertilization have place.

Optimum time of insemination is in the first 10-12 hours of the onset of oestrus, given the fertilization ability of sperm, which is optimal in the first 7-8 hours after ejaculation.

Goats reproduced them selfs with maximum intensity in late summer and autumn when the "day light" duration drops. The rest of the year, end of winter and spring, the ovary is at rest, with very low activity. It is clearly delimited a period of sexual activity called "sexual season" and a rest period called "seasonal anoestrus."

In goat, heats triggering depends on many factors, among which the most important is day lenght reducement. Goat receives light information from the eye, then through nerves reach the epiphysis. This small gland (about 0,1 g) synthesize and secrete melatonin at night, which allows animal "know" the day lenght. Melatonin acts over sexual activity: short days are stimulating, than are inhibiting (after 70 days of sexual activity, it stops). Long days have an inhibitory effect.

Given the economic reasons farmers are forced to use recent methods for heat triggering and insemination. Heat synchronization in herd means grouped calving, which leads to a higher milk production.

Chapter 6 presents the factors that influence breeding. Once reproductive organ began operating its activity is limited and discontinuous, caused by some external and internal factors.

Nutrition has an important role in maintaining optimal level of reproductive function. Nutritional deficiencies are most often involved in states of infertility in dairy goats, especially in those with high milk production.

Nutritional balance determines metabolic disorders, immunological and hormonal, those affecting breeding function and breeding parameters. Infertility is caused by quantitative and qualitative deficiencies. Quantitative deficiencies are given by: overfeeding and underfeeding and the qualititative ones are: deficiencies of vitamins, minerals, micro elements, etc.

At birth, lamb ovaries contain all the eggs needed for reproductive life. Thus, the ovary contains tens of thousands of oogonia, but of them most degenerate and disappear during prepubertal stage. Maturation and growth of primary follicles are continuous processes and occure at regular intervals of 14-17 days

In small ruminants, about 40 follicles come to ovulate, of which only 10-12 are fertilized ovulated and give birth to alive goat kids.

Chapter VII is called Collection and examination of goat semen destinated for preservation. Following the ejaculate evaluation from three categories of goats following values of semen were

observed: Number of ejaculate collected and analyzed was: 80 in Saanen breed, 60 in Alpine and 40 in half bloods. The volume of semen collected from Saanen breed was on average 1.7 ± 0.25 ml, in Alpine race was 1.8 ± 0.27 ml, and the Metis group average volume equaled 1.5 ± 0, 25ml.

Highest average volume was obtained from Alpine breed goats (1.8 ± 0.27 ml), which is 0.1 ml higher than the average volume of the Saanen breed (1.7 ± 0.25 ml) and 0.3 ml higher than the average volume of the half bloods (1.5 ± 0.25ml).

Raw sperm mobility was higher in Saanen breed (94 ± 5.3), with an average of over 0.2% than mobility from Alpine race (92 ± 7.2). The lowest values were found in crossbred (87 ± 9.1). The average ejaculate concentrations collected from goats in natural mating season (autumn) falls within species values, laying around 3 billion sperm/ml, and more than 4 billion per ejaculate. Highest concentration ejaculate were found in the Saanen breed with an average of 3.7 ± 0.85 billion/ml. If we relate this concentration to throughout ejaculate, it was 6.26 billion. Alpine breed average concentration per ml raw semen had an average value of 3.5 ± 0.63 $x10^9$/ml and the average ejaculate volume of 6.3 $x10^9$/ejaculate.

Chapters VIII covers themes related to Oestrus synchronization in goats in natural breeding season.

Heat synchronization during the main breeding season (autumn) in goats is mainly used to facilitate artificial insemination. Conventional treatment protocols are based on a scheme aimed to administrate progesterone for 14 days. Following therapeutic protocol set at 96% of the group, Cronogest and PG F2α regimen could end. The regimen used, triggers a wave like hormonal cascade that occurs from the C.N.S. to the pituitary gland, which has as effect a ovarian follicular wave. Follicles entered in the development phase grow and develop to maturity (de Graff follicle). In 25% of goats were observed reduced secretion, possibly due to transient local inflammatory disease, given by reflex stimulation of the inserts. Within 3 to 5 days after the introduction of goats, and the conclusion of hormonal synchronization regimen, goats began to show estrus. Goats who responded treatment and entered in heats were in percentage of 95.8% and 60.7% became calving. Percentage of twin births after estrus synchronization in goats experimental group was 28.6%.

Chapter IX includes aspects about Oestrous stimulation in goats in spring breeding season,

Stimulation of estrus in extraseason allows grouping births in autumn followed by a period of lactation in winter. These issues are coupled with providing youth meat goat near Easter.

Following established therapeutic protocol, all goats could conclude Cronogest regimen, PG F2α and Folligon, lot represented by 100%. In 94.7% milky serous vaginal secretions were observed when extracting sponges. Thus, 100% of the goats who responded to treatment and entered in heat.

In goats with underdeveloped genital tract, speculum is not used. The insemination device it is carefully introduced by the end of the vagina, were is usually deposited an amount of 2 to 3 times more sperm than when intracervical insemination is performed. In the goat experimental group, 15.7% met return to estrus phenomenon, thus were not initiated pregnancy mechanisms. On this principle, we conclude that goats fecundity assessed on the basis of not return to estrus syndrome is 94.3%.

By using ultrasound at 40 days after artificial insemination, could certainly appreciate that 84.3% of the goats were pregnant. And in 15.7% could not reveal pregnant uterus structures or fetal elements.

Fecundity had a value of 84.3%. Calving rate showed a value of 93.75%. Total fecundity obtained by us was 226.6%, but the proportion of viable offsprings equaled 91.2%, 8.8% of them being removed. So, real prolificacy of the experiment was 206.6%. Was obtained a maximum (100%) of multiple twin births. Percentage of goats that have calved two, was 73.3% and goats that have calved three offsprings was 26.7%.

Chapter X presents: USE OF ULTRASONOGRAPHY FOR GESTATION DIAGNOSIS IN GOATS.

Supervision of a dairy goat breeding flock is essential for the smooth running of the process, finalized by obtaining suitable breeding indices. Use of ultrasound examination on small ruminants begins to great practical importance for health monitoring and pregnancy diagnosing. Early diagnosis of pregnancy in domestic females enables an planned activity regarding growth, exploitation and reproduction of animals. For the diagnosis of pregnancy ultrasound examination was used to monitor the topographic projection area of the goat pregnant uterus, between 40th and 60th day after insemination.

Pregnancy was not diagnosed within 40 to 45 days, only in 15.8%. In the of 60 - 90 day gestation interval, diagnosis was not established at 21.05%. Following ultrasound diagnosis, parturition in goats reached 100%, so parturition, confirmes positive gestation diagnosis established within 60 to 90 days after insemination.

We note that ultrasound examination within 60 to 90 days after insemination, confirmed at a rate of 93.75%, pregnancy diagnosis established within 40 to 45 days after insemination.

The ultrasound examination of abdominal area, revealed portions of ovarian structures.

Ovaries ultrasound approaching in goats is quite cumbersome, especially when using transabdominal method. In few cases could be highlighted elements of the corpus luteum or ovarian structures.

Chapter XI presents researches regarding Dynamics of progesterone concentrations in goats during synchronization and oestrus.

On day 0, the average progesterone titer is very low 0.34 ng/ml. Immediately after insertion of Chronogest sponges, there is a sudden increase in the concentration of progesterone, to 5.41 ng/ml. Subsequently, was noticed a decreasing in the progesteron level of but well above baseline (3.85 to 2.71 ng/ml).

From day 10 there a more pronounced decrease in the concentration of progesterone concentrationis observed. concentration maintaines at a minimum level in the coming days. This decrease in progesterone titer is explained by the removal of exogenous and endogenous sources of progesterone.

At the end of the regimen, with lower progesterone levels, structures of central nervous system are negatively affected, and the cycle resumes by restarting the physiological secretion of Gn-RH.

Endogenous hormonal activity so initiated is accompanied by the administration of a hormonal substances with FSH effect. So explaining, immediate resumption of sexual cyclicity in the occurrence of oestrus in 36 to 55 hours after regimen completion.

Effect over follicular dynamics and estrous manifestation seems to be relevant, based on obtained breeding performance.