

## **TECHNICAL ASPECT OF ACCEPTING THE EMBRIOS OF SHEEP-DONORS USING MEDIAN LAPAROTOMY AND LAPAROSCOPY**

Ralchev I., Ts. Maslev, M. Todorov, **Ts. Hristova**

**Abstract:** Nevertheless of the possibilities which the methods of embryotransfer (ET) offer in sheepbreeding, they have limited application in nowadays selection programs. More often this is due to the low level of superovulation response (*Whyman et al., 1980*), lowered vitality of the fertilized eggs (*Graham, 1986*), and comparatively low percentage of fertilization (*Robinson et al., 1989*). Disadvantages of the method of accepting embryos with median laparotomy are other essential problem, which is difficult to be completed and it is connected with risks of traumatization of internal genital organs and their adhesion. This leads to impossibility of second use as donors (*Vlachov et al., 1991*).

In this study our aim is to research comparatively the possibilities of the two methods for accepting embryos, especially with median laparotomy and laparoscopy.

The results proved the advantages of the method for accepting embryos with laparoscopy in three aspects: washing of embryos, risks of surgery manipulation, easy to be accessed and completed.

The laparoscopy is high effective. The risk of surgery intervention is minimal. The necessity of very expensive technique is a disadvantage of the method.

*Key words:* sheep, laparoscopy, embryotransfer, embryos.

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**Research Institute of Mountain Stockbreeding and Agriculture, Troyan**

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5 cm<sup>3</sup>  
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10 cm<sup>3</sup>  
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21-25.I  
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## **РАСТЕЖ И РАЗВИТИЕ НА АГНЕТА ПОЛУЧЕНИ ОТ МЕСТНИ ОВЦЕ И КОЧОВЕ МЕРИНОЛАНДШАФ\***

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## **GROWTH AND DEVELOPMENT OF LAMBS OBTAINED FROM NATIVE EWES AND MERINOLANDSCHAF RAMS \***

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### **SUMMARY**

A study on growth and development of lambs with different blood percentage from mating of native ewes with rams of Merinolandschaf breed (imported from Germany) was conducted.

Parameters of live weights of the different groups, at birth and till 100-day age, were determined.

Data showed more intensive growth of crosses, as compared to purebred and native lambs.

On these grounds we concluded that the offspring obtained from native ewes and Merinolandschaf rams grew faster and earlier reached the wished market live weight.

*\*The study was conducted with resources and assistance under FAMAD programme*

### **РЕЗЮМЕ**

Проведено беше проучване върху растежа и развитието на агнета с различна кръвност от съешаването на местни овце с кочове от породата Мериноландшаф (внос от Германия).

Установени бяха параметрите на живите телла на различните групи, при раждане и до 100-дневна възраст.

Данните показаха по-интензивен растеж при кръстоските в сравнение с чистопородните и местните агнета.

Това ни дава основание да считаме, че приплодите получени от местните овце и кочове Мериноландшаф растат по-бързо и достигат по-рано желаното пазарно живо телло.

*\*Проучването е извършено със средства и съдействие на програма FAMAD*

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1, 2, 3, 6, 168, 6000, (P < 0,01), (P < 0,05), 2007, 8-9, 2-4, 6, 6, 2-4, 6, 168, (P < 0,01), (P < 0,05).

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\*, 6000, 2006, 27, 18, 2-4, ( ), - , ;

jugularis) (T/L), (fl) Na<sub>2</sub>EDTA (G/L), III. (g/L), (%) (v. Serono Schilin, Serono 106 plus (Germany).)

150 plus VET

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(26.28 P< 0.01), (26.33) (23.70).

(74.50 P< 0.01). (103.67), (109.83), (10.09).

(11.15 P< 0,01). - 420.54 g/l (P<0.01). (17.42-17.55 g/l), -

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5600

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( Saccharomyces cerevisiae) 5 g

15

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,				( <0,01).	
		- 1.457			- 1.523
( <0,01).					
		- 1.547,			( <0,05).
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*Original Contribution*

**BREED-, AGE- AND GENDER-RELATED PARTICULARITIES OF  
COMPLEMENT ACTIVITY IN BULGARIAN LOCAL SHEEP  
BREEDS IN SPRING SEASON**

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<sup>3</sup>Regional Veterinary Service – Plovdiv

<sup>4</sup>Agricultural Institute - Karnobat

**ABSTRACT**

The studies were performed in the spring of 2008 on 66 sheep, 54 rams and 42 female and 42 male lambs. Investigations were carried out on 6 sheep, 6 rams at the age of 2-4 years, 6 female and 6 male lambs at the age of 3-5 months from the following breeds: Karakachan, Tsigay, Replian, Panagyurishte, Copper-red Shoumen, Karnobat, Pleven Blackhead, White Maritsa and Patch-faced Maritsa, Stara Zagora and Romanov. The animals were owned by the Institute of Mountain Animal Stockbreeding and Agriculture–Troyan, the Agricultural Institutes in Karnobat and Shoumen, the Experimental Farm of the Trakia University - Stara Zagora and private farmers from Chirpan, Saedinenie, Vidin and Panagyurishte.

The aim of this investigation was to study the breed, age- and gender-related particularities of complement in local sheep breeds, reared in different regions in Bulgaria during the spring season.

The highest complement concentrations were established in Panagyurishte sheep (215.24), Maritsa White (206.87) and Copper-red Shoumen (201.15) sheep whereas the lowest – in Romanov (160.23) and Pleven Blackhead – 164.09 breeds ( $p < 0.01$ ).

For rams, highest complement activity was exhibited by Copper-red Shoumen (210.24), and the lowest – by Romanov rams 159.09 ( $p < 0.01$ ).

With the exception of Copper-red Shoumen and Karnobat female lambs, the other ones showed APCA values higher than those of adult sheep from the respective breeds ( $p > 0.05$ ).

Highest APCA activities had male lambs of Copper-red Shoumen and Stara Zagora breeds, lowest – Karnobat and Romanov male lambs ( $p < 0.01$ ).

For the ovine species, there was a general trend towards lower complement concentrations in lambs at the age of 3-5 months compared to adult animals.

**Key Words:** Complement, Sheep breeds, Rams, Lambs

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## Summary

The studies were performed in February-March-October 2006 on 30 goats and 18 bucks at the age of 2-4 years: 6 goats were from the Bulgarian Dairy White breed (BDB), reared in the Institute of Mountain Stockbreeding and Agriculture - Troyan and 6 BDB goats from the Experimental Farm of the Trakia University – Stara Zagora, 6 purebred rams of each of BDB, Toggenburg and Anglo-Nubian breeds, and 3-months old doelings and bucklings as followed: 6 BDB, 6 BDB.Toggenburg and 6 BDB.Anglo-Nubian crosses. Blood samples were obtained aseptically in the morning before feeding the animals from the jugular vein in Na<sub>2</sub>EDTA vials (complexon III). The red blood cells counts (T/L), white blood cell counts (G/L), haemoglobin (g/L), haematocrit (%), and the mean corpuscular volume (MCV) (fl) were determined by an automated haematological counter Serono 150 plus VET with a diluting apparatus Serono 106 plus (Germany). Differential white blood cell counts were studied by the method of Schilin on blood smears, stained by Romanovski-Giemsa. The highest erythrocyte counts were established in Toggenburg goats followed by BDB and Anglo-Nubian goats reared in Troyan. Local goats from Bogomilovo showed lower counts and the lowest – BDB reared in Stara Zagora. Highest erythrocyte counts were found out in Toggenburg bucks. Haemoglobin was the highest in BDB.Anglo-Nubian goats and BDB reared in Stara Zagora, and the lowest – in local goats reared in the settlement of Bogomilovo. In bucks, Hb was the highest in the Toggenburg breed and lowest – in BDB. Total leukocyte counts were the highest in BDB goats reared in Troyan as compared to those reared in Stara Zagora. Doelings and bucklings had higher leukocyte counts than adult goats and bucks from the respective breeds. BDB bucklings had the highest leukocyte counts and BDB.Toggenburg - the lowest. In general, male tended to have higher total leukocyte counts than females and kids – highest counts than adults.

**Key words:** bucklings, bucks, doelings, erythrocytes, goats, haematocrit, haemoglobin, differential leukocyte counts.

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## Summary

The studies were performed in May-June 2007. Six sheep (aged 2-4 years) of each of Karakachan, Tsigay, Stara Planina Tsigay, Copper-red Shoumen, Karnobat, Pleven Blackhead, White Maritsa, Patch-faced Maritsa, Stara Zagora and Romanov, 6 rams (age 2-4 years) of each of Karakachan, Tsigay, Copper-red Shoumen, Karnobat, and Romanov breeds; 6 ewe lambs of each of Karakachan, Tsigay, Copper-red Shoumen, Karnobat, Pleven Blackhead, Stara Zagora and Romanov breeds; 6 ram lambs of each of Karakachan, Tsigay, Copper-red Shoumen and Karnobat breeds aged 4–5 months □ total of 156 animals, were studied. Blood samples were obtained before the morning feeding from the jugular vein. Phagocytic reactions was assayed as per Valchanov (1956) via phagocytosis percentage – PI and phagocytic number – PN. The highest PI in sheep was observed in Karakachan and Romanov breeds – 79.33 and 79.20, and the lowest – in Karnobat sheep ( <0.05). In rams, the highest PI was found out in Copper-red Shoumen (79.00) and Romanov (78.00) and the lowest – in Tsigay (76.00). In Copper-red Shoumen and Karnobat breeds rams tended to have higher PI than sheep. Highest PN was established in Karakachan (1.46), Romanov (1.456) and Stara Zagora sheep (1.453). In rams the highest PN was observed in the Copper-red Shoumen breed, followed by Karnobat (1.447), Tsigay (1.413), Karakachan (1.400) and Romanov (1.380). In ewe lambs, highest PN was observed in Karnobat breed (1.493). There was not an uniform trend with regard to PN values in ram lambs with regard to both ewe lambs and adult rams.

**Key words:** lambs, phagocytic activity, phagocytic number, phagocytic index, rams, sheep.

## ПРОУЧВАНЕ ВЪЗМОЖНОСТТА ЗА ПОЛУЧАВАНЕ НА ДВУПЛОДНА БРЕМЕННОСТ ЧРЕЗ ЕМБРИОТРАНСФЕР

ЦОПКО МАСЛЕВ, ЦВЕТОМИРА ХРИСТОВА, СВЕТЛА СТОЙЧЕВА  
Институт по планинско животновъдство и земеделие - Троян

A STUDY ON THE POSSIBILITY FOR OBTAINING  
A TWO-FOETUS PREGNANCY BY EMBRYOTRANSFER

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*Institute of Mountainous Stockbreeding and Agriculture - Troyan*

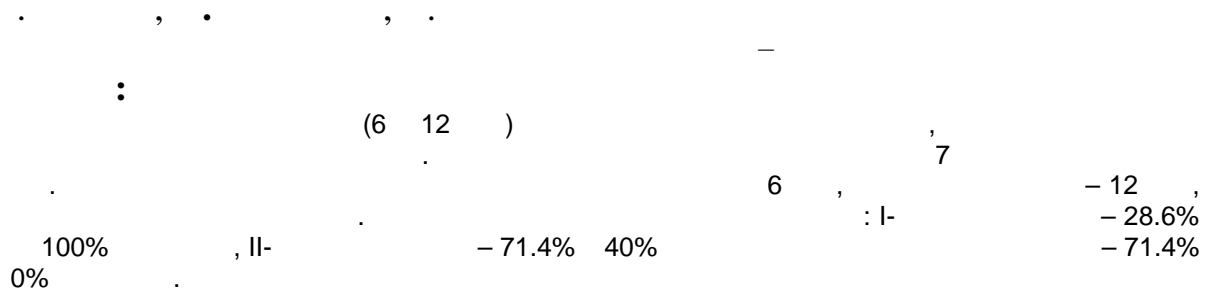
### SUMMARY

It is well known that twinning in cattle as a biological phenomenon is rarely observed. Twinning could be increased by transfer of two embryos or after transplantation of an embryo to a preliminary inseminated cow. The experiment was carried out with 10 Friesian cows. They were artificially inseminated with semen of the same breed at natural oestrus. On the 6<sup>th</sup> day after that two defrosted Aberdeen Angus embryos were placed in one of the uterus horns. The following results were obtained after the calving:

Three of the cows delivered two calves (30%), four cows - one calf (40%), and three cows remained non-pregnant (30%). The study showed that placing a defrosted embryo in one of the uterus horns of preliminary inseminated cows could increase the prolificacy up to 30.3%.

**Key words:** cows, embryo transfer, twinning

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*Research Institute of Mountain Stockbreeding and Agriculture, Troyan*

• , • , • , 5600, ,  
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 , 30 mg , 400 600 IU Folligon,  
 , 12- , 48- 58- , 57.1%  
 , 8 – 20 h. 68.9%

*Journal of Mountain Agriculture on the Balkans, vol. 13, 2, 2010, (334-343)*  
*Research Institute of Mountain Stockbreeding and Agriculture, Troyan*

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 14.4, 3.6 , 11.1%, 14- – 18.6, 9.6 21.0%,  
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*Journal of Mountain Agriculture on the Balkans, vol. 14, 1, 2011 (23-34)*  
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 (<0,01).  
 (p<0,01).  
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**PGF<sub>2</sub>**  
 :  
 (LH) 3 PGF<sub>2</sub> (Pg)  
 0.5 mg Oestrophan, (CL)  
 : 28- 2 28- 40- 4 (selakon/viggo),  
 2- 1.54 ng/ml 3.03 ng/ml,  
 28- 0.03 – 0.23 ng/ml. 24- -  
 PGF<sub>2</sub>

LH - 3.2 – 5.5 ng/ml.  
 (6.0 – 8.0 ng/ml), LH- 4 – 8 -  
 LH 20.9 – 30.1 ng/ml.  
 F<sub>2</sub> ,

AGRICULTURAL SCIENCE AND TECHNOLOGY, VOL. 3, No 1, pp 21 – 26, 2011

## Complement activity in Bulgarian local sheep related to season and breed

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**Abstract.** The studies were performed in 2008 on 304 sheep of the age of 2-4 years. Sheep from the 100-100 breeds were used: Kozlepatan, Tsigay, Masyan, Paragunita, Copper-red Shoumen, Kamhal, Pieven Blackhead, White Merino, Pink-faced Merino, Sam Zapora and Romanov. During the spring and summer 6 blood from each breed were used and during the autumn – 20. The activity of the alternative pathway of complement activation was assessed by the method of Sobirov (1981). During the spring, the highest blood complement concentrations were determined in Paragunita ( $215.24 \pm 5.22$ ), White Merino ( $206.87 \pm 15.12$ ) and Copper-red Shoumen breeds ( $201.15 \pm 3.88$ ), and the lowest in Romanov ( $160.22 \pm 7.34$ ) and Pieven Blackhead breeds ( $164.99 \pm 12.85$ ) ( $p < 0.01$ ). The highest summer complement levels were measured in Paragunita breed ( $219.89 \pm 3.265$ ) and the lowest in Tsigay breed ( $167.14 \pm 5.23$ ) ( $p < 0.01$ ). During the autumn, Kozlepatan breed was with the highest complement concentrations ( $205.79 \pm 11.23$ ), whereas Pieven Blackhead – white breed ( $126.34 \pm 10.73$ ) ( $p < 0.71$ ). Totally for all sheep studied, the average/PCV concentrations were  $192.67 \pm 5.87$  during the spring,  $163.026 \pm 8.284$  during the summer and  $191.24 \pm 8.47$  during the autumn.

## ОБЩЕСТВО

ВЛИЯНИЕ НА СТРЕЖБАТА ВЪРХУ КОНСУМАЦИЯТА  
НА ГРУБИ ФУРАЖИ ПРИ ЛАКТИРАЩИ ОВЦЕ

ЙОРДАН АЛЕКСИЕВ, ЦВЕТОМИРА ХРИСТОВА, ГЕОРГИ ДИМОВ\*

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\*Агробиоинститут - София

EFFECT OF SHEARING ON THE INTAKE OF ROUGHAGES  
IN LACTATING EWES

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## SUMMARY

Effect of shearing on feed intake was studied in lactating Tsigan ewes shorn in April. The Sheep were offered a daily ration comprising of chopped hay administered *ad libitum* and concentrate. Dry matter intake decreased by 7.9% and 13%, respectively, on the day of shearing and on the first day thereafter, and neared the pre-shearing level on the second day after shearing. The changes illustrated the short-term effect of nervous stress provoked by the treatment. Overall for the post-shearing period the average daily dry matter intake increased by 1.6% compared to the corresponding average pre-shearing value. The increase was entirely at the expense of roughages. The data suggest that voluntary intake of hay appeared to be limited by the restriction of the rumen capacity and/or the rate of digesta passage through the gastrointestinal tract. The findings add further support to the contention that the sheep-feeding strategy depends on factors other than the brief changes in energy requirements and the level of intake could not be used for assessment of changes in heat production.

Key words: sheep, shearing, feed intake

## THE INFLUENCE OF THE TIME OF IMPLEMENTATION OF PMSG ON SOME OF THE REPRODUCTIVE PARAMETERS IN<sup>1</sup> SHEEP WITH SYNCHRONIZED OESTRUS

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Communication

**Abstract:** Different schemes of PMSG treatment on some reproductive parameters in sheep were studied. Two groups of 6 sheep each at the end of the non breeding season were treated with vaginal sponges Chrono-gest (Intervet, Holland) containing 30 mg fluorogeston acetate (FGA). The sponges were removed 12 days after insertion. Sheep of the experimental group were injected with 500UI Folligon (Intervet, Holland) 48 hours before sponge removal whilst the corresponding control sheep were treated with the same dose Folligon at the day of of sponge withdrawal. The clinical signs of oestrus, plasma progesterone concentrations and changes in the ovarian morphology during the observation period were registered. The conception rate, fertility and twinning rate were also recorded. The results show that the earlier application of the gonadotropin influence positively the reproductive traits in ewes.

**Key words:** sheep, oestrous synchronization, treatment

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93 -97

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### APPLICATION OF THE HORMONAL METHODS FOR SYNCHRONIZATION OF ESTRUS IN EWES

#### REVIEW

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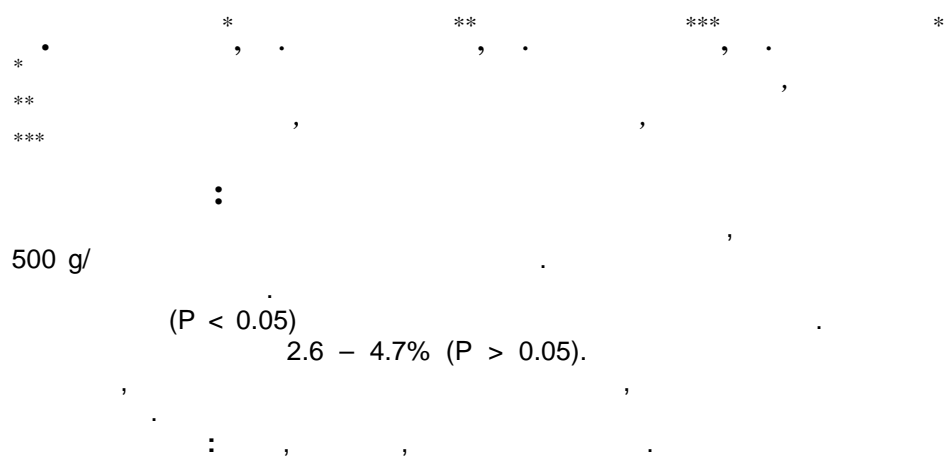
#### ABSTRACT

A great part of sheep breeds bred in our country has a limited period of the conception time. There are a very small number of breeds characterized by pronounced

polyestricty. In this connection the question of change of the seasons of ewe conception emerges. The low conception rate and fertility in spring and summer necessitate applying alternative methods for increase of these characteristics. One of the main methods applied during the reproductive season, as well as during the non-reproductive one in ewes is the hormonal method. The increase of fertility and year-round production of milk and meat is the main reason for the review made by us.

**Key words:** Sheep, hormonal methods, synchronization oestrus, estral season, anestrus

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**ВЛИЯНИЕ НА ВЪЗРАСТТА НА МАЙКАТА ВЪРХУ ТЕГЛОТО ПРИ РАЖДАНЕ НА ЯРЕТАТА**

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**EFFECT OF THE AGE OF GOAT ON BIRTH WEIGHT OF KIDS**

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**ABSTRACT**

The aim of the study was to determine the influence of maternal age and the effect of

year on birth weight of goat kids. The goats included in this investigation were

representatives of three breed groups - Bulgarian White Dairy goat, Bulgarian White Dairy

goat+Toggenburg and Bulgarian White Dairy+Anglo-Nubian. Goats were divided into five

groups according to age: 1 year, 2 years, 3–4 years, 5 years and 6–9 years.

Most low birth weight of singles were registered in the group of one year old dams, (3.72 ± 0.24) and the twins at the two years old dams (2.87±0.20). With increasing the age of the goats is increased the average birth weight of kids, being the highest in the group of 6–9 year old dams (4.18 ±0.11).

**Key words:** goat, kids, birth weight, age of dam

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## Shearing effect on milk yield and milk composition in Bulgarian dairy sheep

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### SUMMARY

Shearing effect on milk yield and milk composition was studied in Awassi type of Bulgarian dairy sheep synthetic population. Ten ewes, at their fourth month of lactation, were grazed on a natural pasture and were shorn in June. Milk yield from each ewe was recorded in the morning and in the afternoon milking. Milk samples for chemical analysis were taken on the day prior to, and on 2<sup>nd</sup>, 5<sup>th</sup> and 10<sup>th</sup> day after shearing. Shearing influenced the rate of decline of daily milk yield. Changes in protein and total solids concentrations, even in the same direction, were lower than in fat content. Daily output of milk fat exceeded the pre shearing value on the 2<sup>nd</sup> day after shearing. Protein and total solids yields in all samples were lower compared with the corresponding pre-shearing values reflecting the decline in daily milk yield. Hormonal and metabolic modifications related to adaptive adjustments seem to underlie the changes in milk yield and milk composition.

Keywords: sheep, shearing, milk yield, milk composition.

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*Research Institute of Mountain Stockbreeding and Agriculture, Troyan*

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## OBJECTIVES AND APPROACHES IN THE BREEDING OF PERENNIAL LEGUMES FOR USE IN TEMPORARY PASTURELANDS

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Review paper

**Abstract:** Legumes are the major element of grassland ecosystem, on which the forage quality depends. Breeding of pasture varieties in perennial legumes firstly aims at achieving tolerance and persistence of the legume component in the pasture. In species having low natural grazing tolerance (lucerne and red clover) it is necessary to conduct breeding for biological, morphological and physiological characteristics, directly related to grazing tolerance. In the species having high grazing tolerance (white clover, birds foot trefoil, sainfoin), the pasture persistence is considered as a function of particular morphological characteristics, adaptive potential and stress tolerance. The indirect breeding for pasture persistence includes also breeding for competitive ability and co-adaptivity with grass pasture species adapted to the region and practices of cultivation, as well as breeding for improved nodulation and nitrogen fixation as an important element of the adaptive ability. The breeding for grazing tolerance and persistence is concentrated also on the mechanisms of self-maintenance of the legumes in the pasture – vegetative reproduction, spread and self-seeding. Many breeding programmes are concentrated also on morphology providing better intake by the animals, on main and specific quality characteristics, on anti-nutrient factors, on adaptation to systems and practices of pasture establishment and use. The breeding strategy using germplasm consolidated through the mechanisms of specific adaptation to unfavourable or specific agro-ecological conditions and influences – i.e. breeding through ecotypic selection, is considered to be the most efficient for grazing purposes. The interactions in the system: pasture species – companion species in the pasture herbaceous community – grazing animals (kind, category, grazing style and behavioural reactions) at pasture are direct and strong. These interactions are of essential importance in genotypic differentiation of the pasture ecotypes. The adaptive variability of the pasture ecotypes is used directly, as well as in recombination breeding.

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**STUDY ON THE PERFORMANCE OF GONADOTROPINRELEASING HORMONE (GnRH) IN THE PUERPERAL PERIOD OF BEEF COWS**

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Original scientific paper

**Abstract:** The effect of the intravenous injection of 100 mcg (2 ml) gonadotropin-releasing hormone (Ovarelin, Ceva) from the 1<sup>st</sup> to the 20<sup>th</sup> day after calving of beef cows was monitored in the article, in regard to the occurrence of the first oestrus and the possibilities for its controlling. It was established that in the first minutes of intravenous application of Ovarelin the concentration of luteinizing hormone (LH) increased. By increasing the number of days increased the amount of secreted LH. Maximum effect of the injection of 100 mcg GnRH occurred between the 10<sup>th</sup> and 15<sup>th</sup> day. The physiological dose (100 mcg) GnRH injected intravenously on the 1<sup>st</sup> day after birth of cows led to increased content of LH in blood circulation.

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*Research Institute of Mountain Stockbreeding and Agriculture, Troyan*

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## ОТНОСНО РЕПРОДУКТИВНИЯ ПОТЕНЦИАЛ ЗА ЕМБРИОТРАНСФЕР НА ОВЦЕ В АНЕСТРАЛЕН СЕЗОН

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### РЕЗЮМЕ

Световните тенденции за увеличаване на продукцията на месо и мляко от овце изисква разработването на биотехнологични методи, даващи възможност за максимално използване на репродуктивния им потенциал. Голям дял в тази насока има трансплантацията на ембриони в анестрален сезон.

Проучванията през юли и август 2004 г. в ИПЖЗ – Троян, бяха проведени първо овце от породата "Романовски", като донори на ембриони и реципиенти от породата "Цигай".

За опитане на суперовулаторния отговор и синхронизацията на еструса бяха използвани ехографски, лапароскопски и клинични методи.

След суперовулаторното третиране с дуплирано изкуствено осеменяване на донорите се отчетоха по 6,2 жълти тела, 1,2 фоликула, 3,2 качествени ембриона и 0,42 кооподобни яйцеклетки.

След хирургическата трансплантация на 14 ембриона в стадий късна морула – бластоцист в шест синхронизирани реципиенти се родиха 3 агнета трансплантанти от Романовската порода.

Получените резултати дават възможност за използването на пълния репродуктивен потенциал на овцете в анестрален сезон и нас.

Ключови думи: ембриотрансфер, овце, анестрален сезон.

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## STUDY OF THE CAPACITIES OF THE ULTRASONOGRAPHY FOR EARLY PREGNANCY DIAGNOSTICS IN EWES

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### Abstract

Echographic (ultrasound, ultrasonography) study in veterinary medicine with a diagnostic purpose is exceptionally promising for an accurate diagnosis of some diseases, as well as for earlier pregnancy diagnostics.

In order to study the capacities of the ultrasonography we investigated 380 Karakachan ewes on the 30<sup>th</sup> and 60<sup>th</sup> day after the artificial insemination by means of an apparatus, "PIA Medical Summer 100" model. For this purpose we put into the rectum a linear transducer with 5 MHz frequency.

In this study we found pregnancy on the 30<sup>th</sup> day from the insemination in 56.8% and on the 60<sup>th</sup> day in 88.0% of the fertilized ewes.

*Key words: ultrasonography, ewes, pregnancy*

## **STUDY ON EFFICIENCY OF DIFFERENT SCHEMES OF ESTRUS SYNCHRONIZATION IN SHEEP**

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### **ABSTRACT**

In order to increase the efficiency of sheep raising, it is necessary to have possibility to control their sexual cyclic activity and to manage their reproduction process. This can be achieved through estrus synchronization on the basis of different hormonal preparations and schemes. We carried out the study with a number of 12 sheep. To synchronize the estrus we used vaginal sponges Chrono-gest (Intervet, Holland), containing 30 mg fluorogestone acetate. We injected the animals of 1<sup>st</sup> (experimental) group with 500UI Folligon (Intervet, Holland) each 48 hours before removing the sponges and those of 2<sup>nd</sup> group also with 500UI Folligon each, but on the day of their removal.

The clinically manifested estrus of sheep in 1<sup>st</sup> group was at the 24<sup>th</sup> hour – 100%, at the 36<sup>th</sup> hour – 100%, at the 48<sup>th</sup> hour – 66.7% and at the 60<sup>th</sup> hour – 16.7%. It was for sheep of 2<sup>nd</sup> group at the 24<sup>th</sup> and 36<sup>th</sup> hour – 0%, at the 48<sup>th</sup> hour – 100% and at the 60<sup>th</sup> hour – 83.3%.

At the 72<sup>nd</sup> hour after treatment with progestagens, all sheep of the two groups were subjected to macroscopic observations of ovaries through the method of laparoscopy. It was found that the number of well formed yellow bodies was greater in sheep of 1<sup>st</sup> group.

The results showed that the animals of 1<sup>st</sup> group should be inseminated artificially twice, between the 24<sup>th</sup> and 36<sup>th</sup> hour and those of second group between the 48<sup>th</sup> and 60<sup>th</sup> hour.

**Key words:** sheep, estrus, synchronization, PMSG

### *10th International Symposium Modern trends in livestock production, 1070-1075.*

## **APPLICATION OF THE NON-HORMONAL METHODS FOR SYNCHRONIZATION OF ESTRUS IN EWES**

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Review paper

**Abstract:** Non-hormonal methods are based on exogenous factors that activate the ovarian function of ewes. They are harmless, economic profitable and easy applicable. They increase the reproductive parameters in farms. Reproductive efficiency of sheep flocks is the product of three factors: fertility, prolificacy and the lambs' survival. The realization of the resulting offspring in current market conditions provide 95-98% of the income in meat sheep (Todorov, 2008), 60% in dairy sheep (Stancheva and Staykova, 2009) and 80% in fine-fleece sheep breeds (Boykovski et al. 2009). The increase of fertility and year-round production of milk and meat are the main reason for the review made by us.

**Key words:** Sheep, non-hormonal methods, synchronization oestrus, estral season, ancestral.

*10th International Symposium Modern trends in livestock production, 979-985.*

**THE EFFECT OF PARITY ON PARTURITION PATTERN IN BULGARIAN WHITE DAIRY GOATS**

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Original scientific paper

**Abstract:** Diurnal distribution of kidding was studied in Bulgarian White dairy goats of different parity kidded in February. Does were divided according to their parity into three groups consisting of 56 primiparous goats, 85 second- and thrimiparous individuals and 91 multiparous animals, respectively. For all groups of does parturitions displayed a unimodal distribution with maximum kidding around midday and with the lowest percentages occurring over the dark hours. The majority of birth occurred between 06.00 and 20.00 h when kidded 90.92 % of the primiparous does, 95.53 % of secondiparous and trimiparouse goats and 92.11 % of fourth or greater parity individuals, respectively The peak of parturitions for all parity categories occurred between 14.00 and 16.00 h. During the night hours the incidence of deliveries were significantly lower ( $P < 0.01$ ) compared to those recorded at day time. No differences ( $P > 0.05$ ) were found in the hourly frequencies of kidding in regard to parity. It may be hypothesized that the diurnal rhythm of deliveries displayed by goats seems to be an evolutionary pre-set event favoring the survival of the newborn kids.

**Keywords:** goats, parity, birth distribution

**NON-GENETIC FACTORS AFFECTING BIRTH WEIGHT OF GOAT KIDS**

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**Abstract**

The aim of the study was to determine paragenetic factors and effect of environmental (year) on body mass of goat kids at birth.

The goats included in this research were representatives of three breed groups - group A (Bulgarian White Dairy goat), group B (Bulgarian White Dairy goat x Toggenburg) and group C (Bulgarian White Dairy x Anglo-Nubian).

Average body mass at birth of male kids was heavier than that of females and the difference is not statistically significant ( $P > 0.05$ ). Exceptions are observed only in 2010 at Bulgarian White Dairy goat, where females are heavier than male kids -  $3.66 \pm 0.29$  vs  $3.40 \pm 0.17$ , as this is probably due to the age of the goats.

The singles were heavier than twins and triplet kids and the differences are statistically significant ( $P < 0.05$ ). For the three groups average trend in singles, twins and triplets, is respectively: 2009 -  $3.25 \pm 0.49$  and  $3.12 \pm 0.15$ ; 2010 -  $3.60 \pm 0.20$ ,  $3.55 \pm 0.09$  and  $3.26 \pm 0.13$ ; 2011 -  $3.68 \pm 0.19$ ,  $3.46 \pm 0.07$  and  $3.33 \pm 0.18$ ; 2012 -  $3.97 \pm 0.14$ ;  $3.70 \pm 0.09$  and  $3.14 \pm 0.28$ .

**Key words:** goat, kids, sex of kids, birth weight, non-genetic factors