REPUBLIC OF TURKEY
MINISTRY OF AGRICULTURE AND FORESTRY
GENERAL DIRECTORATE OF AGRICULTURAL RESEARCH AND POLICIES
International Center for Livestock Research and Training

TAGEM
R & D - INNOVATION
LIVESTOCK STUDIES

2nd International Livestock Studies Congress

30.05.2021   Abstract Submission Deadline
28.10.2021   Check in and registration
29-30.10.2021   Congress presentations
31.10.2021   Check out

Address
Sherwood Exclusive Lara
Lara - Antalya / Turkey

Congress Topics

- Animal Biotechnology

- Animal Breeding and Genetics

- Domestic Animal Genetic Resources and Sustainable Conservation

- Animal Nutrition, Feed and Feed Additives

- Livestock Behaviour, Welfare, Herd Management and Health

- Reproduction, Obstetrics and Udder Health in Livestock

- Livestock Economy

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II. INTERNATIONAL LIVESTOCK STUDIES CONGRESS

International Center For Livestock Research and Training was established to study on Angora goat breeding and improvement of mohair quality in 1931. The Institute started to research and development studies in livestock study field in 1951 within the Ministry and continues its studies in Breeding, Genetics, Animal Husbandry, Herd Management, Animal Production, Animal Nutrition, Animal Biotechnology, Embryo Production and Transfer, Frozen Semen Production and Artificial Insemination. International Center for Livestock Research Training continues to serve with new scientific studies focused on problem-solving for the livestock sector with its strong technological and personnel infrastructure. It is a great pleasure and honor to invite you to II. International Livestock Studies Congress will be held in Antalya/ Turkey, between 28.10.2021 and 31.10.2021. The meeting is where professionals meet to share ideas and advance scientific and technical knowledge. As this conference deals with the basics concepts, students, delegates, academicians and business people can attend the conference to root up the knowledge and excel in this field.

Conference Topics

Animal Biotechnology

Animal Breeding and Genetics

Domestic Animal Genetic Resources and Sustainable Conservation

Animal Nutrition, Feed and Feed Additives

Livestock Behaviour, Welfare, Herd Management Health

Reproduction, Obstetrics and Udder Health in Livestock

Livestock Economy

Sustainable Animal Production and Environment

Invited Speakers

Prof. Dr. Hayrettin Okut

Prof. Dr. Abdul Shakoor Chaudhry

Prof. Dr. Guilherme J. M. Rosa

Prof. Dr. Giovanni Maria Gnemmi

Prof. Dr. Calogero Stelletta

Prof. Dr. Matthias Gauly

Prof. Dr. Francisco Maroto Molina

Prof. Dr. Ilias Giannenas

Prof. Dr. Michael P. Heaton

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		29.10.2021 HALL A
09:00	09:30	Kayıt / Registration
09:30	10:30	Açılış Konuşmaları / Opening Speech
10:30	11:00	Kahve Molası / Coffee Break
11:00	11:20	Genetic Bottleneck Analysis of Native Hair Goats in Turkey Prof. Dr. İbrahim CEMAL
11:20	11:40	Investigation of SNPs related to Growth and Development in Angora Goat Breed Prof. Dr. Yasemin ÖNER
11:40	12:00	Association of TLR2 Haplotypes Encoding Q650 with Reduced Susceptibility to Ovine Johne's Disease in Turkish Sheep Assoc. Prof. Dr. Yalçın YAMAN
12:00	12:30	Çağrılı Konuşmacı / Invited Speaker Deep Learning Algorithms for Complex Traits Genomic Prediction Prof. Dr. Hayrettin OKUT
12:30 14:00		Öğle Yemeği / Lunch
14:00	14:30	Ulusal Siyah Alaca Irkı Genomik Seleksiyon Projesi Sunumu / National Genomic Selection Project Presentation
14:30	14:50	Ana Sponsor Sunumu / Main Sponsor Presentation (Thermofisher)
14:50	15:10	Genomic Prediction of Body Weight in Hereford Cattle Assoc. Prof. Dr. Burak KARACAÖREN
15:10	15:30	Kahve Molası / Coffee Break
15:30	16:00	Çağrılı Konuşmacı / Invited Spiker Combining Big Data Analytics and Omics Techniques to Improve Beef Cattle Selection and Production Prof. Dr. Guilherme J. M. ROSA
16:00	16:20	Expression of Insulin-Like Growth Factor Gene Family Members in Goat Uterus and Ovarium During Different Pregnancy Stages Prof. Dr. Özgecan KORKMAZ AĞAOĞLU
16:20	16:40	Microsatellite Based Bottleneck Analysis of Turkish and Algerian Cattle Breeds Assoc. Prof. Dr. Onur YILMAZ
16:40	17:00	Cervico-Vaginal Mucus (CVM) Sampling from Cattle and Nucleic Acid Isolation Optimization and Standardization from CVM Ahmet AKÇAY
17:00	17:20	Associations with Microsatellites and Milk Yield in Awassi Sheep Breed Dr. Selahaddin KİRAZ
17:20	17:40	Effects of Yeast Cell Wall on Gut Integritiy in Broilers Challenged Salmonella Assoc. Prof. Dr. Özge SIZMAZ

29.10.2021 HALL B		
09:00	09:30	Kayıt / Registration
09:30	10:30	Açılış Konuşmaları / Opening Speech
10:30	11:00	Kahve Molası / Coffee Break
11:00	11:20	Superovulation Performance and Embryo Recovery in South Anatolian Red Cows Dr. Erkan SAY
11:20	11:40	Effects of Different Extenders on Post-thaw Sperm Quality of Locally Adapted Anatolian Black Bulls: The Preliminary Results İlker ÜNAL
11:40	12:00	Effect of Use of Follicle Stimulating Hormone with a Special Adjuvant during Superovulation in Cattle on Corpus Luteum Number and Embryo Production Dr. Mehmet Ali YILMAZ
12:00	12:20	The Effect of Different Synchronization Methods on Fertility in Female Buffaloes Yavuz HAN
12:20 14:00		Öğle Yemeği / Lunch
14:00	14:20	Effects of Developmental Exposure to Endocrine-disrupting Chemicals Methoxychlor and Bisphenol A on Ovarian Follicular Dynamics and Reproductive Parameters in Rats Seher ŞİMŞEK
14:20	14:40	Comparison of the Effects of 3 Different FSH Protocols on Superovulatory Response and Embryo Quality in Anatolian Black Heifers Dr. Muharrem SATILMIŞ
14:40	15:10	Çağrılı Konuşmacı / Invited Speaker Advantages and Disadvantages of Twin Pregnancy. Comparision among Species Prof. Dr. Calogero STELLETTA
15:10	15:30	Kahve Molası / Coffee Break
15:30	16:00	Some Production and Growth Traits of Anatolian Water Buffaloes Raised in Istanbul under the Community Based Water Buffalo Improvement Project Prof. Dr. İhsan SOYSAL
16:00	16:20	Production of Lambs by Laparoscopic Insemination of Ewes in Natural Heat with Mini Doses of Frozen Semen Dr. Nurlan MALMAKOV
16:20	16:40	Litter Size in Karya Sheep Prof. Dr. Orhan KARACA
16:40	17:00	The Effect of Non-aureus Staphylococci on Somatic Cell Count and Milk Yield in Primiparous Holstein Dairy Cows during the First 120 Days of Lactation Dr. Tuncay ÇÖKÜLGEN
17:00	17:20	Relation between Non-infectious Factors and Neonatal Calf Health Status in Dairy Herd Dr. Nurcan KARSLIOĞLU KARA
17:20	17:40	Effect of Ozone Gas Application on Growth, Immune System and Intutive Flora of Holstein Calves Dilemre KÖKEN

**30.10.2021 HALL A**
09:30	09:50	The Effect of Gender, Birth Type and Age of Dam on Growth Curve Parameters in Hair Goats Ali ATİK
09:50	10:10	Climate Change and Livestock Sector in Turkey Prof. Dr. Gürsel DELLAL
10:10	10:40	Çağrılı Konuşma / Invited Speaker The assessment of dairy cattle welfare through the use of PLF technologies: to what extent is that possible? Prof. Dr. Francisco Maroto MOLINA
10:40	11:00	Kahve Molası / Coffee Break
11:00	11:20	Growth Characteristics of Karacabey Merino Sheep in Sheep Breeding Research Institute Prof. Dr. Seyrani KONCAGÜL
11:20	11:40	Sheep and Goat Breeding in Cyprus (North (Trnc) And South) and The Effects and Importance of Geographical Indicatıon of Halloumı/Hellim On This Breeding Prof. Dr. Dilek ARSOY
11:40	12:00	Importance of Morkaraman Breed at the Highland Activities of Small Ruminant Husbandry in Muş Province of Eastern Anatolia in Turkey Prof. Dr. Turgut AYGÜN
12:00	12:30	Çağrılı Konuşma / Invited Speaker Preventive health management - How can Precision Livestock Farming (PLF) help? Prof. Dr. Matthias GAULY
12:30 14:00		Öğle Yemeği / Lunch
14:00	14:20	Effects of Environmental Factors on Growth Performance of Kilis Goat in Gaziantep Province Assoc. Prof. Dr. Sabri GÜL
14:20	14:40	Five-year Term Evaluation of the Project Named "Kilis Goat National Breeding Project in Kilis Province Prof. Dr. Mahmut KESKİN
14:40	15:00	Some Growth and Survival Characteristics of Koçeri Lambs under Breeder Conditions Dr. Mehmet Emin VURAL
15:00	15:30	Kahve Molası / Coffee Break
15:30	15:50	Sustainable Meat Production in a Changing Mediterranean Environmental Area in the COVID-19 Pandemic Era Prof. Dr. Nazan KOLUMAN
15:50	16:10	Analysis of Environmental Factors Affecting on Growth, Reproduction and Production Performance Traits of Anatolian Buffaloes in Yozgat Province Dr. Yusuf KAPLAN
16:10	16:30	A Comparison of some Fertility Traits of Turkish Hair Goats and Growth Characteristics of Kids Raised under Breeder Conditionsbetween Burdur and Muğla Provinces Assoc. Prof. Dr. Aykut Asım AKBAŞ
16:30	16:50	Sektör Sunumu / Sectoral Presentation Elektronik Hayvan Takip Sistemi Proje Sunumu/ Electronic Animal Tracking System Project Presentation
16:50	17:10	Sektör Sunumu / Sectoral Presentation (İNTEGRO)
17:10	17:30	Effects of Some Environmental Factors on the Early Growth Characteristics (Birth and Weaning of Kıvırcık) of Kıvırcık Sheep in Conservation Flock Arzu ÖZDEMİR

X

30.10.2021 HALL B		
09:30	09:50	Effect of Ration Calcium, Phosphorus and Magnesium Contents on Serum Levels in Fatty-Tailed Sheep Dr. Necdet İlker İÇİL
09:50	10:10	Dietary Encapsulated Essential Oil Mixture Influence on Apparent Nutrient Digestibility, Serum Metabolic Profile, Lymphocyte Histochemistry and Intestinal Morphology of Laying Hens Prof. Dr. Cavit ARSLAN
10:10	10:30	Determination of the Effect of Inoculant and Molasses on Silage Quality and In-vitro Digestibility in Silages Prepared with Different Proportions of Ryegrass Grass and Hungary Vetch Mixture Asst. Prof. Dr. Gökhan ŞEN
10:30	11:00	Kahve Molası / Coffee Break
11:00	11:30	Çağrılı Konuşmacı / Invited Speaker Changing Profiles of Sustainable Livestock Production Prof. Dr. Abdul CHAUDHRY
11:30	11:50	TMR Pilot Study in Dairy Farms in Amasya Region: I - Determination of Packaged TMR Durability Dr. H. Hüseyin ŞENYÜZ
11:50	12:10	Fermantation Characteristics of Pomegranate Pomace Silage and Effect on Performance in Lamb Dr. Arzu EROL TUNÇ
12:10	12:30	Effect of Environmental Factors on Lactation Milk Yield and Lactation Period for Anatolian Water Buffaloes of Muş Province Dr. Oğuz AĞYAR
12:30 14:00		Öğle Yemeği / Lunch
14:00	14:20	Effects of In Ovo Glucose and Glutamine Treatment on Hatching Efficiency and Intestinal Histomorphology in Broiler Chicks Dr. Feridun Işın CONER
14:20	14:40	Çağrılı Konuşmacı / Invited Speaker Exploitation of Local Feedstuffs to Improve Milk Production and Reduce Enviromental Foodprint in Small Ruminants Prof. Dr. Ilias GIANNENAS
14:40	15:10	Kahve Molası / Coffee Break
15:10	15:30	Çağrılı Konuşma / Invited Speaker Bovine reproductive ultrasonography: operational strategy for the next future Prof. Dr. Giovanni Maria GNEMMI
15:30	16:00	Effects of Olive Leaf Extracts on In- Vitro and In-vivo Nutrient Digestiblity in Sheep Dr. Pınar ÖZDEMİR
16:00	16:20	Effect of Different Doses of Some Essential Oils on The Growth Rate of Ruminobacter Amylophilus Isolated from Rumen Fluid Dr. Zeynep ŞAHAN
16:20	16:40	The Influence of Hectoliter Weight on Chemical Composition of Barley Dr. Furkan DİLBER
16:40	17:00	Lactation Characteristic of Awasi Sheep Raised in Farmer Conditions Dr. İrfan GÜNGÖR
17:00	17:30	Genel Değerlendirme ve Kapanış Konuşması / General Evaluation and Closing Speech

Deep Learning Algorithms for Complex Traits Genomic Prediction

Hayrettin Okut, PhD.

University of Kansas, School of Medicine-Wichita

The underlying perception of genomic selection (GS) is to use genome-wide DNA variation ("SNP markers") together with phenotypes from an observed population to predict the phenotypic values of an unobserved population in crop and livestock breeding programs. GS was first proposed by Meuwissen et al., 2001 in dairy cattle to identify genetically superior animals at an early age. The aim was to capture specific genes across the whole genome that are associated with desired traits. The major challenge in using GS programs is to predict the effect of many SNP markers using phenotypic information from a few individuals (aka small n big p problem, or $p \gg n$). Many approaches including ridge regression BLUP, LASSO, elastic net, Bayesian approaches (BayesA, BayesB, BayesCπ, BayesDπ, Support Vector Regression have been used to address the $p \gg n$ problem. These methods all perform well for ($p \gg n$) by using linear mapping approach from genotype to phenotypes. However, these methods may not fully capture non-linear effects which are possible to be important for complex traits. To deal with this limitation, many methods including neural networks (NN) were recommended to cover non-linearity for GS. Artificial NNs (ANNs) for GS was first presented by Okut et al. (2011) who built a fully connected regularized multi-layer ANN (MLANN) containing one hidden layer to predict BMI in mice using dense molecular markers. Since 2011, more complex ANN architectures have been used including deep learning (DL) networks. The different DL algorithms have their respective advantages in resolving specific problems in complex trait GS. In this presentation, four different major classes of DL approaches such as fully connected deep learning artificial neural networks (DL-MLANN), convolutional neural networks (CNN), recurrent neural networks (RNN) and long-short term memory (LSTM) and some variation of these network architectures will be summarized.

Keywords: Deep learning, complex traits, genomic prediction

Combining Big Data Analytics and Omics Techniques to Improve Beef Cattle Selection and Production

Guilherme J. M. Rosa

Department of Animal and Dairy Sciences

Department of Biostatistics and Medical Informatics

University of Wisconsin-Madison

The efficiency of beef cattle production dependents on an intricated interaction of cattle genetics and environmental factors. Quantitative methods are a key component contributing to the improvement of beef cattle systems. For example, many advances have been accomplished over the years in terms of animal nutrition, management and welfare through extensive scientific research based heavily on experimental design and statistical data analysis. On the genetic improvement side, a remarkable progress has been accomplished on the last few decades, with improved animal performance scoring, pedigree recording, and the use of mixed model methodology. Nowadays, two innovations contribute for an even more accelerated progress of beef cattle systems. First, the development of genotyping platforms for thousands of genetic markers allow the implementation of more accurate prediction of genetic merit of selection candidates at much earlier ages. Second, the advent of digital technology to record novel traits, and the increase of publicly available databases such as weather and economics information, make it possible the implementation of big data analytics strategies to develop predictive models and the investigation of factors affecting the performance of beef cattle operations. In this presentation we will discuss some of these new technologies and data mining tools, together with examples of applications, including genome-enabled selection and management, precision livestock farming, and the development of optimal combinations of genetics, environment, and management practices.

Advantages and Disadvantages of Twin Pregnancies: A Journey Among Farm Animal Species

Stelletta Calogero[1]   Oztutar Stelletta Fatma[2]

[1]University of Padova. Department of animal medicine, production and health

[2]Rumreprotech Veterinary Services, Piazza Armerina, Italy

Pregnancy represents the culminating part of reproductive activity, whether natural or due to assisted reproductive techniques. In general, multiple pregnancies are of great productive interest but much more specifically they can represent a management challenge for the veterinarian/animal scientist. The species that can be compared among farm animals are small ruminants and horses. Sheep and goats normally have multiple pregnancies and milk production capacity is directly related to the placental size. Pregnancy in these species must be monitored to avoid pregnancy toxaemia. The use of "key factors" like the ultrasonographic early pregnancy detection (25-35 days), numbering the embryos and the BCS monitoring give the possibility to divide the flock in groups and optimize the diet starting from the 3-4 month of pregnancy. In horses, the birth of live and viable twins is considered rare and pregnancy management can be of extreme importance to optimize equine production. The probability to have an early lose or late abortion are depending on the monolateral or bilateral fixation and by the difference between the twin in terms of age. Triplet in horses is very rare but reported as possible. Hormonal treatments can cause an increase of multiple pregnancies in both considered species. Management of twin pregnancies in both farm species can be optimized thanks the use of high-resolution ultrasound equipment. Besides, echo-color doppler machines increase the precision of imaging diagnostics.

The Assessment of Dairy Cattle Welfare Through the Use of PLF Technologies: to What Extent is That Possible?

Francisco Maroto Molina

The presentation will address the possibilities for Welfare Quality® protocol to evolve from an assessment method based on data gathered on punctual visits to the farm to an assessment method based on sensor data. This approach could provide continuous and objective data, while being less costly and time consuming. Precision Livestock Farming (PLF) technologies enabling the monitorization of Welfare Quality® measures for dairy cows will be reviewed and discussed. For those measures that cannot be assessed by current technologies, some options to be developed will be proposed. Imagining future dairy farms, the need for multipurpose and non-invasive PLF technologies will be stated, in order to avoid an excessive artificialization of the production system. Social concerns regarding digitalization, especially in western countries, will also be addressed.

Preventive Health Management - How Can Precision Livestock Farming (PLF) Help?

Gauly Matthias

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Farm management has to assure a high level of animal welfare and to prevent and control at the same time disease. This has the highest priority in livestock production systems. Preventive health management includes the routine care and grooming, which allows the identification of problems early in the course of disease. The preventive health care includes all hygienic protocols as vaccination or parasite prevention. Nutrition (including the control of water quality and quantity) has beside housing and environmental factors the most important impact on health and productivity. To be able to continuously monitor the welfare and health status of individuals and on herd level the close observation of changes in behavior e.g. in appetite, thirst, urination, defecation, ambulation, and general behavior are needed. PLF can support farmers to collect detailed data on a farm from individual animals and a flock across. PLF is the application of principles and techniques of process engineering in order to monitor, model and manage extensive and intensive animal production. The PLF data consolidated is used to capture animal production, health status, monitoring social behavior and enhances the selection of superior performing animals with high genetic potential. A combination of agriculture, engineering and computer science are involved in implementing PLF. Various sensors to record the behavior and physiological parameters of animals (especially dairy cows) are already available. These sensors are building blocks in a complex system. These systems consist of sensors for measuring parameters, antennas or routers for data transmission, algorithms for data processing and end devices that make information available via software and help with action decisions. The following parameters are relevant for assessing animal health and can be recorded using sensors: 1. Body temperature. It can be measured at the base of the ear or using a bolus. The measured temperatures have different informative value because they correlate differently with the internal body temperature. 2. The blood pressure, pulse and heart rate. Among other things, measuring belts or pressure cuffs (e.g. on the tail) are used. The data are suitable, among other things, for assessing stress. However, their application has so far been greatly reduced to the area of research. 3. The respiratory rate. The measurement can be carried out using pressure sensors installed in the area of the lateral abdominal wall. Practical methods are not yet available. 4. The blood oxygen measurement. The values could provide important information about the

functionality of the respiratory system and the stress on the animals. Sensors in the area of the ear base can measure this via light pulses. However, several issues are still reducing a practical adaptation of the technique. 5. The movement activity. Changes in the frequency of movement give clear indications of physiological conditions (health, heat). Movements can be recorded using position and acceleration sensors placed on the head or feet. The technique is already widely used in various farming systems. 6. The rumination. Ruminating activities can be recorded using acceleration and position sensors. 7. The water intake can be measured using different techniques. Overall PLF systems aim to offer a real-time monitoring and management system that focuses on improving the welfare and health situation of animals e.g. by warning the farmer about arising problems. This paper presents examples of systems that have already been developed in order to demonstrate the potential benefits but also the current limitations of this technology.

Changing Profiles of Sustainable Livestock Production

Abdul Shakoor Chaudhry

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It is recognised that global human population is increasing which is happening at a much faster speed in some regions than others. The population growth combined with rapid urbanisation lead into an enhanced demand for food production and ever-increasing concerns for the likely pressures on existing resources. This is particularly relevant to the animal derived foods such as milk, meat, and eggs. These animal derived foods supply high quality nutrients such as essential amino acids and fatty acids. While these animal-based nutrients are crucial to maintain human health, their over-supply in affluent and under-supply in deprived societies have been criticised by many global organisations. In fact, livestock production has been blamed for causing many issues such as animal welfare, environmental pollution, greenhouse gas (GHG) emissions and ultimately climate change. Therefore, there is a need to explore alternative practices to not only optimise livestock production but also to reduce its undesirable impacts on animals, people, and planet. This presentation will examine the changing profiles of livestock production in order to maximise nutrient use efficiency to produce high quality animal products in a sustainable manner, to promote food security and minimise environmental pollution causing GHG emissions.

Keywords: Sustainable Food; Animal Products, Diets, Livestock, Climate Change

Exploitation of Local Feedstuffs to Improve Milk Production and Reduce Environmental Footprint in Small Ruminants

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Dairy products milk, yoghurt and cheese are important foods of the human diet worldwide, with a steadily rising production and consumption, especially for Asian and African countries. Sustainability of ruminant sector should be further regarded as a crucial factor to match worldwide increased food demands and reservation of feed sources. Several feed additives have been used in animal nutrition in order to increase sustainability of the Agrofood sector, in both organic and conventional livestock. The aim of the current course is to provide a comprehensive description on the use of aromatic plants, extracts and essential oils as feed additives alone or in combination with feed additives of different categories mostly based on findings of our most recent research studies. A new strategy in the creation of novel dairy products is the enrichment of the milk nutritional profile through the dietary manipulation of the ruminant's diet. Milk and yoghourt are considered as low fat products, their enrichment with omega -3 fatty acids can become more desirable, especially cheese that contains high fat content. Today, many plants and their extract and by-products are examined in ruminant nutrition, such as flaxseed (*Linum usitatissimum*), cannabis (*Cannabis sativa*) and lupins (*Lupinus albus*). Flaxseed can be fed to cows, sheep or goats despite its content of anti-nutritional factors, such as cyanogenic glycosides that are toxic for the animals. Fatty acids account for 55% of the total fat content of the seed and are mainly represented by α-linolenic which corresponds to 18% of the total seed weight. Available data concerning dairy cows indicate that the addition of 0.9-1 kg of flaxseed per cow per day resulted in an increase in α-linolenic from 0.44 to 0.78 % whereas an 8% content per kilo of dry food substance increased the content of polyunsaturated fatty acids from 33.5 to 36.5 g/kg. Another new feed ingredient is the by-

product of industrial cannabis that is rich in polyunsaturated fatty acids. Cannabis oil is mostly (84%) comprised of polyunsaturated omega-3 and omega-6 fatty acids (56% linolenic, 22% α-linolenic, 4% γ-linolenic and 2% stearidonate). Moreover, lupin contains on average 8.5% oil mainly with C18-ln9 (4.36%) and C18-2n6 (1.45%) fatty acids. This report also explores the potential of the aforementioned feed additives to tackle with environmental problems. In vitro testing of antioxidant and antimicrobial bioactive herbal compounds and novel tools, such as life cycle assessment and genomic microbiota analysis, are necessary to verify effectiveness of aromatic plants, extracts and essential oils as feed additives in supporting livestock health, performance and sustainability.

Bovine Reproductive Ultrasonography: Operational Strategy for the Next Future

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About 30 years ago, ultrasonography took its first steps in bovine reproductive management. Since then, this extraordinary complementary examination has spread throughout the world, making it possible to greatly improve reproductive management in both dairy and beef cattle. Today, veterinarians and technicians use this test mainly for early gestation diagnosis. However, there are many opportunities that could already be exploited, such as for the diagnosis of ovarian physiopathology, where the margin of error of an excellent gynaecologist with palpation is 45-55%, or for the diagnosis of uterine physiopathology, where excluding the diagnosis of gestation, the margin of error with palpation is 70-80%. Today, thanks to ultrasonography, it is possible to read the follicular map under field conditions, thanks to which it is possible to diagnose which oestral window we are in, i.e. to establish if and when to use a GnRH and/or prostaglandin. We can still diagnose embryonic suffering/death and early foetal death. Even fetal sexing can now be performed in a few seconds, in any field conditions. In summary, ultrasonography as a complementary examination today allows us to optimise reproductive management in both dairy and beef cattle breeding, reducing, almost to zero, the margin of error that an excellent gynaecologist has with the palpation of the reproductive apparatus of the cow.

In the present and even more so in the near future, we will have ultrasound scanners that incorporate artificial intelligence. Today, with Doppler it is possible to perform a no pregnancy diagnosis from 19. In the near future, we will be able to have equipment capable of automatically calculating the vascularisation surface of the corpus luteum and also the dosage of progesterone produced. This is a possible frontier that will allow a more informed use of hormone therapies.

Lactation Characteristics of Awassi Sheep Raised in Breeder Conditions

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Abstract

This study was conducted to evaluate lactation performances of Awassi sheep in breeder condition in Şanlıurfa, Turkey. The analyses were performed on data obtained from 70467 completed lactation records in 128 flocks from 2008 to 2021 in two sub-projects of Genetic Improvement of Awassi Sheep that have been supported by the General Directorate of Agricultural Researches and Politics (TAGEM) in the scope of *National Genetic Improvement Project of Small Ruminant in Breeder Condition*.

The data were analyzed using *proc glm* (SAS, 2017) and the differences among means of fixed effect levels were tested by *Tukey* test. The analysis method included project, flock, year, type of birth and birth season. Mean lactation length (LL), lactation milk yield (LMY), average daily milk yield (ADMY) were found as 122.19 ± 0.140 day, 74.49 ± 0.134 kg, 617.86 ± 0.818 g, respectively. The direct and maternal heritability estimates were 0.18 and 0.05, 0.23 and 0.07, 0.26 and 0.02 for LL, LMY and ADMY, respectively.

All lacation traits were significantly affected by project, flock, year, type of birth and birth season ($P < 0.05$). Large variation was observed especially among years, and flocks. The analyses revealed that there is a large variance in terms of all traits and selection for improved milk yield should be continued while some precautions must be taken in order to extent lactation lenght by applying some restrictions in the mating seasons.

Keywords: Awassi sheep, Lactation characteristics, Environment, Selection

Climate Change and Livestock Sector in Turkey

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Climate change has become a very important problem that concerns all countries in the world today. Climate change is generally defined as long-term and slowly developing changes in climate conditions with large-scale (global) and significant local effects (Türkeş 1997). These changes are; emerges mainly as global warming resulting from greenhouse gas emissions. According to the data of 2019, Turkey's total greenhouse gas emission amount is 506.1 Mil. tons of C02 eq. This emission, in order of height, consists of energy (364 million tons), agriculture (68.0 million tons), industrial processes and product use (56.4 million tons) and waste (17.2 million tons) sectors (TÜİK 2021). As in the world, the most important source of the total emissions originating from the agricultural sector in Turkey is the livestock sector (<50%). There are mutual relations between climate change and the livestock sector. While the livestock sector affects climate change by producing greenhouse gases (mainly CH_4, N_2O, CO_2 ve Florlu- F gazlar gases), climate change affects livestock sector by causing factors as increase atmospheric temperature, decrease in water resources, drought. Therefore, climate change studies are carried out at the level of greenhouse gas emission reduction and adaptation to climate change. This paper will focus on analysis of the current situation and near future of climate change mitigation and adaptation studies /practices (goals, action plans, co-benefits, etc.) in the livestock sector in Turkey.

Keywords: Turkey, Climate Change, Livestock Sector

Analysis of Environmental Factors Affecting on Growth, Reproduction and Production Performance Traits of Anatolian Buffaloes in Yozgat Province

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In this study, it was aimed to reveal some growth, reproduction and production traits and environmental factors affecting them. The reproductive and productive data belonging to 1139 Anatolian buffaloes and growth records of their calves were used for this purpose. The data of present investigation were obtained from the sub-project (TAGEM/66/MANDA2015-01) carried out in 39 villages with 143 breeders in Yozgat province under the Community Based Anatolian Buffalo Breeding Project.

Birth weight, weaning weight, live weights at sixth month and twelfth months and average daily live weight gains of calves born between 2015 and 2019 were examined as growth traits. The reproductive traits were calving interval and service period in the study. The lactation milk yield, milk yield per day of lactation period, milk yield per day of calving interval, peak yield, day at peak yield and persistency were taken into consideration as production traits.

The overall mean of live weights in different stages of life were 30.43 ± 0.21 kg at birth, 97.79 ± 1.48 kg at weaning, 112.98 ± 1.13 kg at sixth and 169.40 ± 2.21 kg at twelfth month. The calves gained 0.441 ± 0.011 kg daily weight between birth and weaning, 0.459 ± 0.006 kg between birth and six, 0.382 ± 0.006 kg between birth and twelve and 0.306 ± 0.009 kg between six and twelve months of age. The overall means for reproductive traits were found to be 470.08 ± 9.32 days in calving interval and 150.08 ± 9.32 days in service period. The overall means of production traits were 860.40 ± 17.60 kg for lactation milk yield, 4.447 ± 0.095 kg for milk yield per day of lactation period, 1.916 ± 0.082 kg for milk yield per day of calving interval, 83.34 ± 3.34 days for day at peak yield, 5.589 ± 0.116 kg for peak yield and $77.35\pm1.04\%$ for persistency.

Analysis of variance revealed significant effect of villages on all traits. All of growth traits were affected by sex. Reproductive traits were affected by all factors and year factor also affected all production traits. In the light of these results, it has been determined that some environmental factors affecting the growth, reproduction and production traits of economic importance are available in the breeder condition. As a result, it was concluded that these factors should be taken into consideration in selection programs.
Keywords: Anatolian Buffalo, Growth, Reproduction, Production, Yozgat

Effects of Some Environmental Factors on the Early Growth characteristics of Kıvırcık Sheep in Conservation Herd

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Abstract

There are 384 female sheep and 16 head rams in the conservation herd in Çukurpınar village, Kırklareli. Sheep and rams graze together in the pasture during the summer months. Ram joining with ewes is applied as a free ram joining between 15 August and 30 September. The birth season of the herd is between January 15 and February 28 and the lambs are weighed as soon as they are born and their birth weights are recorded. Weaning is done after 3 months. Lambs are weaned in the first week of April following birth, and weaning body weights are recorded.

This study was aimed to ivestigate the early growth of Kıvırcık sheep in conservation herd Çukurpınar/Kırklareli, using data spanning the years from 2019 and 2020. Live wight data were collected from 751 lambs.

The data were analyzed by *GLM* procedure in SAS (2017) and *Tukey* test was used for the comparison of subclass means of environmental factors. Least square means of birth (BW0), and 90th (BW90) day of age live weights and average daily weight gain (ADWG) from birth to 90-day of age in 2019 and 2020 were 4.56 and 4.44 kg, 25.62 and 30.33 kg, and 231.6 and 283.9 g, respectively.

All growth traits were affected by birth year, season, age of dam, type of birth and sex of lamb (P<0.05).

Keywords: Kıvırcık sheep, Ovine Growth, Ovine Environment, Ovine Weaning, Ram joining

The Effect of Gender, Birth Type and Age of Dam on Growth Curve Parameters in Hair Goats

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Abstract

Growth curve parameters, age and weight at point of inflection (IPT and IPW) can be used for selection of livestock animals. In this study, monthly 3858 test day body weight records of 643 hair goat kids up to 150 days of age were used to fit growth curve and estimate growth curve parameters using with Gompertz and Von Bertalanffy models which are the most used non-linear functions. The live weights of kids were divided into three group; age of dam (3, 4, 5, 6, 7 years), sex (female, male) and birth type (single, twin). With respect to goodness of fit, although both models had high R^2, Gompertz model was determined the best fit for all factors with higher values of determination coefficient (R^2) and adjusted determination coefficient (R^2_{adj}) and lower values for Akaike information criteria (AIC), Bayesian information criteria (BIC) and mean square error (MSE). Effect of sex, age of dam and birth type on IPT, IPW and growth curve parameters (A, B and K) were analyzed with General Linear Model (GLM) in SPSS Version 22.0. Sex of kids showed significant differences for parameter K ($p<0.001$), IPW and parameter A ($p<0.01$) while birth type showed significant differences for B and K parameters ($P<0.001$). As for age of dam, no significant differences were found on any of parameters. In conclusion, Gompertz and Von Bertalanffy models can be used for selecting hair goat kids by prediction of their growth curve traits which would provide more efficient breeding strategies in goat farming. With obtained remarkable results, growth curve parameters should be planned considering birth type and sex effects in the selection strategies of hair goat kids.

Keywords: Growth, growth curve, hair goat, non-linear regression, parameter estimation

Five-year term evaluation of the project named "Kilis Goat National Breeding Project in Kilis province"

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Abstract

Kilis Goat National Breeding Project in Kilis province has been carried out for 12 years in cooperation with The General Directorate of Agricultural Research and Policies in the Ministry of Agriculture and Forestry, Hatay Mustafa Kemal University and The Sheep and Goat Breeders Association of Kilis Province. The aim of this manuscript is to inform about progresses made under the relevant project. In the second five-year period of the project, 43 breeders take part in a total of approximately 6000 female and 300 male animals. 37 of these herds are base herds and 6 of them are elite flocks. In the study, the effects of gender, maternal age, separation as breeding stock or not, birth types and years on birth and weaning weights were analysed by using the SPSS package program. The effects of flock and age differences on lactation milk yield in elite flocks were also analysed by using the SPSS package program. During this five-year period, the data collected from goats in herds were evaluated with the index method and breeding animals were determined for each herd and recommended to the breeders. In the project, average birth weights varied between 2.9-3.1 kg and weaning weights between 11.2-12.7 kg for different years. In the study, milk yield in elite herds increased from 175.6 kg to 346.1 kg from 2016 to 2020. As conclusion, it is recommended that the continuation of this project will be beneficial.

Keywords: Birth weight, weaning weight, milk yield

Importance of Morkaraman Breed at the Highland Activities of Small Ruminant Husbandry in Muş Province of Eastern Anatolia in Turkey*

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Abstract

This research was carried out in order to determine the birth weight, the weaning weight, and some reproductive traits and to define the highland activities of small ruminant husbandry in Muş province of Eastern Anatolia in Turkey. In addition, the importance of Morkaraman sheep breed, a significant genetic resource in Muş province, has been emphasized for the highland activities of small ruminant husbandry. The data used in this study was one-year data of 2020 year obtained from a total of 27 sheep farms in Muş province. The animal material consisted of a total of 6822 head of Morkaraman lambs including in different farms. The birth weight, the weaning weight, and the daily live weight gain were analyzed using covariance analysis design. The means for birth weight and weaning weight of 90th day were calculated as 3.59±0.01 kg and 29.02±0.10 kg. The average daily live weight gain of lambs was found 272.8±0.01 g between birth and 90th day. Means for the lambing rate, the sterility rate, the survival rate at weaning of 90th day, the fecundity, and the litter size as reproductive traits in Morkaraman sheep were found as 95.99%, 4.01%, 97%, 1.15, and 1.23, respectively. Small ruminant activities in Muş province are an important source of income for the indigenous people. In the highland small ruminant husbandry, animals are removed to the highlands with cool and plenty of grassy plains by pressing hot and dry towards the end of spring. The results of this research have been the basis for scientific studies taking into account birth weight, weaning weight, and some reproductive traits of Morkaraman sheep. In particular, the source of observed variation in birth and weaning weight in Morkaraman sheep may be the genetic and the environmental.

Key words: Morkaraman, Muş province, Nomadic activities, Sheep husbandry

Introduction

Turkey's current sheep and goat breeding still maintains its importance due to the following characteristics:

- Its superiority in the evaluation of non-production areas due to its wide structure,

- the indispensability of its products in the nutrition of the people of the country,

- its contribution to the economy and employment,

- the role it has or can play,

- improving the nutrition and quality of life of the rural population, and

- more effective use of rural workforce and potential power.

The most of sheep husbandry in Turkey are carried out in extensive or semi-intensive systems. Muş city in located at East Anatolia region of Turkey is also important for sheep production. The most of sheep breeds reared in Turkey are characterized as rough-mixed wool genotypes and their wools are usually used to carpet, blanket, quilt and weaving socks. There are systems of the stock breeding, the highland sheep husbandry, and the nomadic livestock breeding in Muş province. Morkaraman sheep breed represents 21.5% of sheep breeds in Turkey. This breed is widely raised in the east of the country. Traits of Morkaraman sheep breed such as the herd and the maternal instinct are good. They are resistant to cold. They have also the ability to adapt to living conditions and poor environmental conditions. Their tails are fatty. The fat tail is used as an energy source during the long and insufficient winter feeding period (Kayalık ve Bingöl, 2015).

In the highland sheep husbandry, sheep flocks are removed to the highlands with cool and plenty of grassy plains by pressing hot and dry towards the end of spring. For a period of 3-5 months, sheep remain in control by shepherds in the highland. After the weather cools down, sheep go back to the villages or the farms in the plain. Sheep herds usually consist of 300 to 500 heads. Each sheep is composed of lots of different people with a lot of expenses, depending on the number of animals contributes. Sheep herds are taken away the summer ranges by grazing or by road transport (Aygün and Demir, 2014).

Sheep husbandry is an industrial sector that they transform the natural vegetation cover pasture and the pasture not used in the agriculture into the products such as meat, milk, and wool. There are breeds such as White Karaman, Morkaraman, Awassi, Dağlıç, Kıvırcık, and Karayaka among local sheep breeds of Turkey (Öztürk ve Odabaşı, 2011). During recent years, sheep breeding has gained increasing popularity in Turkey.

Studies about Morkaraman sheep breed have been mostly performed in the Eeastern Anatolia of Turkey. The results of this study would be the basis for the scientific studies taking into account the greasy wool yield, the live weight after shearing and, the clean fleece percentage of Morkaraman ewes and the wool problems in the region. Even so, in order to obtain a more definite conclusion is required

to detailed works in native sheep populations in Eastern Anatolia region of Turkey. The findings of this study have suggested that the ram factor used in villages can be significant. In particular, the source of the observed variation in the greasy wool weight may be the genetic and the environmental in Morkaraman sheep.

Researches to determine the general performance, morphological and physiological characteristics of domestic sheep breeds under direct breeder conditions, and to determine the breeding infrastructure and trends will provide more effective livestock development policies.

This research was carried out in order to determine the birth weight, the weaning weight, and some reproductive traits and to define the highland activities of small ruminant husbandry in Muş province of Eastern Anatolia in Turkey. In addition, the importance of Morkaraman sheep breed, a significant genetic resource in Muş province, has been emphasized for the highland activities of small ruminant husbandry.

Materials and Methods

The data used in this study was one year data obtained from a total of 27 sheep farms in Muş province. The animal material consisted of a total of 6822 head of Morkaraman lambs including in different flocks bred in the villages (Figure 1 and 2). Lambs were weighed using electronic bascule at birth and weaning period. After birth, the lambs were weighed with a weighing instrument with a sensitivity of 10 g within 24 hours, and the main ear number, lamb's ear number, birth type, gender, and birth dates were recorded in the registry.

Muş district is located on the Eastern Anatolia region of Turkey. Its surface area is 8196 km^2. Its sea level height (altitude) is 1350 meters. Average annual minimum and maximum temperatures of the region range from -29 ºC to +37 ºC, respectively. It snows too much in the winter months in Muş province.

Statistical analysis

Birth and weaning weight and daily live weight gain were analyzed using covariance analysis design. Statistical analyses were performed by using SAS (2016) statistical package program. The statistical model based can be written as follows:

$Y_{ijkl} = \mu + a_i + b_j + c_k + e_{ijkl}$

Where;

Y_{ijkl} = Birth and weaning weight and daily live weight gain associated to l. lamb with i. birth type j. sex and k. dam age, μ = Expected mean value, a_i = the effect of i. birth type (i=1, 2; single, twin), b_j = the effect of j. sex (j = 1, 2; male, female), c_k = the effect of k. dam age (2, 3, 4, 5$\leq$), and e_{ijkl} = the random residual error.

Results and Discussion

Averages for the birth weight, weaning weight, and daily live weight gain of Morkaraman sheep

Averages for the birth weight, the weaning weight, and daily live weight gain of Morkaraman sheep are presented in the Table 1.

Figure 1. A herd of Morkaraman sheep.

Figure 2. Morkaraman rams.

Table 1. Averages for the birth weight, the weaning weight, and the daily live weight gain of Morkaraman sheep.

Factors	n	Birth Weight (kg) Mean	Weaning Weight (kg) Mean	Daily Live Weight Gain (0-90th day, g) Mean
Birth type		***	**	***
Single	4866	3.80±0.01	29.60±0.10	0.295±0.01
Twin	1956	3.35±0.01	28.35±0.16	0.260±0.01
Gender		***	**	*
Male	3366	3.78±0.01	29.22±0.12	0.285±0.01
Female	3456	3.56±0.01	28.75±0.13	0.268±0.01
Dam age		***	***	***
1	125	3.77±0.09[b]	28.41±1.18[a]	0.241±0.01[a]
2	1890	3.60±0.01[a]	29.62±0.14[b]	0.290±0.01[b]
3	1725	3.59±0.01[a]	29.60±0.20[b]	0.288±0.01[b]
4	978	3.70±0.02[ab]	29.40±0.33[b]	0.288±0.01[b]
5≤	2104	3.60±0.01[a]	28.11±0.13[a]	0.254±0.01[a]
Overall	6822	3.59±0.01	29.02±0.10	0.273±0.01

[*]: $p<0.05$; [**]: $p<0.01$; [***]: $p<0.001$; a, b: Values in same column not having a common superscript differ significantly ($p<0.05$).

The means for birth weight and weaning weight of 90th day were calculated as 3.59±0.01 kg and 29.02±0.10 kg. The average of daily live weight gain of lambs was found 0.273±0.01 g between birth and 90th day (Table 1).

It has been reported in a study conducted in Awassi sheep raised in the Central Anatolia Region that rates of the pregnancy, the birth, the single birth, the twin birth, the abortion, and the lambing rates and the litter size were 93.8%, 90.5%, 79.7%, 20.3%, 1.4%, 108.8%, and 1.20, respectively. Survival rates were determined as 88.3% at 60 and 84.5% at 120 days of age (Üstüner and Oğan, 2013).

Means for some reproductive traits in Morkaraman sheep

Means for the pregnancy rate, the sterility rate, the lambing rate, the survival rate at weaning of 90th day, the fecundity, and the litter size as reproductive traits in Morkaraman sheep are presented in the Table 2.

Table 2. Means for the pregnancy rate, the sterility rate, the lambing rate, the survival rate at weaning of 90th day, the fecundity, and the litter size as reproductive traits in Morkaraman sheep.

Traits	According to Results of the Mating and the Parturition
-Pregnancy rate (%)	96.14
-Sterility rate (%)	4.01
-Lambing rate (%)	95.99
-Fecundity	1.15
-Litter size	1.23
-The survival rate at weaning of 90th day	97

Means for the pregnancy rate, the sterility rate, the lambing rate, the survival rate at weaning of 90th day, the fecundity, and the litter size as reproductive traits in Morkaraman sheep were found as 96.14, 4.01, 95.99, 1.15, 1.23, and 97, respectively.

It has been suggested that the ram factor used in villages can be significant. In particular, the selection of ram must be considered for breeding in Morkaraman sheep. In order to obtain a more definite conclusion is required to detailed works in native sheep populations in Eastern Anatolia region of Turkey.

Detailed descriptions regarding the overall performances of Turkey's native breeds in local conditions are not sufficient. However, the improvement programs should be efficiently developed in livestock at direct breeders. Investigations should be conducted to identify the morphological and the physiological characteristics of native breeds under normal breeder conditions. By obtaining the more synthesis of this information, the more sensitive animal breeding programs and the policies can be developed (Kaymakçı, 2010; Gürsu ve Aygün, 2014; Aygün, 2015).

As a method, selection should be used for improvement of Morkaraman breed because of their high milk yield, and the growth and development properties of lambs. To increase the yield of indigenous breeds, a selection which will take into account the structure and yields must be applied. In selection, lamb yield and live weight gain should be emphasized.

Sheep husbandry is an industrial sector that they transform the natural vegetation cover pasture and the pasture not used in the agriculture into the products such as meat, milk, and wool. There are breeds such as Akkaraman, Morkaraman, Awassi, Dağlıç, Kıvırcık, and Karayaka among local sheep breeds of Turkey (İnan and Aygün, 2019).

This study is also important in terms of identification, conservation, breeding of native breeds and types and updating the literature information.

Conclusion

Small ruminant breeding in Turkey is generally done by small family businesses with insufficient economic power, using extensive and traditional production techniques based on pasture. Despite this, many domestic sheep breeds that persist to a certain level, are resistant to diseases, have low labor costs, and are contented, have emerged. Studies about Morkaraman sheep breed have been mostly performed in the Eeastern Anatolia of Turkey. In order to obtain a more definite conclusion is required to detailed works in native sheep populations in Eastern Anatolia region of Turkey.

In conclusion, small ruminant husbandry is indispensable and an important source of income for farmers in Muş province. Muş province is suitable for small ruminant breeding in terms of large pasture areas, water resources, and climate characteristics. It can be said that the province is rich in terms of underground and surface irrigation sources as well as a suitable land structure for the production of forage crops. It has been suggested that the ram factor used in villages can be significant. In particular, the selection of ram must be considered for breeding in Morkaraman sheep.

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Superovulation Performance and Embryo Recovery in South Anatolian Red Cows

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Abstract

South Anatolian Red (SAR) cattle which breeds from Mersin to Sanlıurfa with centered Kilis in the region of South Anatolia, is one of native breeds of Turkey. Superovulation protocols are performed in cattle to maximize the number of fertilized and transferable embryos. The aim of this study was to evaluate superovulation response and embryo recovery rate of SAR breed cattle. 10 cows were selected without any genital problems. FSH (Stimufol®, Reprobil, Belgium) was injected in decreasing doses administered twice daily over a 4 day period to these cows. Together with the 5th and 6th FSH injections, donors were treated with PGF2α (Dalmazin, Fatro, Italy). 12 hours after the last FSH injection, each donor was taken to the same paddock with the bull for 24 hours for mating. Uterine flush was performed 7 days after estrus. Before uterine flush, the structures on the ovaries were determined by recto-vaginal ultrasound examination. 38 Corpus Luteum (CL), 16 Anovulatory Follicle (AF) in the right ovaries; 36 CL and 12 AF were determined in the left ovary in 10 animals. There were 74 CL and 28 AF in total. It was calculated per animal average on right ovary 3.8 CL, 1.6 AF; 3.6 CL, 1.2 AF on the left ovary. When both ovaries were evaluated, it was calculated that the average per animal was 7.4 CL and 2.8 AF. 5 non-fertilized oocytes, 3 degenerated embryos and 2 transferable ebmryos were obtained from 10 donors. Consequently, although the response to the superovulation protocol was good in SAD breeds, the rate of embryo recovery was low. The rate of embryo recovery can be increased with different protocols, different flushing methods or more advanced methods (such as OPU) and much more studies are recommended for this purpose.

Keywords: Embryo, Native Breed, South Anatolian Red Cattle, Superovulation

Effects of Different Extenders on Post-thaw Sperm Quality of Locally Adapted Anatolian Black Bulls: The Preliminary Results

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Abstract

The objective of this study was to evaluate the effect of 3 differrent extenders on post thaw sperm quality of locally adapted Anatolian Black Bulls. For this study a total of 21 ejaculates were collected with artificial vagina from 4 bulls within Anatolian Black Cattle Genetic Resources Conservation Herd belong to International Center For Livestock Research And Training. After the collection, semen samples with motility ≥70% were divided into 3 aliquots and diluted with each of the three extenders (liposome-based extender-E1, soybean lecithin-based extender-E2 and Tris-egg yolk extender-E3) and cryopreserved using an automated freezing machine. After freze-thawing sperm motility and progressive motility was analysed using Computer Assisted Semen Analyser (CASA). Flow Cytometry was used for analyze the plasma membrane and acrosome integrity (PMAI, %) and high mitochondrial membrane potential (HMMP,%). After post-thawing evaluation, Extender-E1 had significantly ($P<0.05$) higher sperm motility (47,38 ±12,56 %) and progressive motility (14,7 ±7,9%). However, PMAI rates were recorded higher ($P<0.05$) in Extender-E3 (26,0 ±9%) compared with E1 and E2, while there was no significantly difference ($P>0.05$) in HMMP(%) rates between three extenders. In our knowledge it was the first report on sperm cryopreservation and evaluation of post thaw sperm quality of locally adapted Anatolian Black Bulls. In conclusion, liposome-based extender was superior to other extenders used in this study in terms of frozen-thawed sperm motility and progressive motility in Anatolian Black Bulls.

Keywords: Sperm Quality, Cryopreservation, Anatolian Black Bull, Flow Cytometry

The Effect of Use of Follicule Stimulating Hormone with a Special Adjuvant During Superovulation in Cattle on Corpus Luteum Number and Embryo Production

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In this study, follicle stimulating hormone (FSH) to induce superovulation in cattle by standard method (Control Group, CG), FSH adjuvant (Montanide ISA 206 VG) with stirring at full dose (400 mg + ADJ) to use at a time (Experiment Group 1, EG1) and the effect of adjuvant and 80% reduced use of FSH (320 mg+ADJ) at one time (Experiment Group 2, EG2) on Corpus luteum (CL) count, embryo count and quality was investigated. A total of 15 Holstein cows were used as material for this purpose. CL counting in cows was performed rectally on the 7th day after insemination with an ultrasonography device (HASVET, Mindray® DP50). Each cornu uteri of the cow uterus was flushed separately with a double-way balloon catheter using a non-surgical method. In the stuy, CL numbers were 32 in total in CG and the mean of this was 6.40±1.208, CL numbers were 32 in total in EG1, and the average of this was 6.40±0.927, the number of CL was 42 in EG2 and the mean of this was 8.40±1.435. The difference between the groups in terms of total CL numbers was found to be statistically insignificant ($p < 0.05$). The number of embryos was 15 in total in CG and its average was 3.00±1.265; the number of embryos was 9 in total in EG1, and its average was 1.80±0.800; the number of embryos in EG2 was 17 in total, and the mean was 3.40±1.166. The difference between the groups in terms of the mean total number of embryos was found to be statistically insignificant ($p < 0.05$). In the study, the evaluations of the embryos were ranked according to the groups; The number of Unfertil Ova (UFO) was 1 in CG, 2 in EG1 and 2 in EG2; The number of non-transferable embryos was 6 in CG, 2 in EG1, and 6 in EG2; The number of transferable embryos was 8 in CG, 5 in EG1, and 9 in EG2. Differences between groups were statistically insignificant in terms of UFO, number of non-transferable embryos and number of transferable embryos ($p < 0.05$). As a result of experiments conducted using adjuvants lack of statistical difference between the groups has shown that positive results. These adjuvants can be used in the superovulation protocols in cattle, but in different cattle breeds for the strengthening of data and studies with different doses of FSH is recommended to be done.

Keywords: Bovine, embryo transfer, follicle stimulating hormone, adjuvant, superovulation.

The Effect of Different Synchronization Methods on Fertility in Female Buffaloes

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Abstract

In this study, the efficiency of artificial insemination was demonstrated by using frozen Anatolian Buffalo bull semen obtained by artificial vagina in the International Livestock Research and Training Center Directorate under field conditions. For this purpose, the animals to be inseminated were created from 100 Anatolian Buffaloes in the sub-project carried out in Diyarbakir within the scope of the Anatolian Buffalo Breeding National Project. Anatolian Buffaloes were divided into two groups and 50 heads were synchronized with the ovsynch protocol and inseminated in a fixed time with the recto-vaginal method. The other 50 heads were synchronized with the doublesynch protocol and inseminated in a fixed time with the recto-vaginal method. 100 buffalo buffalo were inseminated between April and July. Oestrus was observed again in 10 heads of 100 buffalo inseminated. Pregnancy checks will be made with Rectal Palpation or Rectal USG device in buffaloes that are more than 60 days after insemination in August.With this study, the effectiveness of synchronization methods in the field in the Anatolian Buffalo was tried to be revealed. It is thought that artificial insemination practices will become widespread, thus contributing to the production and studies of Anatolian Buffalo semen.

Keywords: Anatolian Water Buffalo, artificial insemination, semen, ovsynch, doublesynch

Comparison of the Effects of 3 Different FSH Protocols on Superovulatory Response and Embryo Quality in Anatolian Black Heifers

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Abstract

The present study, it was aimed to compare the superovulation responses applied with 3 different FSH protocols in Anatolian Black heifers. Twenty-four Anatolian Black heifers aged 2-4 years and who did not give birth were used in the study. Anatolian Black heifers received Cue-mate containing 1.56 g progesterone. The heifers were randomly divided into three groups (Group1, Group2 and Group3) based on the dose and administration route of FSH. In group G1 a total of 200 mg FSH was given intramuscularly in decreasing doses for twice daily for 4 days. In groups G2 and G3, FSH was given 100mg epidural plus 100mg im injection on day 7 of the cycle. In addition, group G3 was given 40 mg FSH im injection on day 9 of the cycle. On the 9th day of the cycle, the Cue-mate was removed and the heifers received PGF2α in all goups. On days 11 and 12, they were inseminated 12 hours apart. Superovulated cows were non-surgically flushed 7 days after AI. In the study, corpus luteum (CL) number, quality embryo ratio, poor quality embryo ratio, degenerated embryo ratio, recovery ratio and unfertilized oocyte (UFO) ratios were respectively as; 38 (4.75±0.996), 55.0 (11/20), 15.0 (3/20), 30.0(6/20), 52.6(20/38), 21.1(8/38), in G1; 36 (4.50±0.779), 66.7(16/24), 0.0(0/24), 33.3(8/24), 66.7(24/36), 11.1(4/36) in G2 and 31(3.75±0.726), 60.0(9/15), 13.3(2/15), 26.7(4/15), 48.4(15/31), 16.1(5/31) in G3 was obtained. The effect of different protocols on superovulation response and embryo quality was not statistically significant between the groups (P>0.05). As a result, although there is no statistical difference between the groups, it is considered that it is practically important to obtain high quality embryos and total embryo numbers in G2.

Keywords: Anatolian Black heifer, embryo, flushing, FSH, superovulation,

The Effect of Non-Aureus Staphylococci on Somatic Cell Count and Milk Yield in Primiparous Holstein Dairy Cows During the First 120 Days of Lactation.

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The purpose of this study was to identify the most common non-aureus staphylococci (NAS) species in intramammary infections in Konya province, as well as to determine effect somatic cell count (SCC) and milk yields of NAS species within the early lactation period. It is also aimed to contribute to the development of effective mastitis control programme in primiparous cows during early lactation. In terms of intramammary infection (IMI), 32 primiparous Holstein dairy cows with milk yields of more than 20 liters were observed during the first 120 days of lactation. Three separate samples were taken at 30-day intervals from primiparous cows between 7 and 50 days of lactation for bacteriological identification and counting of somatic cells. The milk yield records of the sampling group were determined using an automatic milking system over multiple sampling periods. At the first 120 days of lactation, the prevalence of IMI was found to be 75% in the sampling group, and IMI prevalence caused by NAS was found to be 53%. Of the 68 isolated isolates, 61.6% were identified as NAS, 7.3% *S. dysgalactiae*, 5.8% *S. uberis*, 5.8% *T. pyogenes*, 7.3% *E. coli*, 11.5% other environmental pathogens. *S. chromogenes* was the most commonly isolated pathogens in the sampling group (45,5%). Overall, NAS in early lactation caused an increase in quarter SCC compared with noninfected quarters during the sampling period, whereas no significant difference in monthly milk yield was present between NAS-infected and noninfected primiparous cows. Finally, NAS may cause herd-level udder infections in primiparous cows during the early lactation period, and in primiparous cows *S. chromogenes* may emerge as a new contagious mastitis agent in early lactation period. NASs should be identified at the species level rather than the group level in order to develop effective control programs. Additional measures should be added to the existing udder health control programs for primiparous dairy cows in the early lactation period.

Acknowledgements

Relation Between Non-infectious Factors and Neonatal Calf Health Status in Dairy Herd

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The aim of this research was to determine some non-infectious factors [sex of calf (SC), calf birth weight (CBW), calving season (CS), dam parity (DP) and dam body condition score at dry (BCS_D and calving (BCS_C) that can under control by breeders affecting calf health status (CHS) in neonatal period. 517 calves (from delivery of calf until 28 days) and their dams (at dry and calving) were assessed according to study criteria. All BCS were assigned by one individual using the visual technique developed by Edmonson et al. (1989). CHS were scored using the calf health scoring chart University of Madison Wisconsin School of Veterinary Medicine www.vetmed.wisc.edu/dms/fapm/fapmtools/calves.htm. Chi-square tests were performed to investigate the relationship between maternal BCS, DP, SC, CS and CHS. Similarly, CBW and their relationship with CHS was examined. ANOVA was used to investigate the effects of BCS_D, BCS_C, DP and SC on CBW. SPSS program (2008) was used for statistical analysis. According to study results, connection between CHS and BCS_D, CS, CBW was found important, 59% of healthy calves are in $3,0 \leq BCS_D \leq 3,75$ interval, CHS is maximum in spring (64%), minimum in winter (49%), CHS was maximum in $42,31 \leq CBW \leq 54,59$ interval. Also, influences of DP, SC BCS_C and BCS_D on CBW were examined and while effects of DP and SC on CBW were found important ($P<0.05$, $P<0.01$ respectively), effects of others were not. As a conclusion, according to the results, the practical solution can be that management practices must focus on these non-infectious determinants that largely can under control to reduce the prevalence of neonatal morbidity and improve neonatal CHS in dairy herds.

Associations with Microsatellites and Milk Yield in Awassi Sheep Breed

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Awassi is fat-tailed, drought-resistant, well adapted to herd life, double-purpose sheep breed. Although the breed is raised for milk, its meat quality is also high. These attributions make it a critical component for animal production. Besides its economic value, the breed is essential in terms of genetic resources. In this study, associations with microsatellite markers and milk yield in Awassi sheep were studied. Phenotipic records and saliva samples were obtained fom Awassi sheep herds reared in Şanlıurfa belong to National Genetic Improvement of Small Ruminant in Breeder Conditions Project. Milk yield records were obtained for 180 days of lactation, and each ewe has a least 4 test day records for each one lactation. Eighteen microsatellites located near QTL regions were genotyped by fragment analysis in 500 Awassi ewes. Lactation milk yield was estimated by the day records using the Sweden method. General linear model (GLM procedure, SAS/STAT 9.1) was performed to analyze correlated average daily milk yield and microsatellite alleles. Significant associations were found between milk yield and eight microsatellites distributed among four autosomal chromosomes. Two microsatellites were located on OAR2 [BMS1341 ($P<0.01$) and BMS381($P<0.05$)], one microsatellite was on OAR6 [MCM140 ($P<0.05$)], the other two located on OAR7 [MB1237 and BMS2721 ($P<0.05$)], three of them were on OAR8 [INRA127, BMS1967, and BM4208 ($P<0.05$)]. These findings should be used in marker-assisted selection practice possibilities after confirming interactions with other economically important traits.

Keywords: Awassi sheep, microsatellite, polymorphism, milk yield, genetic recourses

Investigation of SNPs related to growth and development in Angora Goat Breed

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Angora goat is one of the three major native goat breeds of Turkey due to its unique angora quality; the breed is significant as a genetic resource and for animal production. Efforts have been focused on genetic improvement and the protection of the breed. To perform more effective breeding and conservation programs, breeds should be characterized genetically. For this reason, we aim to investigate SNPs related to growth and development, which are essential to sustainable population existence for both breeding and conservation. Phenotypic records and DNA samples were collected from three herds belong to National Genetic Improvement of Small Ruminant in Breeder Conditions Project. In total, 384 animals geneticly analyzed from 720 newborn Angora goats sampled equally from each herd.analyzed. Following quantitative analyzes of phenotypic metric values, fixed environmental factors in the model were corrected using CRIMAP software. Panels included 128 SNPs related to investigated characters were created and genotyped by iPLEX GOLD; Sequenom. Ninety-eight SNPs were selected for association analysis according to call rates. Population parameters were estimated by POPGENE32. Association analysis was performed multiple regression analysis. Four SNPs located on OAR18, OAR7, and OAR4 were significant ($P<0.05$) on birth weight and 120-day age live weight. All of them related to birth weight were located on *OSGIN1*(rs670409957), *GDF9* (rs645345606), *IGFBP3* (rs659773941), while *IGFBP3* (rs659773941) was also related with 120-day age live weight. The contribution of these genes to reproductive and developmental traits is also well documented. Future breeding and conservation programs may be planned by taken into account polymorphism of these genes to more successful results in the Angora goat production.

Keywords: Angora goat, birth weight, live weight, SNP effect, genetic recourses,

Genomic Prediction of Body Weight in Hereford cattle

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Abstract

Body weight (BW) is an important heritable phenotype and related to other functional and production traits in cattle. Hereford cattle has been the subject of many BW studies due to favorable breed specific properties. The main of this investigation is to explore the relationship between different genomic prediction (GP) methods to accuracy of GP of BW in Hereford cattle. 150 cattle genotyped by 107550 SNP markers. Square root of age (at the time of weighing), sex, and SNPs were included as fixed effects. After quality control and SNPs prunning for linkage disequilibrium 29089 SNPs remained. Various GP models evaulated to predict body weight using 10 fold cross validation strategy based on training (%80 of animals) and testing (% 20 of animals) procedures. Bayesian Lasso [0.057 (0.049)] and Bayes $C\pi$ [0.050 (0.038)] shown to have slightly higher predicted accuracy compared with other GP models (random forest, BayesA, BayesB, GBLUP, RKHS). In general prediction performance of the GP models was found to be lower. The relevance of genetic architecture in conjugate to the prior distributions could improve the GP accuracy. The issue of huge dimension of genotypic datasets in GP is an intriguing one which could be usefully explored in further research.

Keywords: Body weight, genomic selection, genomic prediction, machine learning

Genetic Bottleneck Analysis of Native Hair Goats in Turkey

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Genetic diversity plays a very important role in the adaptation of farm animal populations to changing environmental conditions. Although today there is an increasing trend in terms of Hair goat population size, there was a 56.1% decrease in the population size of this breed between 1980 and 2001. Because of these dramatic changes, the definition of population structures is of great importance in Hair goat population. The present study was carried out in a total of two-hundred Hair goats sampled from populations raised in Aydın and Denizli Provinces in order to perform a genetic bottleneck analysis. Eighteen microsatellite markers were used in the study and sampling was carried out in accordance with the criteria specified by FAO (2011). The mean values of statistical parameters defined in the study such as number of alleles (Na), number of effective alleles (Ne), observed heterozygosity (Ho), expected heterozygosity (He) and polymorphic information content (PIC) were 15.67, 6.33, 0.72, 0.82 and 0.81, respectively. All the microsatellites used in this study deviated from Hardy Weinberg Equilibrium (HWE). The L-shaped curve obtained from analyze indicates absence of bottleneck in Hair goat populations raised in Aydın and Denizli provinces of Turkey. The still significantly high population size can be explained as the main reason why no bottlenecks were observed.

Keyword: Hair goat, bottleneck, microsatellites, population

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Microsatellite Based Bottleneck Analysis of Turkish and Algerian Cattle Breeds

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The study was carried out to reveal the genetic bottleneck in a total of 270 samples from five Turkish (Native Southern Yellow (n=30), South Anatolian Red (n=30), Native Black (n=30), Anatolian Grey (n=30), and East Anatolian Red (n=30)) and four Algerian (Cheurfa (n=30), Guelmoise (n=30), Tlemcenienne (n=30) and Zebu (n=30)) native cattle breeds. Genetic diversity and bottleneck parameters were defined with twenty-two microsatellite markers recommended by FAO. Beckman Coulter GeXP genetic analyzer (Beckman Coulter, Inc., USA) was used for the separation of the PCR fragments. GenomeLab™ DNA Size Standard Kit 400 was used for determination of fragment size. The mean values of number of alleles (Na), number of effective alleles (Ne), observed heterozigosity (Ho), expected heterozigosity (He) and polymorphic information content (PIC), which are considered as genetic diversity parameters in the studied populations, were obtained as 24, 4.55, 0.62, 0.78 and 0.77, respectively. All of the 22 microsatellite markers used in the study deviated from the Hardy Weinberg Equilibrium (HWE). The null allele frequencies in the studied microsatellite loci were below 20%. Bottleneck was analyzed with Bottleneck software according to three different mutation models including the infinite allele model (IAM), two-phase mutation model (TPM) and stepwise mutation model (SMM). It can be said that there is no any ultimate risk in terms of bottleneck considering L–shaped curve showing normal distribution obtained from analysis.

Keyword: Cattle, bottleneck, diversity, population

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Association of *TLR2* Haplotypes Encoding Q650 with Reduced Susceptibility to Ovine Johne's Disease in Turkish Sheep

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Abstract

Johne's disease (Paratuberculosis) is caused by *Mycobacterium avium subsp. paratuberculosis* (MAP) and globally widespread among ruminant livestock. There are no effective treatments for this disease and traditional control methods provide limited success. Ovine Johne's disease (OJD) has a significant negative impacts on animal health and welfare, and carries a potential zoonotic risk for consumers. This has prompted the implementation of "test and cull" erradication programs in many countries. If available, selective breeding strategies for reduced disease susceptibility would be welcome tools to complement efforts to eradicate the disease. *TLR2* has been recognized as playing a crucial role in host immune response to mycobacterial diseases. In the present report, our aim was to test the association of serological status of the ovine Johne's disease (OJD) and *TLR2* coding variants in a retrospective matched case-control design. Eleven *TLR2* missense variants and 17 haplotype configurations were identified *in silico* in genomic sequences of 221 sheep from 61 globallydistributed breeds. Accordingly, the five most frequent haplotypes were tested for OJD association in Turkish sheep. For this purpose, 102 case-control matched pairs were constructed from 2257 serologically tested ewes. To account for population stratification, each OJD seropositive ewe was matched with a seronegative ewe from same flock, breed, and age group. A McNemar's test for correlated proportions was performed over the matched pairs panel. Statistical analiysis demonstrated that ewes with one or two copies of *TLR2* haplotypes encoding glutamine (Q) at position 650 (Q650) in the TIR domain were 6.6-fold more likely to be uninfected compared to ewes with arginine (R650) at that position (p-value, 3.7×10^{-6}; statistical power >0.97). This is the first report describing a major protective effect of the *TLR2* Q650 missense variant against OJD and may faciliate selection of breeding stock with reduce susceptibility to MAP infections.

Acknowledgements

Dietary Encapsulated Essential Oil Mixture Influence on Apparent Nutrient Digestibility, Serum Metabolic Profile, Lymphocyte Histochemistry and Intestinal Morphology of Laying Hens

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Abstract

The study was aimed to evaluate the effects of a mixture of encapsulated essential oils (EOs) addition on dry matter, organic matter, crude protein digestion, serum biochemical parameters, peripheral blood alpha-naphthyl acetate esterase (ANAE), and acid phosphatase (ACP-ase) positive lymphocyte ratios and intestinal morphology in laying hens. A total of 360 laying hens of 48-wk-old were randomly allotted into 4 treatment groups with 10 replicates of 9 birds in each replicate. The birds were fed a basal diet (Control) or diets with added EOs at 50, 100, and 200 mg/kg. The study lasted for 84 d. The addition of EOs at 100 or 200 mg/kg increased the dry matter, organic matter, and crude protein digestion. The addition of all EOs doses did not affect serum GGT, ALT, and P concentration but increased serum AST concentration. The addition of 200 mg/kg EOs increased serum creatinine, while 100 mg/kg decreased Ca concentration. The addition of 100 and 200 mg/kg EOs generally improved ANAE and ACP-ase positive peripheral blood lymphocyte ratios and intestinal morphology. It can be concluded that, the addition of 100 or 200 mg/kg encapsulated essential oils (which containing eugenol, nerolidol, piperine, thymol, linalool, and geraniol as active compounds) generally improved apparent nutrient digestion, ANAE and ACP-ase positive peripheral blood lymphocytes and intestinal morphology in laying hens.

Keywords: Essential oils mixture, nutrient digestibility, blood, ANAE, ACP-ase, intestinal morphology, laying hens

Determination of the Effect of Inoculant and Molasses on Silage Quality and in vitro Digestibility in Silages Prepared With Different Proportions of Ryegrass Grass and Hungary Vetch Mixture

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Abstract

In this study, it was aimed to determine the silage quality and in vitro digestibility of the silages and their molasses and inoculant additives of feed materials obtained from the cultivation at different rates of ryegrass-vetch mixtures grown in Central Anatolian conditions. For this purpose, 5% molasses and 10 g/ton (1.25×10^{11} cfu/g) inoculant containing *Lactobacillus plantarum* and *Enterococcus faecium* species were added to silages of ryegrass grass containing 20%, 40%, 60% and 80% Hungarian vetch under laboratory conditions. The prepared silages were opened at the end of 60 days and their physical analysis, chemical contents, fermentation parameters, in vitro digestibility and energy levels were determined.

In the study, it was determined that there was no difference between the pH values of the silages ($P>0.05$), and the inoculant additive increased the lactic acid level significantly ($P<0.05$). In vitro organic matter digestion and energy values increased in silages containing 60% Hungarian vetch compared to other silages ($P<0.05$). Likewise, both inoculant and molasses additives increased the in vitro organic matter digestion and energy values of silages ($P<0.05$). NDF levels increased in mixtures containing 40% and 60% Hungarian vetch ($P<0.05$), and the additives had no effect on the nutrient content of silages ($P>0.05$). The increase in the vetch ratio affected the external appearance of the silages negatively ($P<0.05$), and the odor, appearance, color, and structure were adversely affected by the inoculant additive ($P<0.05$).

As a result, it was determined that Hungarian vetch can be mixed with ryegrass grass up to 80% and ensiled. It has been concluded that inoculant and molasses additive can improve silage quality for the aforementioned mixtures, but it would be more appropriate to prefer molasses in order to avoid undesired changes in physical properties.

Keywords: Ryegrass, Hungarian Vetch, Inoculant, Molasses, Silage quality, In vitro digestibility

Effects of Yeast Cell Wall on Gut Integritiy in Broilers Challenged Salmonella

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Abstract

The objective of this study was to determine the effects of different yeast cell wall components on gut histomorphology, volatile fatty acid composition of cecal content and intestinal barrier related gene expression in broilers at day 35. For this purpose, 2 experiments were conducted with or without Salmonella challenged. In Experiment 1, a total of 320, 1-day old male broilers obtained from a local hatchery were weighted and randomly assigned to 5 groups. Basal diet was supplemented without feed additive (Control group, C); supplemented with 0.565% autolyzed whole yeast cell (W); supplemented with 0.125% autolyzed whole yeast cell (WP); supplemented with 0.565% yeast cell wall that removed the bond with enzymatic reactions (CL) and supplemented with 0.2% pure MOS +β glucan (MB) in powdered form all. In Experiment 2, a total 200 male broiler chickens were used in this study. Dietary treatments were formulated same as in Experiment 1 with Salmonella challenged. Salmonella challenge was performed by individual oral administration of 1 ml 3×10^8 cfu/ml *Salmonella* Typhimurium at the 7th day post-hatch for all groups. There were statistically increasing in CL group on ileum crypt depth and with the lower depth in WP group, while no difference was observed in other histomorphology parameters in Experiment 1 ($P < 0.05$). In Experiment 2, whereas jejenum crypt depth significantly increase in all treatment group ($P < 0.05$), the ratio of villus height to crypt depth has been decreased ($p < 0.001$). The volatile fatty acid concentration did not alter by supplemental cell wall components both in Experiment 1 and 2. Occludin, claudin and cecal tonsilla gene expression were changed with the feed additives in Experiment 1 and Experiment 2 ($p < 0.05$). In conclusion, different yeast cell walls components with different form of MOS and β glucan effective on gut health in both Salmonella challenged broilers and non-challenged broilers.

Key words: MOS, β glucane, Salmonella, Volatile fatty acid

Effects of In Ovo Glucose and Glutamine Treatment on Hatching Efficiency and Intestinal Histomorphology in Broiler Chicks

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This study was conducted to identify the effects of glucose and glutamine injections into the amniotic fluid of the fertilized broiler eggs, on the 17th day of incubation, on hatching efficiency, chick weight, liver and yolk sac weights, intestinal histomorphology and gen expressions of digestive enzymes.

By using eggs obtained from 35 weeks old flocks of Ross 308 breed; 100 eggs per group were assigned to the each of the five treatment groups, namely the control (no injection) and NaCl (0.9% -to determine the effect of injection), glutamine (10% glutamine), glucose (0,25 g/ml) and glucose + glutamine (0,25 g/ml glucose + 10% glutamine) injections respectively. The effects of these treatments on the hatch day (21st day) chick weight, liver and yolk sac weights and small intestine histomorphology were investigated. Villus height, crypt depth, villus height/crypt depth, tunica muscularis thickness, villus width, and the number of goblet cells were determined for the small intestine histomorphological analysis. One-Way ANOVA test was used for statistical analysis of hatchability and intestinal histomorphology data. The degree of significance between the means was determined by the Tukey Test. $P \leq 0.05$ criterion was used for all comparisons.

Hatching efficiency was observed to be significantly decreased those in glucose (%49,89) and glucose + glutamine (%7,81) treatment groups (p<0,001). In-ovo glucose and glutamine injections were not found to be significantly affecting the chick weight, liver and yolk sac weights in our study. When the intestinal histomorphology is evaluated, while the villi height/crypt depth (7,65), jejunum villus width (92,30) and the number of goblet cells in the jejunum (19,96) were increased villi height, crypt depth, and tunica muscularis thickness were not significantly affected by the applications. Moreover, the ileum histomorphology in general appear not be affected by any of the treatments as well.

In conclusion, while in ovo glucose and glutamine injection had an overall negative effect on the hatching efficiency in broiler chicks; the application has a significant effect on intestinal histomorphology so it has been considered that it is feasible.

Keywords: Broiler, Glucose, Glutamine, Hatching efficiency, In ovo feeding, Intestinal histomorphology

TMR Pilot Study in Dairy Farms in Amasya Region: I - Determination of Ensiled TMR Stability

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Abstract

The aim of this study is to expand the use of total mix ration (TMR) in dairy cattle breeding enterprises in Amasya Region. This research was designed in two steps. In the first stage, an average dairy cow ration is evaluated and prepared than a 500 kg stretch package is formed. In addition, the endurance period of the ensiled total mix ration (ETMR) is determined. In the second stage, TMR will be mixed in bulk and transport to farms daily basis. For this reason, roughage and concentrate feeds which are available in Amasya Cattle Breeders Association (ACBA) were analyzed in terms of nutrients. For this purpose, alfalfa hay, barley straw, corncob, corn silage, commercial concentrate, sunflower seed meal (SSM) were used. TMR was estimated based on NRC (2001) for a Holstein cow with a body weight of 550 kg and milk yield is 25 liters of milk. TMR was ensiled and analyzed for nutrients contents, total anaerobic bacterial load, E. coli, L. monocytogenes, Cl perfringens, Salmonella spp, aflatoxin B_1, total Aflatoxin (B_1, B_2, G_1, G_2) at certain periods. Samples were taken from the ETMR at 0, 3, 7, 14, 21 and 42 days and nutrient and microbiological-toxicological analyzes were performed. Natural dry matter (NDM), crude protein (CP), neutral detergent fiber (NDF), and acid detergent fiber (ADF) of ration has found respectively 58.60±0.53, 10.28±0.48, 51.29±1.53, 36.66±1.66. According to results, monositogenez, Salmonella spp. couldn't determined in ETMR while Cl. perfringens, E. coli, aflatoxin B1, total aflatoxin found below detectable value. The number of anaerobic bacteria was determined as 1.4x10 on day 0 and 5.2x10 on day 42. results of study shows that the ETMR created under suitable package conditions can be stored for 42 days without spoiling, and that no pathogenic agents or toxins are produced. Also, study indicates that ETMR could be use safely for at least 42 days. Further studies are needed to clarify shelf life of TMR.

Keywords: Ensiled Total Mix Ration, dairy cattle,

Amasya Bölgesindeki Süt Sığırı İşletmelerinde TMR Pilot Uygulama Çalışması: I - Paketlenmiş TMR Dayanıklılığının Belirlenmesi

Özet

Bu çalışmanın amacı Amasya Bölgesinde süt sığırı yetiştiriciliği yapan aile işletmelerinde toplam karışım rasyon (TKR) kullanımını yagınlaştırmaktır. Bu araştırma iki aşama olarak tasarlanmıştır. Birinci aşamada ortalama bir süt ineği rasyonu oluşturularak silo TKR oluşturulması, silolanan TKR'ın dayanıklılık süresinin belirlenmesidir. İkinci aşamada ise TKR dökme olarak karıştırılacak ve günlük işletmelere sevkiyatı yapılacaktır. Bu amaçla Amasya Damızlık Sığır Yetiştiricileri Birliği (ADSYB) bünyesinde mevcut bulunan kaba ve kesif yemler besin madde yönünden analiz edilmiş, 25 lt süt veren 550 kg canlı ağırlığa sahip Holstein inek için NRC (2001) esas alınarak temel bir TKR oluşturulmuş, oluşturulan silo TKR belirli periyotlarda besin madde, toplam anaerob bakteri yükü, E. coli, L. monositogenes, Cl perfringens, Salmonella spp, aflatoksin B_1, toplam Aflatoksin (B_1, B_2, G_1, G_2) yönünden incelenmiştir. Açılan paketlerden 0, 3, 7, 14, 21 ve 42 günlerde numune alınarak besin madde ve mikrobiyolojik-toxikolojik analizler yapılmıştır. Oluşturulan TKR rasyonunun havada kuru madde (HKM), ham protein (HP) ve neutral detergent fiber (NDF) ve acid detergent fiber (ADF) ortalamaları sırasıyla; 58.60±0.53, 10.28±0.48, 51.29±1.53, 36.66±1.66 olarak bulunmuştur. Silo TMR'ların hiçbirinde L. monositogenez, Salmonella spp. bulunmazken, Cl. Perfringens, E. coli, aflatoksin B_1, toplam aflatoksin tespit edilebilir değerin altında bulunmuştur. Anaerobik bakteri sayısı 0. gün $1.4x10^7$ iken 42. gün $5.2x10^7$ olarak tespit edilmiştir. Çalışma sonucunda; uygun koşullarda oluşturulan silo TKR'nin 42 gün boyunca bozulmadan saklanabileceği, herhangi bir patojen etken veya toksin üremediği görülmüştür. Oluşturulan silo TKR en az 42 gün boyunca güvenle kullanılabileceği belirlenmiştir. Daha uzun dayanıklılığın tespit edilmesi için daha fazla ve hayvan deneyi çalışması yapılmasına ihtiyaç vardır.

Introduction

A good feeding management system should be applied to cows for maximum efficiency. For this, the feed must be balanced and homogeneous. (Sherpa, 2019). Total mix ration (TMR) is the preparation of an animal's daily nutrient needs in a balanced way and feeding it to the animal as a whole mixture (Ergün et al, 2011). This feeding system has been practiced around the world for nearly 100 years. However, it started to be adopted in the 1950s (Schingoethe, 2017). In this system, the roughage and concentrate that the animal should consume are mixed and brought to the appropriate sizes and fed to the animal. Although TMR is used in all ruminants, it is mostly preferred in dairy cattle (Terefe et al., 2018). This system finds application in big farm rather than family businesses. It has been observed that, in a study conducted by the USDA National Animal Health Monitoring System (2014) in the USA, 90% of the >500 head farms apply the TMR system, and 20% of the 30-99 head farms feed with this system. In addition, ensiled TMR has started to attract attention again in recent years. In this way, by-products with high humidity can be easily used in ruminant feeding(Wang et al. 2020). In fact, there are countries where TMR is used as a partially mixed ration (PMR) in the form of complementary TMR by grazing animals in regions where TMR prices are high. (Pastorini et al. 2019).

Advantages of TMR;

1: Animals cannot choose feed, homogeneous consumption occurs,

2: High productivity in dairy cows on large farms,

3: Less digestive problems in early lactation cows that switch from high roughage to high concentrate in the postpartum period,

4: Optimum environment for rumen fermentation and health,

5: Easier and safer use of non-protein nitrogen compounds,

6: Labor savings,

7: Usability with mechanization conversion even in traditional barns,

8: Ability to formulate the TMR quantitatively,

9: Easy feeding and reducing the waste rate are among its advantages.

(Schingoethe, 2017, Sarker et al 2018, Pachauri et al, 2010)

Disadvantages of TMR

1: Baled dry roughage must be pre-shredded,

2: Requires a mixer,

3: It may not be suitable for small farm. (Schingoethe, 2017)

In the studies carried out; TMR feeding gives better results than conventional feeding in 1-year-old heifers (Pachauri et al., 2010), Murrah buffaloes feding with TMR has a positive effect on milk yield, milk fat, protein and lean dry matter (Kumar et al., 2015). In the study investigating the effect of TMR in dairy cows (Sarker et al., 2018), TMR feeding showed better results than conventional feding, In a study investigating the effect of supplemental TMR feeding on cows eating fresh grass (Pastorini et al., 2019), it was stated that feeding 29% fresh grass did not cause any negative effects. In addition, there are studies reported that conventionally fed dairy cows give higher milk than TMR (Sahib et al., 2020). In a study conducted to investigate the use of wet by-products in ensiled TMR (Wang et al., 2020), barley straw, common vetch, oats, beer pulp and concentrate were used instead of common vetch in different proportions in the ration. The ensiled TMR was opened after 70 days, and it was stated that the addition of 20% beer pulp instead of common vetch did not have a negative effect on the quality of the silage and could be stored for 70 days.

In the light of this information, it has been seen that the TMR system is used in large enterprises (>100 heads) in Turkey conditions, and it is not possible to use it in small enterprises or in enterprises which using seasonal pasture.

In this study, it is aimed that small enterprises can benefit from the TMR system, both with the ensiled TMR and with the central distribution network.

Material and Method

The roughage and concentrate feed used in the study were provided by ACBA. For this purpose, alfalfa hay, barley straw, corncob, corn silage, commercial concentrate, sunflower seed meal (SSM) were used. The samples taken from the TMR and other feeds used in the research were ground to pass

through a 1 mm sieve and, the amounts of dry matter (DM), organic matter (OM), crude ash (CA), CP, ether extract (EE) were analyzed according to AOAC (1995). The analyzes of NDF, ADF, acid detergent fiber (ADL) and crude cellulose (CS) were analysed acoording to Van Soet et al. (1991), in the "Ankom 200 Fiber Analyzer" at the International Livestock Research and Training Center Feeds and Animal Nutrition Laboratory. The base ration was prepared by considering the nutrient requirement of Holstein cows (NRC, 2001) in the second early lactation with 550 kg body live weight (BLW) and 25 lt milk yield in commercial ration program(Anonymous, 2021). Nutrient contents and ration components of pre-mixed feeds are given in Table 1. About 5 tons of the determined ration was mixed in the 20 m^3 mixer available in ACBA for 20 minutes and then ensiled in the silage packaging unit. Corn cob pre-mixed for 10 min. Each silo was created as 500±40 kg. By taking samples from the ensiled TMR on days 0, 3, 7, 14, 21 and 42, and analysed about nutrient, aerobic-nonaerobic bacteria, aflatoxin B_1, total aflatoxin (B_1, B_2, G_1, G_2), Cl. perfiringens, L. monocytogenes, Salmonella spp and E. coli. Microbiological and toxicological analyzes were performed in an accredited laboratory through out sourcing. General linear model (GLM) was used for nutrient content change according to ETMR days. Statistical analyses were made by using Minitab (2006) software program.

Table 1: Nutrient contents of feeds and ration composition.

Feeds	Nutrient Contents						
	DM %	CP %	CA %	EE %	NDF %	ADF %	CL %
Alfalfa hay	92.64	13.94	8.92	1.29	42.40	38.74	30.32
Barley straw	95.86	2.68	11.5	1.94	68.41	51.75	39.35
Corncob	94.21	3.07	12.7	0.44	62.61	43.87	31.82
Corn silage	27.50*	6.01	5.88	1.99	50.78	33.74	24.31
Sunflower seed meal	93.41	40.40	6.46	1.28			29.19
Concentrate	89.76	21.84	8.15	3.98			

Ration Composition					
	Corn Silage	Barley Straw	Alfalfa Hay	Corn Cob	Sonflower Seed Meal	Concentrate
Rate %	55.56	9.72	8.33	8.33	2.78	15.28

DM: Dry matter; CP: crude protein; CA: crude ash; EE: ether extract; NDF: neutral detergent fiber; ADF: acid detergent fiber; CL: crude lignin.
*:natural dry matter.

Results

Dry matter, CA, nature DM, CP, EE, NDF, ADF, CL values of ensiled TMR are given in Table 2. At the end of the 42nd day in the ensiled TMR, no change was observed in terms of nutrients. In addition, the bacteriological and toxicological analysis values are given in Table 3. Likewise, at the end of the 42nd day, no adverse effect were observed in the TMR content about bacterial or toxicological conditions.

Table 2: Nutrient contents of TMR for days.

Item	Days						Mean± SE
	0	3	7	14	21	42	
Dry matter	96.64	95.00	95.10	95.34	95.17	95.28	95.42±0.25
Crude ash	9.37	8.78	9.37	9.15	8.90	8.78	9.06±0.11

Natural dry matter	60.05	59.70	58.4	56.94	59.24	57.27	58.60±0.53
Crude protein	12.08	9.62	11.33	8.89	9.90	9.88	10.28±0.48
Ether extract	2.25	1.29	1.42	1.20	1.54	1.57	1.55±0.15
Neutral detergent fiber	46.01	51.04	50.65	57.31	49.66	53.05	51.29±1.53
Acid detergent fiber	31.00	37.99	35.55	43.50	36.07	35.85	36.66±1.66
Crude lignin	20.91	28.63	26.78	29.81	28.14	28.99	27.21±1.33

Table 3: Bacteriological and toxicological analysis values of TMR according to days

	Days					
Item	0	3	7	14	21	42
Aerobic Colony kob/g	8×10^6	2×10^7	5.8×10^7	1.5×10^8	3.6×10^9	4.1×10^7
Anaerobic Colony kob/g	1.4×10^7	3.1×10^7	5.1×10^7	1.7×10^8	2.9×10^9	5.2×10^7
Cl. Perfiringens kob/g	<10	<10	<10	<10	<10	<10
L. monositogenez	-	-	-	-	-	-
E. coli kob/g	<10	<10	<10	<10	<10	<10
Salmonella spp.	-	-	-	-	-	-
Total Aflatoksin (B_1, B_2, G_1, G_2) mg/kg	<LOQ	<LOQ	-	<LOQ	<LOQ	-
Aflatoksin B_1 mg/kg	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	-

Discussion and Conlusion

Natural dry matter of ensiled TMR in the study was similar with Pachauri et al. (2010), Wang and Nishino (2013), Miyaji and Nonaka (2018) and Wang et al. (2020) and higher than Kumar et al. (2015), Yuan et al. (2015), Sarker et al. (2018), Pastorini et al. (2019) and Xie et al. (2020). It is thought that DM difference is due to the watery roughage which used in the ration. The crude protein value of ensiled TMR was lower than Pachauri et al. (2010), Wang and Nishino (2013), Kumar et al. (2015), Terefe et al. (2018), Sarker et al. (2018), Miyaji and Nonaka (2018), Pastorini et al. (2019), Xie et al. (2020) and Wang et al. (2020). This is thought to be due to the ratio of concentrated feed used in the ration. The neutral detergent fiber value of TMR was similar with Yuan et al. (2015) and lower than Kumar et al. (2015), higher than Weinberg et al. (2011), Wang and Nishino (2013), Pastorini et al. (2019) and Xie et al. (2020). Acid detergent fiber value was similar with Kumar et al. (2015), higher than Yuan et al. (2015), Miyaji and Nonaka (2018), Pastorini et al. (2019) and Xie et al. (2020). The reason for this difference is thought to be due to the ratio of roughage and concentrated feed used in the ration.

Ensiled TMR created in the study were kept for 42 days and no adverse effect were observed. Weinberg et al. (2011) 140 days, Wang and Nishino (2013) 90 days, Yuan et al. (2015) 45 days, Wang et al (2016) 40 days, Xie et al. (2020) 30 days, Wang et al. (2020) 70 days and Li et al (2021) 56 days kept to TMR silos and reported no adverse events. It is thought that more studies should be done by designing different studies according to the ratio of watery roughage used in TMR.

As a result, it has been observed that TMR formed with a balanced ration can be stored for 42 days without deterioration and does not cause any pathogen growth. However, it seems that more studies and animal trials are needed on this subject.

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Some Growth and Survival Characteristics Of Koçeri Lambs Under Breeder Conditions

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Abstract

This research includes the activities of the 1st Sub-Project of the Breeding of Koçeri Sheep under breeder conditions, it is aimed to breed Koçeri sheep, which are in the possession of breeders in Batman Province, to increase their productivity for their growth and development characteristics, within the scope of the National Animal Breeding Project under breeder conditions carried out under the coordination of the General Directorate of Agricultural Research and Policies between 2016-2020. In the study, from 2016 to 2020 and the overall average of litter size was found 1.08, 1.11, 1.10, 1.15, 1.17 and 1.12, survival rate of lambs up to weaning was found 0.94, 0.95, 0.95, 0.96, 0.96 and 0.95 respectively. The least squares avarages of birth weight, 30, 60 and 90th day weights were found 3.20, 10.63, 17.11 and 22.65 kg in overall average, respectively. Among the factors examined, the effects of years, gender, birth type and birth month on all live weights were statistically significant (P <0.001). Least squares means of live weight gains at birth and 30, 60 and 90th days were 246.88, 231.19 and 215.97 g in overall average, respectively. Among the factors examined, the effects of years, gender, birth type and birth month on all body weight gains were significant (P <0.001).

Keywords: Koçeri sheep, fertility, live weight

Effect of Environmental Factors on Lactation Milk Yield and Lactation Period for Anatolian Water Buffaloes of Muş Province

Oğuz Ağyar

Abstract

In this study, we aimed to determine the effect of environmental factors on lactation milk yield and lactation period for Anatolian Water Buffaloes which are reared in Mus province. For this aim, the data were taken from National Community Based Anatolian Water Buffalo Breeding Program (TAGEM/49 MANDA 2012-01). In this study, 2.629 milk yield records obtained within the scope of the project between 2013 and 2020 were used. The region and the years were analyzed in terms of environmental factors effects on lactation milk yield and lactation period. Differences between the levels of factors that have an effect on lactation milk yield and lactation period were revealed using the Duncan multiple comparison test. It has been determined statistically that the regions effected on only lactation period and the regions and years effected on lactation milk yield and lactation period ($p<0,05$).

Keywords: Anatolian Water Buffalo, Lactation Milk Yield, Lactation Period, Environmental Factors

Effects of Developmental Exposure to Endocrine-Disrupting Chemicals Methoxychlor, Bisphenol A and Diethylstilbestrol on Ovarian Follicular Dynamics and Reproductive Parameters in Rats

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Abstract

Endocrine-disrupting chemicals(EDCs) are synthetic or natural compounds that can be found in the environment in various forms, such as pesticides[e.g.,methoxychlor(MXC)], plasticizers[e.g.,bisphenolA(BPA)], or pharmaceutical-agents[e.g.,diethylstilbestrol(DES)], a potent synthetic estrogen that was prescribed to pregnant women between 1940s and 1970s. Previous studies have shown that the ovary is particularly vulnerable to estrogenic EDC exposures during fetal and neonatal periods. To investigate the effects of DES,MXC, and BPA in the ovary and on female reproduction, we exposed timed-pregnant Fisher-CDF rats(F0) to $0.1\mu g/kg/day$DES(n:6litters), 75mg/kg/dayMXC(n:8litters), 50mg/kg/dayBPA(n:8litters), or vehicle(Control,n:5litters) from embryonic-day(E)11 to 21(i.p.) and their F1pups(s.c.) from postnatal day(PND)0 to PND7. We then examined reproductive parameters, including pubertal age, regularity of reproductive cycles, and follicular composition. Expression of critical ovarian markers, including estrogen receptor 1(ESR1), Mullerian inhibiting substance(MIS), cytochrome P450-side chain cleavage(P450scc), luteinizing hormone receptor(LHR), and proliferating cell nuclear antigen(PCNA) were also examined. Our results demonstrated that DES-and MXC-treated females had an accelerated onset of puberty and altered estrous cyclicity. Although there was no effect on the litter size, MXC-treated females showed a strong trend towards reduction in litter size(p=0.07) as compared to control. MXC caused a decrease in steroid hormone levels. DES, MXC, and BPA exposures altered follicular dynamics. There was an increase in atretic follicles in DES and BPA-treated females. In addition, the number of corpora lutea(CL) was reduced($p<0.01$) in MXC-treated females while the total follicle numbers were not altered. There were alterations in ovarian molecular markers. Expression of MIS significantly increased in secondary and preantral follicles in MXC-treated group. Furthermore, expression of P450scc decreased in pre-and early-antral follicles in MXC-treated females while the expression increased in CL in BPA-treated females. Overall, the results show that developmental exposure to estrogenic-EDCs affects female

reproduction and ovarian follicular dynamics. In addition, DES and MXC can alter the age of puberty, and regulatory of reproductive cycles, which may lead to female fertility problems.

Some Production and Growth Traits of Anatolian Water Buffaloes Raised in Istanbul under the Community Based Water Buffalo Improvement Project

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Abstract

This study was aimed to determined some production traits as milk yields, lactation lengths, and growth traits as birth weights and body weights of six and twelve months of Anatolian water buffalo in Istanbul. All data used in this study were obtained from the project of community based Anatolian water buffalo improvement program in Istanbul. Milk yields, birth and body weights (6-12 months) obtained between 2011 and 2019 were evaluated. Overall birth weight was 36.83 ± 0.41 kg in 22226 females and 37.71 ± 0.40 kg in 2281 males. Overall six months of body weight was found to be 112.85 ± 1.63 kg in 1467 head females and 117.02 ± 1.62 kg in 1445 head males. Overall twelve months body weight was determined as 193.04 ± 2.93 kg in 1057 head females and 201.07 ± 2.89 kg in 1052 head males. Overall lactation milk yield was 1204.66 ± 6.39 kg and lactation length was 221.82 ± 0.86 days in 6510 females. Additionally, location, year, parity, calving season and gender was found important as statistically for birth weight (P<0.01), year, parity, calving season and gender effect were found important as statistically for six month and location, year, parity and gender effect were found important as statistically twelve weight of animal (P<0.01).

Keywords: Anatolian Water Buffalo, Birth Weight, Lactation Yield, Body Weights

Effect of Ozone Gas Application on Growth, Immune System and Intestinal Flora of Holstein Calves[*]

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It was aimed to examine the effect of ozone gas, which has antibacterial and antioxidant properties, on the healthy rearing of calves during the suckling period. Ten holstein calves (n=5 each group) were used in the study conducted to determine the effects of rectal application of ozone gas on Holstein calves on the growth, immune system and intestinal flora of calves. Groups; Calf starter feed + whole milk (CNT) and Calf starter feed + whole milk + Rectal ozone application (DNM) was formed. Ozone gas was applicationed to the calves once a week as 50 µg gas/200 ml dose. When the calves consumed an average of 800 g/day starter on consecutive days, they were weaned and the ozone application was terminated. The experiment was terminated by taking live weight and body measurements at the 60 d-age. The data were analyzed with the repeated measures analysis of variance technique. The effect of ozone gas application on the live weight of the calves was not significant. The effect on the measure of the body depth at the 2nd and 5th weeks and the measure of the chest girth at the 2nd, 3rd, 4th and 5th weeks were significant ($P<0.05$). The effects of ozone gas application on the general health parameters of the calves were not significant. However, a decreasing trend was observed in the number of days with diarrhea and disease in the DNM group compared to the CNT group. The effect on fecal bacterial counts was not significant, but ozone application showed a tendency to decrease in bacterial counts. While the effect of the ozone on the biochemistry blood analyzes of the calves was not significant, the difference between the groups in the hemogram blood values of hemoglobin, red blood cell and Mean Corpuscular Volume was significant ($P<0.05$). The differences between total antioxidant status, total oxidant status and Glutathione peroxidase values of the calves were significant ($P<0.05$). The differences between the immunoglobulin values of the calves were not significant, but the IgA value tended to increase and the IgG value to decrease in the DNM group. The results showed that ozone gas application can have positive effects on the health of the calves without adversely affecting their growth and can support the antioxidative defense mechanism.

Keywords: Calve, Ozone, Growth, Immunity, Intestinal flora

Litter Size in Karya Sheep

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Fertility is an important feature that characterized proliferation. Karya sheep, which is a prolific sheep breed, mainly raised in Aegean region. Their reproductive performance is noticeable compared to other Turkish sheep breeds The objectives of the present study were to determine litter size performances for ewes of Karya sheep which is most widespread in Western Anatolia. The study was carried out in a total of 64 132 head Karya sheep, aged 2-7 years, raised in Aydın and Denizli provinces. Litter size performances of ewes were defined in 122 based and 24 multiplier flock within the scope of the ""National Genetic Improvement Project for Small Ruminants at Breeders' Conditions" coordinated and supported by the General Directorate of Agricultural Research (TAGEM). Analysis of variance, least squares means and phenotypic correlation coefficients were obtained by using GLM procedures in the SAS (SAS, 1999) statistical package program. The overall least square means of litter size were found as 1.42. The effect of province, year, tier and ewe age used as a fixed effect on litter size in the study was statistically significant. In the study, litter size values for 2017, 2018, 2019 and 2020 were obtained as 1.40, 1.41, 1.42 and 1.45. Differences between tiers (multiplier and base flocks) and years for litter size indicate the success of the applied selection program. The findings indicate that Karya sheep have a very important potential in terms of fertility compared to other domestic sheep breeds raised in our country.

Keywords: Fertility, ewe, breeders, Karya, reproduction

Sustainable Meat Production in a Changing Mediterranean Environmental Area

in the COVID-19 Pandemic Era

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Meat production is a fundamental activity to supply the increasing demand of high-quality protein for human consumption in this Mediterranean region. The rapid increase of the red meat price and increasing input cost in Mediterranean countries in the recent years negatively affects its production. Consumers are seeking to compensate for the need for animal protein with cheaper substitution products. The livestock sector faces in the Mediterranean area in a climate change scenario calls for a continuous improvement and adaptation of animal genetic through breeding programs coupled with tailored conservation actions to ensure resilience of the meat production sectors. These actions should deal with the unforeseen impacts that COVID-19 pandemic may on biodiversity conservation at various levels both economic and social. Even high performance of exotic breeds, indigenous breeds are well adapted to harsh and challenging environments and might be more resistant to some diseases typical of the Mediterranean areas. The aim of this paper is to discuss adapt meat sector to changing environmental area in COVID-19 pandemic era.

Keywords: Sustainability, Mediterranean, Meat Production, Climate Change, Covid-19

Effects of Olive Leaf Extracts on *in vitro* and *in vivo* Nutrient Digestibility in Sheep

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Abstract

In this study; the effects of olive leaf extract on *in vitro* and *in vivo* nutrient digestibility in sheep were investigated. The effects of different doses of olive leaf extract (based on oleuropein content) containing 100, 150, 200, 250, 300, 350 and 400 ppm oleuropein, on *in vitro* nutrient digestibility of alfalfa hay, barley and sunflower meal (SFM) were identified by fermentation system of ANKOM Daisy (DaisyII200/220 incubator). A classical digestion trial was conducted using three adult Akkaraman rams with oleuropein doses selected of 200 ppm (OLE200) and 400 ppm (OLE400) based on findings from the *in vitro* study. The effects of increasing doses of olive leaf extract on *in vitro* nutrient digestibility of alfalfa hay, barley and SFM were significant, while fluctuations were observed among the means for the doses. In the *in vivo* study, the effect of the treatment on dry matter (DM), organic matter (OM), crude fiber (CF), neutral detergent fiber (NDF) and acid detergent fiber (ADF) were found to be insignificant, crude protein (CP) and ether extract (EE) digestibility were found to be significant. The CP digestibility decreased significantly in the OLE200 and OLE400 groups, while EE digestibility decreased only in the OLE400 group compared to the control.

As a result, the addition of olive leaf extract at increasing doses generally decreased the *in vitro* nutrient digestibility of the feeds. The effect of olive leaf extract (200 ppm and 400 ppm oleuropein) was negative on *in vivo* CP and EE digestibility in this study.

Keywords: Olive leaf extract, oleuropein, sheep, *in vitro-in vivo* nutrient digestibility.

1. Introduction

Agricultural production and agro-industrial processing generate a high amount of by-products and waste, resulting in significant sources of alternative additives or raw material for the animal feed industry (Ajila et al., 2012). The use of reliable and sustainable new resources in the livestock sector is extremely important. Increasing productivity and ensuring its sustainability in animal husbandry is possible by making the most efficient use of available resources. A significant contribution to

sustainable animal production can be made by using various by-products, which are obtained as a result of the industrial evaluation of agricultural production and plant products, in animal nutrition (Makkar and Ankers, 2014). By-products that obtained during the harvesting and processing of olives, which have played an important role in the healthy diet of Mediterranean countries for years, constitute an important source in this respect.

While olives and olive oil are obtained as the main product from the olive tree, high amounts of various by-products such as olive cake (pomace), olive mill wastewaters, twigs and olive leaves produce during the harvesting of olives and olive oil production. During the harvesting of olives from the olive tree, processing into oil (approximately 10% of the total olive weight) and pruning of olive tree branches, a very high amount of olive leaves are produced (Niaounakis and Halvadakis, 2006). Leaves of the olive tree (Olea europaea L., Oleaceae) or its metabolites, such as oleuropein, strong antimicrobial and antioxidant properties (Silva et al., 2006; Sudjana et al., 2009). Although *in vitro* (Öztürk et al., 2012) and *in vivo* studies (Romero-Huelva and Molina-Alcaide, 2013; Moate et al., 2014) investigating the effects of agro-industrial by-products in ruminants are limited, studies investigating the effect of olive leaf extract on *in vivo* nutrient digestibility in ruminants have not been found.

In this study, it was aimed to determine the effect of different doses of olive leaf extract on *in vitro* and *in vivo* nutrient digestibility in sheep.

2. Material and Method

Olive leaf extracted, which extracted with ethanol, obtained from a commercial overseas company (Nutra Green Biotechnology Co., Ltd., China) was used in the study. The oleuropein content of olive leaf extract was 220.30 mg/g.

This study was conducted in accordance to the International Center For Livestock Research and Training Guidelines for the Care and Use of Experimental Animals.

The effects of olive leaf extract on *in vitro* true digestibilities of alfalfa hay, barley and sunflower meal (SFM) were evaluated using fermentation system of ANKOM Daisy (DaisyII200/220 incubator). The ruminal inoculum, used for *in vitro* incubations, was collected from four adult Akkaraman rams with an average weight of 74±0.5 kg fed 60:40 ratios of forage to concentrate. The ruminal inoculum collection was carried out after morning meal. Then the ruminal inoculum was strained through various layers of cheese cloth and kept at 39°C under a CO_2 atmosphere. Alfalfa hay, barley and SFM is grounded using a 1 mm sieve for chemical analysis and *in vitro* incubation. Weighed about 0.5 g of feed samples in filter bags (F57) and closed with heat stamping device and incubated in a DaisyII incubator (ANKOM Technology Corp., Newyork-USA) with rumen fluid, buffer in a 1:4 ratio. The effects of different doses of olive leaf extract (based on oleuropein content) in an amount to meet the dosage of

100, 150, 200, 250, 300, 350 and 400 ppm oleuropein for 24 h (for SFM and barley) and 48 h (for alfalfa hay) under anaerobic conditions at 39.0 °C. At the end of the incubations, filter bags were cleaned under water flow and dried. Then, the bags was analyzed for dry matter, organic matter crude protein and neutral detergent fibre digestibility. *In vitro* true digestibilities of samples were estimated as follows;

In Vitro True Digestibility (IVTD) % =100 - ((W3 - (W1 × C1)) × 100)/W2

W1: Weight of filter bag, W2: Weight of sample, W3: Final weight after analysis, C1: The bag without sample was prepared also for correction.

In the *in vivo* study, three Akkaraman sheep, with an initial body weight of 75 ± 0.5 kg were used involving three treatments based on findings from the *in vitro* study: basal diet (control), basal diet added with 200 ppm oleuropein (OLE200); basal diet added with 400 ppm oleuropein (OLE400). While transferring the results from the *in vitro* study to the *in vivo* study, the average amount of rumen fluid of the sheep was taken into account (Al Rahmoun, 1985; Silanikove et al., 2001). The composition of the concentrate feed used in the *in vivo* study and the nutrient content of the used feeds are shown in Table 1. The olive leaf extract was added into the concentrate. The feed material consisted of 60% forage (alfalfa hay and barley straw) and 40% concentrated. Sheep were fed twice daily with 1.69 kg DM, 3.24 Mcal ME/day in two equal portions at 08:30 and 17:00 (NRC, 2007), and had free access to water.

Each experimental period lasted for 20 days, of which the first 10 days were for adaptation, and the remaining 10 days were for sampling. Samples of the offered diets and orts were recorded daily. Fecal samples were taken daily and composited per sheep during the sampling period. Samples were dried at 65°C for 48 h for subsequent analysis of chemical compositions to calculate feed intake and digestion. Total nutrient apparent digestibility was calculated according to the difference between nutrient intake and fecal output.

Table 1. The composition of the concentrate feed used in the *in vivo* study and the nutrient content of the used feeds (concentrate, alfalfa hay and barley straw)

Composition of the concentrate feed, %			
Barley	68.40		
Wheat bran	20.00		
SFM	9.00		
Marble dust	2.00		
Vit-min premix[*]	0.10		
Salt	0.50		
Nutrient content, DM%[**]	**Concentrate feed**	**Alfalfa hay**	**Barley straw**

DM	92.26	89.03	95.77
CA	5.44	9.39	7.05
CP	14.07	19.49	3.45
EE	1.63	1.66	0.55
CF	8.67	21.95	42.97
NDF	50.74	33.97	76.86
ADF	18.42	28.85	52.27
ADL	6.35	5.85	3.03
ME, Mcal/kg KM	2.85	2.21	1.33

[*] Provides per kg of diet: 15.000.000 IU Vitamin A (E672), 3.000.000 IU Vitamin D_3 (E671), 30.000 mg Vitamin E (3a700), 5.000 mg Vitamin B_1, 100.000 mg Niacin (3a314-3a315), 10.000 mg Copper (Cu; Sülfat; E4), 50.000 mg Iron (Fe: Sulfate E1), 50.000 mg Manganese (Mn; Oxide; E5), 150 mg Cobalt (Co; Mono carbonate; 3b304), 800 mg Iodine (I; Calcium Iodate; E2), 50.000 mg Zinc (Zn; Oxide; E6), 150 mg Selenium (Se; Sodium Selenite; E8).

[**] DM: Dry matter, CA: Crude ash, CP: Crude protein, EE: Ether extract, CF: Crude fiber, NDF: Neutral detergent fiber, ADF: Acid detergent fiber, ADL: Acid detergent lignin, ME: Metabolic energy.

Samples of feed orts and samples of feces were ground through a 1 mm screen. The amount of nutrients (DM, OM, CP and EE) were determined according to the methods specified in AOAC (1995). CF, NDF, ADF and ADL contents of feeds Van Soest et al. (1991) using Ankom Fiber Analyzer (ANKOM200 Fiber Analyzer, Ankom Teknoloji, Fairport, NY).

Statistical analysis of the obtained data was made with IBM SPSS Statistics for Windows, v20 (IBM Corp., Armonk, N.Y., USA, 2011) package program and General Linear Model (GLM). One-Way Analysis of Variance (One-Way ANOVA) was used to statistically evaluate the data on the effect of olive leaf extract on *in vitro* and *in vivo* nutrient digestibility, which was followed by the Bonferroni multiple comparison method to outline the pairwise significant differences among the means of the groups.

3. Result and Discussion

The results of the effects of increasing doses of olive leaf extract on the *in vitro* DM, NDF and OM digestibility of alfalfa hay are given in Table 2.

Table 2. The effect of increasing doses of olive leaf extract on the *in vitro* DM, NDF and OM digestibility of alfalfa hay, (%).

Treatments	Digestibility (%)		
	DM	NDF	OM
Control	54.90±0.41[a]	56.82±0.63[a]	53.81±0.55[a]

OLE100	52.70±0.60[cd]	50.33±0.86[cd]	50.43±0.80[cd]
OLE150	54.47±0.58[ab]	52.23±0.92[bc]	52.36±0.77[abc]
OLE200	52.29±0.58[cd]	48.78±0.86[d]	49.83±0.77[d]
OLE250	53.55±0.58[abc]	55.09±0.89[a]	52.92±0.77[ab]
OLE300	52.83±0.58[bcd]	54.71±0.83[ab]	51.20±0.77[bcd]
OLE350	50.12±0.58[e]	52.32±0.83[bc]	52.22±0.77[abc]
OLE400	51.56±0.60[de]	54.36±0.86[ab]	50.90±0.80[bcd]
	P value		
Treatment	<0.001	<0.001	<0.001
Linear	<0.001	0.348	0.037
Quadratic	<0.001	<0.001	0.029
Cubic	<0.001	<0.001	0.004

The results of the effects of increasing doses of olive leaf extract on the *in vitro* DM, CP and OM digestibility of sunflower meal are given in Table 3.

Table 3. The effect of increasing doses of olive leaf extract on the *in vitro* DM, CP and OM digestibility of sunflower meal, (%).

Treatments	Digestibility (%)		
	DM	CP	OM
Control	57.13±0.41[a]	80.31±0.78[a]	58.41±0.56[a]
OLE100	53.54±0.55[b]	75.32±1.10[b]	54.11±0.78[b]
OLE150	51.67±0.56[c]	70.18±1.10[c]	52.74±0.78[b]
OLE200	52.15±0.58[bc]	74.35±1.10[b]	53.80±0.81[b]
OLE250	45.91±0.59[d]	62.87±1.10[d]	48.33±0.81[cd]
OLE300	45.67±0.67[d]	61.61±1.10[d]	49.81±0.67[c]
OLE350	43.62±0.67[e]	62.52±1.10[d]	46.37±0.67[de]
OLE400	44.23±0.59[de]	63.38±1.10[d]	45.23±0.90[e]
	P value		
Treatment	<0.001	<0.001	<0.001
Linear	<0.001	<0.001	<0.001
Quadratic	<0.001	<0.001	<0.001
Cubic	<0.001	<0.001	<0.001

The results of the effects of increasing doses of olive leaf extract on the *in vitro* DM and OM digestibility of barley are given in Table 4.

Table 4. The effect of increasing doses of olive leaf extract on the *in vitro* DM and OM digestibility of barley, (%).

Treatments	Digestibility (%)	
	DM	OM
Control	71.76±0.45[b]	75.26±0.48[b]
OLE100	72.47±0.62[b]	75.00±0.67[b]
OLE150	72.46±0.62[b]	75.14±0.67[b]
OLE200	75.18±0.62[a]	77.98±0.67[a]
OLE250	68.72±0.62[c]	73.33±0.67[bc]
OLE300	67.90±0.62[cd]	72.03±0.67[cd]
OLE350	67.08±0.62[cd]	71.32±0.67[d]
OLE400	66.25±0.62[d]	70.61±0.67[d]
P value		
Treatment	<0.001	<0.001
Linear	<0.001	<0.001
Quadratic	<0.001	<0.001
Cubic	<0.001	<0.001

According to the findings obtained from the *in vitro* study, the *in vitro* nutrient digestibility of alfalfa hay, SFM and barley were significantly affected by the addition of olive leaf extract at increasing doses. The DM, OM and NDF digestibility of alfalfa hay decreased (P<0.05) significantly with increasing doses of olive leaf extract. Although this decrease is not related to the increasing dose of olive leaf extract, fluctuations are observed (Table 2). The DM, CP and OM digestibility of sunflower meal decreased with the addition of olive leaf extract at increasing doses, especially after 200 ppm oleuropein dose, a significant decrease (P<0.05) was observed (Table 3). While the DM and OM digestibility of barley increased significantly compared to the control at 200 ppm oleuropein dose, they decreased significantly after 200 ppm and the highest decrease was observed at the 400 ppm (Table 4)

In some studies in which the effects of different phytochemicals on *in vitro* nutrient digestibility were investigated (Canbolat et al., 2011; Kamalak et al., 2011; Şahan, 2012), as in this study, While forage and concentrate were used alone as a substrate, in some studies, forage and concentrate were used as a mixture (TMR). Şahan (2012) reported that DM and OM digestibility of soybean meal was increased with increasing doses of black cumin, laurel, coriander, garlic and grape seed essential oils (50, 100, 150 ppm); also reported that CP digestibility decreased significantly with the doses of 100 ppm of black cumin essential oil and 150 ppm of laurel oil. In another study (Öztürk et al., 2012), in which forage:concentrated (50:50) feed as substrate and a different digestibility method (RUSITEC) were used, it was reported that the effect of olive leaf extract on OM digestibility was insignificant. It has been

reported that the digestibility of the feeds differs according to the phytochemicals used, and may vary according to the feed used as the substrate or the forage:concentrated feed ratio (Molero et al., 2004). When we evaluated the effect of olive leaf extract on barley DM and OM digestibility; the digestibility decreased above 200 ppm. The effect in this direction can be explained by the fact that starch-digesting bacteria may be affected by increasing doses of olive leaf extract. The decrease in rumen digestibility and degradability of feed raw materials with high rumen degradability such as barley is important for the control of rumen pH (Qadis et al., 2014). In terms of reducing the rate of degradability in the rumen, the use of increased doses of olive leaf extract (over 200 ppm) can eliminate the negative effects. In this *in vitro* study, the addition of increasing doses of olive leaf extract had a positive effect on concentrate feeds (SFM and barley) used as substrate, while the effect of olive leaf extract on alfalfa hay, which is a source of roughage, was negative.

In the *in vivo* study, a classical digestion trial was conducted with the control, OLE200 and OLE400 treatment groups to see the effect of 200 ppm and the highest doses 400 ppm oleuropein. The effect of olive leaf extract on *in vivo* digestibility are given in Table 5.

Table 5. Effect of olive leaf extract on *in vivo* nutrient digestibility, %.

Item	Groups			SEM	*P* value
	Control	**OLE200**	**OLE400**		
DM	61.85	59.84	58.56	1.48	0.352
OM	65.69	65.06	63.60	1.41	0.590
CP	72.04[a]	67.81[b]	67.44[b]	0.96	0.026
EE	86.13[a]	85.73[a]	73.72[b]	1.36	0.001
CF	50.08	48.12	49.30	2.92	0.836
NDF	61.34	61.87	59.53	1.25	0.430
ADF	53.90	50.04	49.61	1.93	0.297

In the *in vivo* study, it was determined that two different doses of olive leaf extract (200 and 400 ppm) selected based on findings from the *in vitro* study were added to the feed of the sheep fed with a 60:40 ratio of roughage and concentrate based on the amount of rumen fluid, effects on DM, OM, CP, EE, CF, NDF and ADF digestibility were investigated. The effect of olive leaf extract added to the forage and concentrate mixture on DM, OM, CF, NDF and ADF digestibility is insignificant, but its effect on CP and EE digestibility is significant. As a matter of fact, the *in vivo* CP digestibility decreased (P<0.05)significantly in the OLE200 and OLE400 groups, and the EE digestibility decreased (P<0.05) significantly in the OLE400 group (Table 5).

Kumar et al. (2017) reported that, tea seed saponin extract at 0.4% of dry matter intake (DMI), and tea seed at 2.6% of DMI in kids did not affect the DM, OM, CP, NDF, and ADF digestibility but reduced EE digestibility in both treatment groups after 21 days. In another study, it was reported that mint (37.69% L-menthol and 21.79% menthone) and thyme (49.72% thymol and 50% carvacrol) added to lamb rations containing forage: concentrated (30:70) at 3% did not affect the nutrient digestibility of the feed (Khamisabadi et al., 2016).

Various findings obtained from different *in vivo* studies using phytochemicals may be related to diet content, type of phytochemicals, and adaptation of the animal to the phytochemicals used. Another factor in obtaining different findings in studies investigating the effects of phytochemicals is dose. Indeed, Calsamiglia et al. (2007) reported that rumen fermentation manipulation can be achieved by determining the appropriate dose of phytochemicals used.

4. Conclusion

As a result, although generally there was a positive effect of olive leaf extract on nutrient digestibility on individual feeds (barley and SFM) in the *in vitro* study, this effect of olive leaf extract added to the concentrated feed was not observed in the *in vivo* study. This might be explained by the low number of animals used in this study. It is therefore necessary to increase the number of *in vivo* studies by increasing the number of animals used and also considering not only in terms of digestibility but also in terms of rumen metabolites and some blood parameters (biochemical, oxidant and antioxidant).

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Effects of Environmental Factors on Growth Performance of Kilis Goat in Gaziantep Province

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Abstract

The study was aimed to investigate the effect of some environmental factors on birth weight, weaning weight and average daily gain of Kilis goat kids reared in Gaziantep province. For this purpose, a total of 14956 heads of goats born in 2019 and 2020, which were included in the national project named "Improvement of Kilis Goat under Farm Conditions" carried out in the province, were evaluated. As a result, average birth weight was found as 3.5±0.01 kg, weaning weight as 15.2±0.02 kg, and average daily gain as 193.4 g. It was determined that year, maternal age, gender, the month of birth and year had effects on birth weaning and average daily gain (P<0.01).

Keywords: Kilis goat, environmental factors, growth performance

Effect of Ration Calcium, Phosphorus and Magnesium Contents on Serum Levels in Fatty-Tailed Sheep

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Abstract

The aim of this study is to determine the relationships between serum levels of calcium (Ca), phosphorus (P) and Magnesium (Mg), which are metabolic profile parameters, and their amounts in the diet in fat-tailed sheep. For this purpose, 20 of clinically healthy Akkaraman sheep, which gave birth in the previous year, were selected from six flocks as a sum of 120 heads. Analyzes were performed in the serum of blood samples taken from the selected sheep during the late pregnancy and postpartum periods by the jugularis vein route. The sampling process was carried out before the morning or evening feeding. Following standing at room temperature for 20-30 min, the tubes were centrifuged at 3,000 rpm for 10 min and the serum samples stored at -20°C until biochemical analyses. Calcium, P and Mg were determined within 1 month following sampling for each period at auto analyzer *(BS 200 chemistry analyzer, Shenzhen Mindray Bio-Medical Electronics Co. Ltd, Shenzhen, China)* using commercial kits. The differences between the herds in terms of the measured minerals were determined by the Z test based on the average values determined for both physiological periods, and flocks different from the mean values were found for the relevant metabolite. The flocks that differed from the means were coded as Different From Means (DFM), and those that did not differ from the mean as WIM (With-in Means). The existence of the relations between the ration components and serum levels of minerals in question was determined by the correlation and regression analysis, the strength of the relations was determined by the coefficient determination. Significant correlations were found between ration mineral amounts and blood mineral levels from the two groups formed, only in the DFM group (p=0.000). The exception was the only element magnesium. Although the interactions regarding this element were also seen in the WIM group, the direction of the relations was not positively but negative rather than the other elements. It was determined that the strongest interaction occurred between dietary Ca amount and serum Mg level in DFM group (R-Sqadj=48,15), while the weakest interaction was between ration mineral amounts and serum P level(R-Sqadj=20.70).

Keywords: Metabolic Profile Test, Akkaraman sheep, blood biochemical parameters.

Effect of Different Doses of Some Essential Oils on The Growth Rate of *Ruminobacter amylophilus* Isolated from Rumen Fluid

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Abstract

Essential oils are known to have an impact on rumen microbial population by their antibacterial property. Six essential oils (EOs) were chosen for this study according to their antimicrobial activity: cinnamon, garlic, thyme, laurel, orange peel and oleaster essential oils. Dose–response incubations were conducted to determine their effect on bacterial maximum specific growth rate (μmax). For this purpose, ten different doses (0,50,100, 200 300 400 600 800 1000 5000 ppm) were used. The growth rate of *Ruminobacter amylophilus* which is gram (-) amylolytic bacteria was measured by reading the optical density at 650 nm hourly until the reading for bacterial growth decreased. Maximal bacterial growth rate before growth commenced was calculated using the Micro Fit (v 1.0). According to the results the effect of essential oils, doses, and dose-oil interaction on the maximum specific growth rate (μmax), which is one of the parameters measuring the growth rate of the bacteria, was statistically significant (P<.0000). The strongest antibacterial effect on *Ruminobacter amylophilus* was observed in thyme essential oil. Following thyme essential oil, the strongest antibacterial effect was observed in laurel and oleaster essential oils. The antibacterial effect was generally clearer after the 100 ppm dose for thyme and oleaster, 400 ppm dose for laurel. The results of this study show that the effects of essential oils, doses and dose-oil interactions on growth rate of *Ruminobacter amylophilus* are statistically significant.

Keywords: Rumen bacteria, Growth rate, Essential oils, *Ruminobacter amylophilus*

Fermentation Characteristics of Pomegranate Pomace Silage and Effect on Performance in Lamb

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Abstract

This study was planned to determine the effects of pomegranate pomace silage on body weight gain, feed consumption, feed efficiency ratio in lambs and to investigate the potential of using it as a roughage source in ruminants. In order to determine the effect of fresh pomegranate pulp (TNP) obtained from the juice factory on the fattening performance of lambs, silage was made in the silage pit according to the classical method. Chemical composition (DM, CA, OM, CP, CO, NDF, ADF, ADL, CS, CT and TFC (Total Phenolic Content), dry matter digestibility, dry matter consumption and relative feed values, silage fermentation characteristics (organic acid levels, pH, aerobic stability, NH3_N, WSC, fleig score) of all silage groups were determined. In the fattening study; the animal material consisted of 24 head of AkkaramanxKıvırcıkG1 male lambs and grouping was made according to 3 different rations, 1 control (K) and 2 experimental groups. The groups were fed with 50% roughage and 50% concentrate feed, and meadow grass was used as a source of roughage in all groups. 25% and 35% pomegranate pomace silage was added to the rations of the first (G1) and second (G2) groups respectively. The fattening study, in which ten days of practice feeding was applied, lasted a total of 58 days. Analysis of variance was used to determine the differences between the averages of the findings obtained as a result of the research, and the Tukey test was used to determine the significance level of the differences observed. According to the research results; In the fattening study, the average live weigts of K, G1 and G2, which were determined as 22.49kg, 22.88kg and 22.45kg, respectively at the beginning of the exercise feeding were determined as 31.40kg, 32.15 kg and 33.30kg respectively at the end of the feeding. daily live weight gains of K, G1 and G2 groups were determined as 174.79kg, 178.13kg and 195.83kg, respectively. There was no statistically significant difference between the groups in terms of body weight, daily live weight gain, roughage feed efficiency ratio, concentrate feed efficiency ratio and total feed efficiency ratio during the period from the beginning to the end of the feeding (p>0.05). Throughout the research, it was observed that the lambs eagerly ate the Pomegranate pomace silage. It was concluded that

pomegranate pomace silage, which is a fruit juice industry waste material, can be used in the feeding of lambs without causing any negative effects. It has been observed that it can be easily used as a roughage source at a rate of 35% in lamb fattening to be made especially in regions close to pomegranate processing facilities.

Cervico-Vaginal Mucus (CVM) Sampling from Cattle and Nucleic Acid Isolation Optimization and Standardization from CVM

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In the presented project, the aim is to optimize the cervico-vaginal mucus (CVM) sample collection, nucleic acid isolation technique and to compare the amount and quality of isolation between different techniques in the critical period from the embryo's recognition by the mother to the implantation, which is one of the important stages of reproduction in cows (day 0 to day 28th). The quantity and quality of nucleic acid isolation has the potential to obtain illuminating information about the critical stages of the reproductive process in Yerli kara(Native black) and Holstein cows, and as an output of the study, a method that requires minimal intervention for the use of nucleic acid biomarkers in pregnancy detection can be developed and used.

The minimum nucleic acid quality and quantity required for different purpose genomic/transcriptomic studies such as RNA-seq, NGS (Next Generation Sequencing), quantitative real-time PCR (qRT-PCR), microarray and Northern blot also differ. It is obvious that the most critical step is to establish an optimized and standardized isolation technique in order to avoid erroneous results in studies with nucleic acids. The quality and quantity characteristics of the nucleic acid to be isolated are determined by the sampling technique, time, storage conditions and isolation method based on the kit used. While mucus is collected (flushing, catheter) from CVM in proteomic studies in animals, swap samples are taken using cotton for transcriptomic studies in humans.

For this purpose, in our study, commercial nucleic acid (DNA and total RNA) kits based on solid-phase isolation technique were used by using cotton-swap and saline-flushing techniques for sampling. After isolation process for both kits and for both with/without saline buffer total RNA concentration was ranged from 14,1 to 48,6 ng/µl which is meet most molecular studies minimum sample input quality requirements.

Keywords: Cervico-vaginal mucus(CVM), Total RNA isolation, DNA isolation, Yerli kara(Native black)

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The Influence of Hectoliter Weight on Chemical Composition of Barley (*Hordeum vulgare* L.)

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Abstract

This research was carried out to determine the effect of hectoliter weight on some chemical properties of barley. In this study, mixed barleys with different hectoliter weights (55, 60, 65 and 70 kg hl^{-1}) supplied from different suppliers were used as the material. Crude protein, crude fiber, crude fat, crude ash and starch contents of the barley samples were determined. The data were subjected to variance analysis according to the randomized plot design. According to the analysis, the hectoliter weight had a significant effect on all characters ($P<0.01$). The results of the present study showed that crude protein ranged from 9.83 to 12.18%, crude fiber from 4.14 to 6.26%, crude fat from 1.43 to 1.51%, crude ash from 2.40 and 2.98% and starch from 47.63 and 53.17%. In conclusion, as the hectoliter weight increased, the crude protein and crude fiber and crude ash contents of the barley samples subjected to investigation decreased; on the other hand, the crude fat and starch contents increased. Since most of the barley produced in Turkey is used in feed production, these results can be considered for efficient and cost effective use of barley in concentrate feed production and animal nutrition.

Keywords: Barley, Chemical composition, Crude protein, Hectoliter weight, Starch content

Sheep and Goat Breeding in Cyprus (North (Trnc) and South) and the Effects and Importance of Geographical Indication of Halloumi/Hellim on This Breeding

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The share of the livestock sector a specially dairy sector in the Cyprus economy is very important. Halloumi production and export take the biggest share economically. Today, the majority of Halloumi produced in Cyprus is made using milk of varying proportions and species, predominantly from 80-95% cow's milk. However, this is not in line with the actual specification of the product. 50(2)(a) of Regulation (EU) No 1151/2012, with the application of geographical indication of halloumi to Cyprus, in accordance with origin in a specific place, region or, in exceptional cases, a country defined according to Article 5 of Regulation (EU) No 1151/2012) item) in the making of halloumi, the presence of sheep and goats, breed characteristics, feed and geographical region, the quality of the vegetation and its effect on milk, and the quality of the milk that constitutes the content of halloumi came to the fore.

In this context; The share of livestock production in total agricultural production is around 35-50% in TRNC and 60.8% in Southern Cyprus. In the TRNC, the number of Cattle is 65,241 heads, Sheep 220,252 heads and Goats are 83,467 heads, (2018). Cattle breeding constitutes the largest sub-sector in agriculture with 18%. Dairy products have the largest share with 58% in exported products. In Southern Cyprus, the number of cattle is 70,821 heads, sheep are 310,988 and goats are 250,412, (2018). The cattle breed is Holstain Frisian in both regions. Sheep breeds are Awasi, Chios sheep, Cyprus sheep and Goat breeds are Damascus and native hair goats varieties. Goat and sheep breeds such as Saanen, Alpin, Asaf were brought to the island, but they are considered controversial within the scope of geographical indication.

In this article, the current situation of dairy farming and halloumi production in both regions of Cyprus, the effects of the geographical indication process on the sheep and goat production and the strategy to be followed will be discussed.

Keywords: Geographical indication of halloumi, livestock production in Northern and South Cyprus

Growth Characteristics of Karacabey Merino Sheep in Sheep Breeding Research Institute

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Abstract

This study was aimed to determine growth characteristics of Karacabey Merino (KM) sheep in Sheep Breeding Research Institute, Bandırma, Balıkesir, using data spanning the years from 1992 to 2019. Live wight data were collected from 22 738 lambs.

The data were analyzed by *GLM* procedure in SAS (2017) and *Tukey* test was used for the comparison of subclass means of environmental factors. Least square means of birth (BW0), 90th (BW90) and 365th (BW365) day of age live weights and average daily weight gain (ADWG) from birth to 90-day of age in females and males were 4.61 and 4.90, 27.95 and 30.25, 51.07 and 58.86 kg, and 258.4 and 283.9 g, respectively.

BW0 and BW90 were affected by birth year, birth season, type of birth, sex of lamb and age of dam (P<0.05), while BW365 was affected by flock (elite vs breeding), birth year, birth season and sex of lamb (P<0.05). In addition, coefficients of regression of BW90, BW365 and ADWG on birth weight were 2.674±0.0562 kg, 2.394±0.01020 kg, 18.603±0.6248 g, respectively (P<0.01).

Keywords: Karacabey Merino sheep, Growth, Environment

Expression of Insulin-Like Growth Factor Gene Family Members in Goat Uterus and Ovarium During Different Pregnancy Stages

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Abstract

Insulin-like growth factors (IGFs) contribute to the pregnancy process by stimulating cell differentiation and proliferation in pregnancy-related tissues. In this study, mRNA and protein expression of IGFs were investigated in the goat uterus and ovarium during pregnancy. A total of 42 female goats were divided into six different groups, seven animals in each group, as preimplantation (Group 1; G1), implantation (Group 2; G2), mid-term pregnancy (Group 3; G3), late pregnancy (Group 4; G4), early luteal stage (Group 5; G5) and late luteal stage (Group 6; G6). Expression of IGFs was investigated by quantitative PCR (qPCR) and immunohistochemistry. In caruncular tissues, the expression of IGF-1 and IGF-2 was significantly greater in G1 than in G2, G3, and G4. In addition, the expression of IGF-1 and IGF-2 was higher in G1 than in G5. Expression of IGF-2R was significantly higher in G1 and G3 than in G2 and G4. In cotyledonary tissues, IGF-1 expression was greater in G2 and G3 than in G4. IGF-1R expression was higher in G2 than in G3 and G4. In the ovarian tissues, IGF-1 expression was higher in G1 than in G2, G3, and G4. However, IGF-2 expression did not change in cotyledonary and ovarian tissues during pregnancy. Expression of IGF binding proteins (IGFBPs) differed in caruncular, cotyledonary, and ovarian tissues depending on pregnancy stages. Immunohistochemistry indicated that IGF gene family members localized in different sites of the uterus during pregnancy. In addition, IGFs proteins were detected in luteal cells of the ovarium. However, the staining intensity of IGFs differed in a stage-dependent manner both in the uterus and ovarium. These findings indicate that IGFs also contribute to the establishment and maintenance of pregnancy and regulation of ovarian functions in goats. This study was supported by TUBITAK (project no: 117O613).

Keywords: goat, IGF gene family, ovarium, pregnancy, uterus

Production of Lambs by Laparoscopic Insemination of Ewes in Natural Heat with Mini Doses of Frozen Semen

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The purpose of the study was a production of lambs by laparoscopic artificial insemination (LAI) with Romney semen imported from Australia. In breeding seasons of 2019 and 2020 total 280 ewes of Kazakh semi-fine-wooled breed were LAI-ed. Ewes were exposed to the direct contact of a teaser rams (belly covered with sackcloth) in a fenced area in the morning for one hour. Considering the response of the ewes to the teaser male, they separated those showing behavioural symptoms of oestrus. Ewes in heat were LAI-ed with frozen semen from Tintern Hugo 607, a Champion Romney ram at the Royal Melbourne Show 2018, Australia. Three ewes were inseminated with contents of one 0.25 ml straw with the aid of a Robertson gun. Total 94 doses of semen frozen in 0.25 straws were thawed to inseminate 280 ewes. 105 ewes lambed out of 280 inseminated (37.5%) and delivered 120 lambs resulting prolificacy of 1.14 lambs born per lambing. Thus 1.28 lambs were produced per 0.25 ml straw of semen. It was concluded that LAI of three ewes with contents of one 0.25 ml straw with the aid of a Robertson gun is an efficient option when expensive imported semen is used.

Raw Mohair Processing Applications

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Abstract

Mohair is the sheared hair of the breed defined as Angora goat and is known as mohair in the world. Mohair is a valuable species due to its softness, thin, shiny, durable, flexible and silky structure, glamorous gloss and superior dyeability, and has cultural and economic value. Since the yarn obtained from mohair is used in the production of fabrics, it is preferred in many areas from knitting and weaving industry to furniture, aviation to automotive. Although natural raw materials have been replaced by artificial fibers and materials in the textile sector with the industrial revolutions, the tendency to natural products for a healthy life increases the importance of mohair and similar natural raw materials again. The most important process step that adds value to raw mohair is finishing processes. The finishing processes, starting from shearing, are classification, analysis, washing, combing, tops and spinning processes until they turn into the final product, which is the most valuable form of luxury fibers such as mohair. In this paper, it is aimed to analyze the basic applications for the processes carried out until the raw mohair reaches the weaving loom.

Keywords: Angora goat, Mohair, Mohair process

Cervico-Vaginal Mucus as a Biomarker

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Introducing new biomarkers with methods that require minimal intervention (blood, mucus, urea, etc.) in mammalian biological processes and diseases is important for accurate diagnosis of the condition. Many biotechnological techniques are used and developed for the field use of these biomarkers in livestock, medicine and biology. Recently, some of the key points of the research in this area is focused on: increasing the sensitivity of current techniques, developing new techniques and finding new markers. Some of the examples that researchers focus on livestock biomarker search can be counted as blood, milk, uterus, mucus.

Cervico-vaginal mucus (CVM) secreted by epithelial cells covers the vagina, cervical canal, uterus and ovaries. Although the secretion of CVM in the genital system is an uninterrupted process, its content, amount, physical and biochemical properties are affected by the cow's health status and oestrus cycle. Nucleic acids originating from the destruction of leukocytes, epithelial cells and symbiotic bacteria are also found in the mucus of healthy animals, and it is known that this nucleic acid density changes in cases of infection. In biomarker research studies associated with clinical endometritis disease, it has been shown that some proteins may be associated with this disease.

As a result, it has been shown that CVM can be used as an important biomarker tool for disease diagnosis, monitoring disease progression and pregnancy process in cows.

Keywords: Cervico-vaginal mucus(CVM), Biomarker

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Lamb Fattening and Live Yeast (*Saccharomyces Cerevisiae*) Use in Lamb Diet

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SUMMARY

Lamb fattening has a very important place in Turkey's red meat production. However, it is known that diseases such as acidosis caused by malnutrition, mistakes made with traditional methods and misuse of existing feed raw materials cause serious economic losses for the breeder and the country. In addition, nowadays people are turning to natural nutrition for the purpose of healthy nutrition. In this respect, instead of feed additives that are used as growth promoters such as antibiotics and hormones that threaten both animal nutrition and human health, there is a need to use alternative natural supplements such as probiotics, prebiotics and enzymes, which do not have side effects, in animal nutrition. The potential contribution of live yeast (*Saccharomyces cerevisiae*), which is one of these feed additives, to the economy, health, breeder and consumer, and thus to the country's economy, is discussed.

Keywords: Lamb fattening, probiotic, *Saccharomyces cerevisiae.*

INTRODUCTION

The increase in the world population causes serious nutritional problems. As in the past, the problem of nutrition will continue in the future. Today, people have become more conscious and have begun to pay more attention to the foods they consume. For this reason, the demand for naturally produced foods is increasing. For these reasons, it should be aimed to optimize the existing food resources by using natural resources.

Our most important food sources are foods of animal origin. Therefore, it is necessary to increase the number of animals, the production and quality of animal food. The most important and most consumed food as animal food is red meat.

Today, a large part of the red meat in Turkey is provided from cattle breeding. However, especially in recent years, sheep breeding based on grazing has gained importance due to the significant increase in the costs of raising and feeding cattle, the lack of an efficient breeding method based on grazing, the long duration of intensive fodder and the low slaughter prices. In addition, lamb meat also seriously supports the consumption of red meat.

Ovine Meat in Turkey

Table 1.1 TUIK and TEPGE Calculations, ¹/Shows the change in the last two years for which data is available (Anonymous 2020 d).

	2013	2014	2015	2016	2017	2018	Changing (%)
Number of Slaughtered Animals (thousands)							
Sheep	4,958	5,197	5,008	4,084	5,134	4,653	-9.4
Goat	1,341	1,570	1,999	1,756	2,069	693	-66.5
Meat Production (tonnes)							
Sheep	102,943	98,978	100,021	82,485	100,058	100,831	0.8
Goat	23,554	26,770	33,990	31,011	37,525	13,603	-63.7
Total Number of Animals (thousands)							
Sheep	29,284	31,140	31,508	30,984	33,678	35,195	4.5
Goat	9,226	10,345	10,416	10,345	10,635	10,922	2.7

According to TUIK data in Turkey, while there were 46.1 million sheep and goats in 2018, 76% of this figure was sheep and 24% was goat (Anonymous 2020 d). The first 5 provinces with the highest number of sheep and goats are Van, Konya, Şanlıurfa, Diyarbakır and Ankara, respectively. These five provinces account for 22% of Turkey's ovine livestock. The sheep number of Turkey increased by 48% between 2002 and 2019, from 25.2 million to 37.3 million; goat number increased by 65% from 6.8 million to 11.2 million. In other words, the number of sheep and goats, which was 31.9 million in 2002, reached 48.5 million in 2019 (Anonymous 2020 d).

Table 1.2. Turkey's sheep and goat meat production by years (Anonymous 2015).

	Number of slaughtered animals (thousand heads)		The amount of meat produced (tonnes)		Average Carcass Weight (kg)	
	Sheep	Goat	Sheep	Goat	Sheep	Goat
1991	7,927	1,198	128,626	19,570	16.20	16.30
1993	6,869	959	112,806	16,166	16.40	16.90
1995	5,494	843	102,115	14,124	18.60	16.80
1997	6,488	922	116,104	15,592	17.90	16.90
1999	7,105	1,309	132,476	23,693	18.60	18.10
2001	4,747	879	85,661	16,138	18.00	18.40
2003	3,554	607	63,006	11,487	17.70	18.90
2005	4,145	689	73,743	12,390	17.80	18.00
2007	6,429	1,256	117,524	24,136	18.30	19.20
2009	3,997	606	74,633	11,675	18.70	19.30
2011	5,480	1,254	107,076	23,318	19.50	18.60

Although the increase in the number of sheep and goats in recent years makes us happy, the fattening carcass yield has not reached the desired level on average. Although the average carcass weight has increased each year, it has not reached the desired level. When considered in terms of yield per animal, it is far behind the desired level. Especially in our sheep breeding, the level of meat and milk production is quite insufficient when compared to the developed countries in livestock production. The fact that our current sheep stock consists of low-yielding breeds prevents this yield level from increasing. Almost all of our sheep population consists of indigenous breeds such as Ak Karaman, Mor Karaman, Kıvırcık, Dağlıç, Karayaka, Chios and Avesi. None of them can be compared with beef breeds in terms of criteria such as daily body weight gain, adult or fattening body weight, feed conversion level, carcass weight, and carcass yield. Although the meat of Kıvırcık and Karayaka is very popular in terms of taste, the others are not sufficient in terms of quality. In addition to causing a great loss of time and economy, the lack of a conscious livestock breeding also causes the meat produced to be of poor quality and tasteless. However, when we look at the structural features and quality of our pastures, the importance of animal foods in nutrition, consumption habits, and employment with low capital, sheep breeding has a great importance for Turkey (Özen et al. 2015).

Livestock in Turkey is experiencing serious structural, financial and technical problems today. The most important problem among these is the ones related to feeding. Because, first of all, feeding seriously affects the yield and quality of the products obtained (Özen et al. 2015).

Overview Of The Animal Feeding

Since ancient times in Turkey, livestock has been going on pasture. However, in recent years, the previous pasture quality and pasture size have decreased due to the changing climate structure depending on seasonal changes and the progress of mechanization in agriculture. There are many more reasons why this could happen. For example, unconscious grazing, wrongly applied agricultural policies, insufficient irrigation resources, pesticides used, etc.

The most important deficiencies in both bovine and ovine feeding in Turkey is the inability to provide adequate high quality roughage. Despite the innovations developed in agriculture, the production of high quality roughage plants is still not sufficient. While many countries use straw as an animal bed, barley or wheat straw is the main source of roughage used today in Turkey. Especially in ovine feeding, at least half of the roughage should consist of legumes such as alfalfa or vetch (Özen et al. 2015).

In Turkey, the roughage deficit is tried to be filled with concentrated feed. As such, the breeder cannot make enough profit from livestock. There are also insufficiency and imbalances in the use of concentrated feed. It is well known that the amount of concentrated feed used in feeding cattle and sheep throughout Turkey is lower than it should be used. The route followed throughout Turkey consists of giving a single type of factory feed, sometimes more than necessary and sometimes in small amounts, in addition to straw or poor quality pasture and meadow grasses (Özen et al. 2015).

Sheep Feeding

Sheep can consume all kinds of roughage very easily, as well as all kinds of grain and food industry by-products. The feeding of the sheep varies according to the dry period, the period when the ram will be added, whether it is in lactation and even according to the season, climate and breed type. There are some important periods in the feeding of sheep. These are mating, pregnancy, lactating period, and dry period. In addition to these, there is also a lamb feding (Anonymous 2020 c). In order to make a good lamb fattening, first of all, lambs should be fed very well from birth.

Lamb Feeding:

First of all, if we want to make a good lamb fattening, healthy and normal weight lambs should be obtained. Thus, they will be both resistant to diseases and will show high live weight gain. (Çolpan 2014).

The most important point of obtaining high yield is to obtain healthy offspring. The first rule in this regard is to give the lamb a sufficient amount of colostrum on the first day after birth. During this period, lambs can easily have diseases such as diarrhea and respiratory system. Different from normal milk, colostrum contains biological preservatives such as albumin and globulin. In addition, colostrum is high in some vitamins and minerals, especially vitamins of group A, E and B. In the first 4 hours after birth, these substances that provide immunity are found at the highest level in the colostrum. In the following process, the amount of this substance gradually decreases (Çolpan 2014).

Table 7. Composition of colostrum and normal milk in sheep, % (Çolpan 2014).

Nutritional Ingredients	Colostrum (1. day)	2-6. day	7-27. day
Total dry matter	39	22.5	22
Fat	17.2	10.7	9
Protein	19.5	7.1	5.5
Lactose	1.6	4	5.5
Minerals	1	0.9	0.8

Table 7.1 Change of nutrients in sheep colostrum over time (Küçük 2020).

Nutritional Material	1 hour after birth	12 hours after birth	24 hours after birth
Dry matter %	29.6	25.3	22.6
Fat %	10.5	9.2	8.8
Total protein %	15.9	12.3	9.4
Casein %	6	5.4	5.2
Seroprotein %	9.5	6.4	3.7
Immunoglobulin %	5.1	0	1.1
Lactose %	2.8	3.7	4.3
Ash %	1.4	0.9	0.9
Ph	6.37	6.42	6.5
Intensity	1,056	1,046	1,042

The absorption ability of these protective substances from the digestive tract of lambs continues until the first 24 hours at most. Therefore, in the first 4 hours after birth, lambs should receive colostrum of at least 50 ml per kg body weight. Motherless lambs should be given colostrum from another sheep or artificial colostrum (Çolpan 2014).

Table 8. The amount of colostrum that lambs should consume (Çolpan 2014).

Lamb's age (days)	Amount given, ml/day	Repast
1	250-275	6 to 8
2 and 3	250-300	4 to 6

When the lambs are 1 week old, lamb starter feed and legumes should be given (Çolpan 2014).

Lamb Raising Methods

1. Milk feeding of lambs
2. Early weaning
3. Feeding with milk replacer feeds

Nutrition of Lambs with Milk;

Whether the lambs will be used as a breeder or to be fattened, feeding with milk for 12-16 weeks is the most appropriate time. After the lambs receive the colostrum, they are started to be fed with milk. After the lambs are one week old, they are fed ad libitum with lamb starter feed (16-18% CP) together with high quality dry alfalfa. If the young lambs are grazing in the pasture, it is recommended to give 100-200 gr of lamb starter feed daily (Çolpan 2014).

Table 9. Lamb starter feed samples, % (Çolpan 2014).

Feed Ingredient	1	2
Barley	0	24
Corn	53.2	20
Oat	0	14
Alfalfa flour	25	0
Soybean meal	20	12.5
Bran	0	28
DCP	1.3	0.5
Trace minerals	0.3	0.5
Vitamin	0.2	0.5
Total	100	100

Raising Lambs by Early Weaning:

This method is generally preferred by business owners who can sell sheep's milk. Lambs are weaned after being fed with milk for 5-6 weeks. From the first week, the lambs are fed with lamb starter feed. When the lambs are 5 weeks old, they will start to consume 300 g of concentrated feed. Concentrated feed should have at least 16% crude protein. Feeding them with high quality alfalfa grass during this period will ensure that the rumen development is more smooth. In the studies, it was observed that the live weight of the lambs weaned at 5-6 weeks reached 12.5 kg (Çolpan 2014).

Feeding With Milk Replacer Feeds:

Generally, this feed is used for raising motherless lambs, in cases where the mother's milk is insufficient in multiple lambings, when the mother has no milk, has mastitis or does not accept the offspring. It is started to be used following the colostrum period. Milk replacer contains at least 30% fat and 25% milk protein on a dry matter basis. The level of lactose should not exceed 35%. 230-340 grams of this feed can be dissolved in a liter of water and given as 1.5 L per lamb. It can be used up to six weeks of age. Milk replacer feed samples are shown in table 10 (Çolpan 2014).

Table 10. Milk replacer feed samples % (Çolpan 2014).

Feed Ingredient	1	2	3
Dried skim milk powder	63	70	71.4
Glucose	20	8	0
Sodium caseinate	17	0	0
Internal fat	0	0	26.6
Brewer's yeast	0	5	0
Emulsifier	0	0	2
Milk fat	0	17	0
Vitamins (A,D,E)	X	0	X
Crude protein %	30	31	25
Crude oil %	16	16	0
Lactose %	26.5	0	42.5

Feeding of Lambs Drinking Milk:

In this method, lambs are fed in a closed place. In some cases, sheep cannot meet the nutritional needs of their lambs. In these cases, an energy-rich and delicious compound feed is prepared. In order to

improve the rumen function early, it is used to this food in 7-10 days. Quality legume roughage should be given with this feed.

LAMB FATTENING

Lamb fattening is the most common fattening in the world. Lamb fattening in the pasture, which is common in Turkey and in the world, leaves its place to fattening done in the barn (Özen et al. 2015). For lambs, lamb rearing and fattening method; First of all, lambs should be accustomed to a ration consisting of unbroken grain from 4 weeks of age. It should be weaned at 6 weeks of age. Fattening should be continued with the same ration until the most suitable selling weight is reached (Özen et al. 2015).

Fattening is to increase the yield and quality of meat with a balanced ration containing all the nutrients needed by the animal. For this, the lamb's live weight gain and benefit from feed should be at the highest level. Live weight gain in a lamb occurs in the form of protein and mineral increase in the body.

Energy and Nutrient Needs of Lambs

Energy Need:

Energy needs for lambs are of great importance. The energy need of lambs with a live weight of 10-20 kg, which are weaned early, is 2.60 Mcal/kg ME. For lambs with 30-40 kg body weight, 2.50-2.60 Mcal/kg ME is sufficient. In energy deficiency, live weight and resistance to infections decrease in young fattening lambs. Energy and nutrient needs of lambs with different body weights and newly started fattening are shown in Table 11 (Çolpan 2014).

Table 11.Energy and nutrient needs of newly fattened young lambs (15-20 kg LW) (Çolpan 2014).

Weeks after arrival at the feedlot			
Property	1.	2.	3-4.
Feed consumption, DM, kg	0.2	0.4	1
Feed consumption, %LW	1	2	5
Crude protein, %	18	16	15
Ca, %	0.36	0.37	0.37
P,%	0.24	0.23	0.23
ME, Mcal/kg	2.60	2.60	2.60
Ration: 85% concentrate + 15% roughage.			

Protein Needs:

One of the most important nutrients in lamb fattening is protein. Protein shows an exogenous qualification as a building material in the animal organism, and the need for protein is higher in animal growth, that is, in live weight gain. Crude protein requirement of early weaning lambs (10-20 kg CA) is 16-18%. The protein requirement of animals with a higher body weight (30-40 kg CA) is accepted as 13-14%. Average live weight gain of animals during this period is 250-300 g/day (Çolpan 2014).

Mineral Needs:

Mineral needs of fattening lambs are more important than adults. Salt is important in lambs grazing in the pasture, and deficiency can be observed. For this reason, salt can be used at a rate of 0.50-1.00% in the rations of lamb. Urinary stones (Urolithiasis) are more common in male lamb fattening. In such cases, a large of salt (3-5%) can be added to the lamb rations. The aim is to ensure that the animal consumes more water. The water requirement of the lambs is between 3-7 L per day depending on the amount of protein, salt in the ration and environmental conditions. Calcium and phosphorus play a role in the development and growth of lambs. In its deficiency, bone growth stops and rickets occurs. Calcium and phosphorus levels of lambs should be 0.35-0.70% and 0.17-34%, respectively. Urinary stones (Urolithiasis) are a major problem in male lamb fattening. For this reason, Ca/P should be regulated as 2/1. In order to prevent the formation of this disease, 0.5-1.0% NH_4Cl or NH_4SO_4 can be given to the ration orally for 3-5 days, 7-14 g per animal per day. 3-5% NaCl is added to the ration and lambs should be given plenty of good quality water. Sulfur should be regulated according to the N/S ratio in the ration. This ratio should be in the form of 10:1. According to the ration dry matter, the sulfur requirement of young lambs is 0.18-0.26%. Na_2SO_4 is recommended as a source of sulfur, especially in diets that include urea. This Na_2SO_4 amount should be 0.40% (Çolpan 2014).

Lamb Fattening Types

The speed with which lambs for butchery reach their slaughter weight after weaning depends on feed costs and market meat slaughter prices. Lambs for butchery should be fattened by the most appropriate method after the lambs to be used as breeders are separated (Küçük 2020). In determining the slaughter time in lamb fattening, the breeder's own program is also important, as well as the meat and feed prices (Çolpan 2014).

1. Intensive lamb fattening

2. Extended lamb fattening

3. Yearling lamb fattening

4. Dairy lamb fattening (Çolpan 2014).

Intensive Lamb Fattening:

It is a form of fattening made with high quality roughage and concentrated feed until the lambs are weaned at an early age of 4-6 months and reach a live weight of about 40 kg. Breeders who want to buy two lambs a year, want to wean the lambs early because the sheep's milk is valuable. Therefore, weaning of lambs is usually ensured when they reach the age of six weeks. It is planned to give the lambs an average of 100-250 g of dry alfalfa grass and 300 g of concentrated feed per animal per day. These amounts are increased over time until the fattening period ends (Çolpan 2014).

Table 12. The energy-protein balance that should be in the rations to be prepared for lambs is shown in the table below (Küçük 2020).

	Lamb, LW, kg			
	20 kg	30 kg	40kg	50 kg
Ration energy, Mcal/kg KM	Crude protein ratio corresponding to ration energy, %			
3.1	18.2	17.5	16.8	15.5
2.87	16.5	15.8	13.8	12.6
2.63	14.5	13.5	11	10
2.39	12.8	11.8	9.2	8.6

Extended Lamb Fattening:

In this form of fattening, it is generally applied in regions with quality pastures where there is no shortage of pasture. This form of fattening is also done in order to reduce the cost of feed in enterprises that buy one lamb per year. After the lambs are weaned, they are fattened by grazing in the pasture, up to 6-7 months of age, by trying to reach a live weight of around 45 kg. However, in areas with low pasture quality, roughage and concentrate feed should be supplemented depending on the situation (Çolpan 2014).

Yearling Fattening:

It is a form of fattening done in order to reduce the cost of feed after the lambs are weaned, generally in places with bad pastures and to benefit from stubble fields. The animals are taken to a closed place and subjected to a short fattening to reach a live weight of about 60 kg. In this form of fattening, the fat rate in the animals increases as the age of the lambs is advanced. This is generally an undesirable situation (Çolpan 2014).

Dairy Lamb Fattening:

This form of fattening is made to produce a better quality, soft and delicious meat from animals. Of course, the price of meat produced in this way will also be different. In this form of fattening, lambs suck their mothers and are fed by supplementing with extra concentrated feed. After the lambs are one week old, they are fed with ad libitum concentrate in addition to milk. Business owners who can evaluate milk can also use milk replacer instead of milk. It is also supported with good quality roughage. The amount of roughage is reduced towards the end of the fattening. If needed, vitamin and mineral supplements can also be given. Lambs start this type of feeding at one week of age and are fattened up to 8 weeks of age. In another measure, male lambs are sent to slaughter when they reach a body weight of approximately 15 kg and female lambs of approximately 12 kg. The negative aspect of this form of fattening is that diseases such as diarrhea, constipation, enterotoxemia, and pneumonia can be observed more frequently than normal (Küçük 2020, Çolpan 2014).

Table 13. Different nutritional regimens applied after weaning in butchery lambs sent to slaughter with 43-48 kg body weight (Küçük 2020).

	Daily live weight increase, gr	Time taken to slaughter, days	Comment
Pasture grazing only	50-250	150-250	Daily live weight gain is low in pasture fattening made without grain feed.
Finishing in pasture	50-250	150-250 (additional 3-6 weeks of grain feeding)	Grain feed supplement is made according to the quality of the pasture.
Feeding with grain in a closed barn	325	100-400	From weaning to slaughter, the feed conversion ratio is 4:1, and greasy carcass is obtained in grain-maize-weighted feeding.
Feeding with coarse, concentrated feed mix	250	100-180	Feed conversion ratio is 6:1.

LIVE Yeast *(Saccharomyces cerevisiae)* **FROM PROBIOTIC MICROORGANISMS**

Antibiotics were used to control pathogenic microorganisms in the ruminant digestive system, to prevent negative events of rumen fermentation, and to increase the yield performance of the animal. Antibiotics, which have been used as growth promoters until recently, reduce the effectiveness of beneficial

microorganisms along with pathogenic bacteria in the intestine (Kocaoglu Güçlü et al. 2009). These additives added to feeds not only promote performance, but also have side effects that seriously damage human and animal health (Erdogan 1999). Due to the use of antibiotics along with feeds to animals fed for the purpose of animal food production for humans, resistance occurs by microorganisms against antibiotics used in humans (Cengiz 2016). Consumption of these foods with antibiotic residues leads to toxicity, cancer, unwanted harmful bacteria in the intestine, as well as the death of beneficial bacteria such as Lactobacillus, resulting in deterioration of the intestinal flora (Erdogan 1999). Due to these harmful effects on human and animal health, antibiotics used in animal nutrition for the purpose of growth factor were first banned in Sweden in 1986 and in the European Union in 1999. In Turkey, all antibiotics used in animal feed were banned in 2006 (Gümüş et al. 2014).

The need to use various feed additives is increasing day by day in order to ensure the development of beneficial bacteria in the rumen, to reduce the number and efficiency of pathogenic microorganisms, to increase live weight and carcass yield, and to facilitate adaptation to bad conditions (Budak et al. 2019). Antibiotics, hormones and hormone-like substances used as feed additives in ruminant feeding have recently been replaced by feed additives such as probiotics, prebiotics and enzymes (Gümüş et al. 2014).

Probiotic

The term probiotic was first coined by Nobel Prize-winning Russian researcher Elie Metchnikoff. Thinking that there was a reason why the villagers in Bulgaria lived so long, he started his research. In his impressions, introduced us to probiotic bacteria, thinking that the reason for this long life is related to consuming too much yogurt and fresh fermented milk products (Kocaoğlu Güçlü ve ark. 2009).

Probiotics are feed additives that are an alternative to growth factors in animals. The word probiotic, which is a term of Latin origin, means 'for the living', which is the opposite of the meaning of antibiotics 'against the living' (Erdogan 1999).

Probiotics regulate the microbial balance in the digestive system in order to increase the feed utilization of farm animals. While doing this, they prevent the growth of pathogenic microorganisms and their harmful effects. They are biological products containing a group of live bacteria, fungi and yeasts or their cultures, which are mostly Gr (+) and facultative anaerobes, and can also be defined as microbial additives (Alic Ural et al. 2017).

A good probiotic that is desired to be used should have the feature that will help to provide resistance and endurance against diseases in animals. It should not be toxic and pathogenic, and it should be able to maintain its vitality and effectiveness in the gastrointestinal tract. In addition, it should have an increasing effect on beneficial microorganism activities in the digestive system and provide a negative environment for pathogenic microorganisms (Sarıpınar et al. 2005). Microorganisms used as probiotics in ruminants are generally Lactobacillus, Bacteriodes, Enterococcus, Streptococcus, Pediococcus,

Bacillus and Bifidobacterium spp bacteria, Aspergillus spp fungi and Saccharomyces cerevisiae yeasts (Kocaoğlu Güçlü et al. 2009).

Table 15. Probiotic Microorganisms Used as Feed Additives (Tunç 2012).

The Bacteria	
Bacillus	Coagulans lentus Lincheniformis, pumilus, subtilis
Bacteroides	Amylophilus, capillous, ruminocola, suis
Bifidobacterium	Adolescentis, animalis, bitidum, infantis, longum, thermophilum
Lactobacilus	Acidophilus, brevis, bulgaricus, casei, cellebinous, curvatus, delbruekii, fermentum, lactis, plantarum, reuterii
Pediococcus	Acidilacticii, cerevisiae, pentosaceus
Streptococcus	Cremoris, diacetylactis, faecium, intermedius, lactis, termophilus
Colostridium	Butyricum
Leucanostoc	Mesenterodies
Funguses	
Aspergillus	Niger Oryaze
Yeasts	
Saccharomyces	Cerevisiae
Torulopsis	Candida

The benefits of microorganisms used as probiotics can be listed as follows;

- Reducing the growth of pathogenic bacteria by producing lactic acid in the environment, and limiting their reproduction by producing hydrogen peroxide.
- Helping beneficial bacteria to multiply by providing a suitable environment.
- To avoid pathogenic bacteria by multiplying rapidly in the intestine and clinging to the intestinal surface, and also to compete for food.
- To increase feed consumption by giving flavor to the feeds that animals eat and to promote the synthesis of B group vitamins.
- To secrete enzymes such as lipase, cellulase, protease and proteinase.

- To reduce toxic amine and ammonia in the intestines and to prevent the proliferation of bacteria that produce them.
- Ensuring the synthesis of acetate, which is a precursor for fatty acid production (Sarıpınar et al. 2005).

Yeasts

Today, *Saccharomyces cerevisiae* is the most used probiotic. *Saccharomyces cerevisiae* (probiotic), recognized as a microbial feed additive, is a live yeast culture. Yeast cultures used as feed additives consist of yeast with preserved fermentation efficiency (for example, *Saccharomyces cerevisiae*) and medium, the growth medium of yeast (Canpolat et al. 2015). The dry matter of the yeast cell contains 40-60% crude protein, 25-35% carbohydrates, 7-15% fat, 5-11% inorganic matter. Phosphorus, potassium, magnesium, calcium and sulfate are the most abundant inorganic substances. Yeast cell is also a good source of vitamins B (Budak ve ark. 2019). However, it is poor in terms of fat-soluble vitamins (vitamins A, D, E, and K). Ergosterine, which is the basic ingredient of vitamin D2, is abundant in yeast cells (Öztürk 2008).

Saccharomyces cerevisiae live yeast cultures added to ruminant rations are in powder form and can be added to mixed feeds as 106-107 g feed (Canpolat et al. 2015).

Figure 1. The mechanism of action of Mayan culture in the rumen (Öztürk 2008).
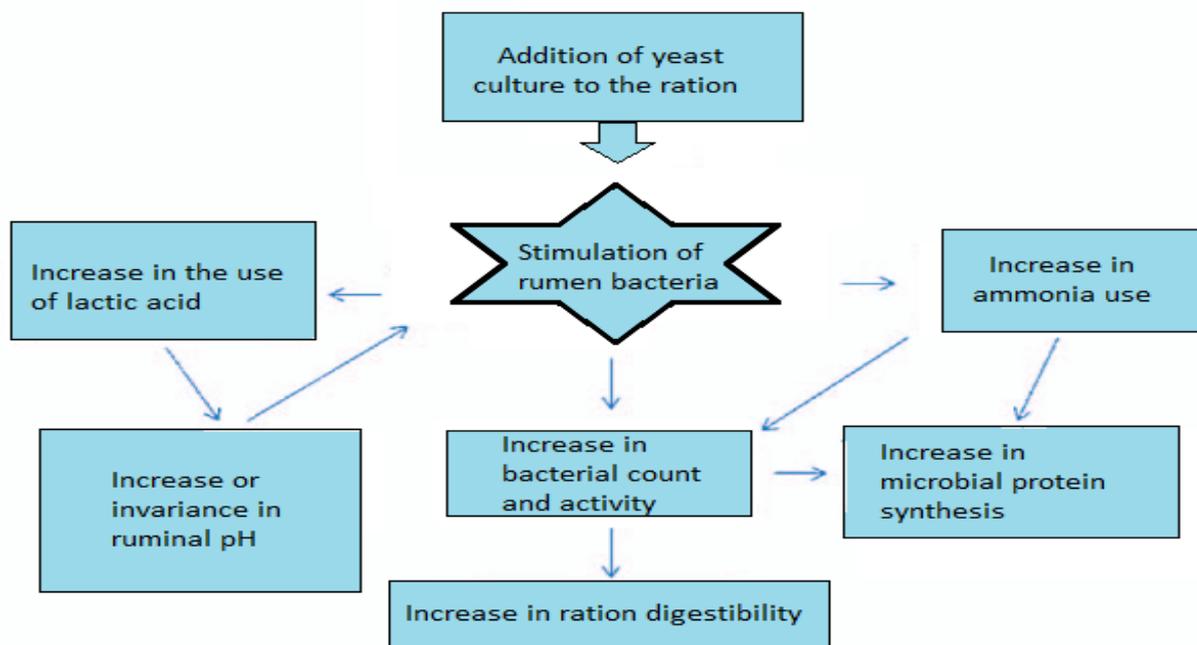
By using O_2 in the rumen of *Saccharomyces cerevisiae* ruminants, it increases the number of anaerobic rumen microorganisms with cellulolytic, hemicellulolytic, pectinolytic and amylolytic properties and increases the digestion of feed. Thus, it has been noted that it contributes to the development of rumen

flora by increasing the total volatile fatty acids, acetic acid and propionic acid concentrations (Kocaoğlu Güçlü et al. 2009).

Due to the low metabolic activities of yeasts used as probiotics in the rumen, they do not directly participate in the digestion of nutrients in the rumen. however, since yeasts can produce malic acid, short chain peptides, amino acids, carbonic acids, vitamins and lipid compounds, it can stimulate the activities or growth of bacteria present in the rumen environment. And by consuming the oxygen in the rumen, they can prepare a suitable environment for anaerobic bacteria to live. Ruminants generate methane gas as a result of fermentative digestion in the rumen, thus they contribute slightly to the increase in methane gas in the atmosphere (Tunç 2012). Although its effect cannot be fully explained, it is thought that the decrease in methane production with the use of yeast as a feed additive may be due to the increase in the number of bacteria using lactate in the rumen and the conversion of lactic acid to propionic acid (Kocaoğlu Güçlü et al. 2009). For this purpose, the amount of propionic acid in the environment is increased with probiotic applications to the rumen. It is stated that there is a decrease in methane production due to the reduction of hydrogen and formic acid production, which is the first substance of methane (Tunç 2012).

As a result, lamb fattening performance is at a low level when we look at the lamb fattening data in Turkey. This situation can be brought to the desired level by providing the most suitable breed, fattening type, quality feed raw material according to the current situation. In addition, the use of natural feed additives to increase performance can contribute to increasing feed efficiency and yield performance. It is thought that positive results can be obtained with natural feed additives such as probiotics and prebiotics used in the studies. At this point, some variables such as the type, breed, age, care and feeding conditions of the animal, and the dose of the additive used may affect the result positively or negatively. Therefore, we need to do much more work on this issue.

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The Breeding Of Karacabey Merino In Farm Conditions Of Balikesir Province

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Abstract

Karacabey Merino Sheep, common in the Marmara region in the Northwest Turkey, is reared for meat and wool production. It was genetically developed by crossbreeding German Mutton Merino (96%) and Kivircik (4%). The breeding project of Karacabey Merino in farm conditions was started by TAGEM in the central villages of Balıkesir in 2006 and continues in 5-year periods.

In this study, it is aimed to increase the meat yield of Karacabey merino which is reared in farms in Balıkesir central villages by breeding. Between 2016-2020, in the third 5-year period, lambs were selected for breeding according to their birthweights and 90th day live weights.

In this study, we evaluated the correlation among lambing percentage, birth weight, 90th day weight and lamb survival rate. In 2020, when the lambing percentage was the lowest, birth weight, 90th day weight and survival rate of lambs were 4,32±0,01, 29,5±0,1and 74,24%, respectively. In 2019, which is one of the highest lambing percentge, the birth weight, 90th day weight and survival rate of lambs were 4,02±0,01, 28,0±0,1 and 95,34%, respectively.

In this study, it was found that the effect of lambing percentage on birth weight and 90th day weight was insignificant.

Keywords: Karacabey Merino, lambing percentage, survival rate , birth weight, 90th day weight

Determination of lactation curve parameters utilizing Prasad model in Anatolian Buffaloes of different ages

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Abstract

This research was carried out to determine the lactation curve parameters of 3, 4 and 5 years old Anatolian buffaloes. For this purpose, 2233 data of 316 Anatolian buffaloes born in Tokat province and its districts in 2012 and later were used. Lactation curve parameters (a, b, c and d) were determined by the STATISTICA (5.0) program. Lactation curve parameters (a, b, c and d) were determined by the Prasad model. The coefficients of determination for three, four and five year old buffaloes were determined as 97.72, 96.75 and 97.36, respectively. Similarly, the mean of error squares was determined as 0.047, 0.082 and 0.052 for three, four and five year old buffaloes, respectively.

Keywords: lactation curve, buffalo, mean of error squares, coefficients of determination

Growth and Development Characteristics of Lambs Born From Zom Sheep up to the Weaken Perıod [1]

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[1] This Project was supported by General Directorate of Agricultural Research and Policies and carried out by GAP International Agricultural Research and Training Center

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Abstract

The aim of this study covers the activities of Zom Sheep Breeding by Public I. Sub-Project, which is has been carried out in Diyarbakır Province, between 2018-2021. It is carried out under the project leadership of the GAP International Agricultural Research and Training Center Directorate, in coordination with Diyarbakır Provincial Sheep and Goat Breeders' Association and Diyarbakır Provincial Directorate of Agriculture and Forestry.

In the study, the mean and standard errors of lambs in the herd were 3.6±0.01 at birth weight (Lw0), 30th day body weight (Lw30), 60th day body weight (Lw60) and 90th day body weight (Lw90), respectively. 10.36±0.03, 16.45±0.05 and 22.92±0.07 kg were found. The mean and standard errors of daily live weight gains at birth – 30th day (Lw30 - DLWG), birth – 60th day body weight (Lw60 - DLWG) and birth – 90th day body weight (Lw90 - DLWG) were 227, It was found to be 41±1.13, 214.41±0.74 and 214.34±0.73 g. . The effects of year, herd, birth type, gender and maternal age on live weights of all periods were found to be significant.

As a result of the study, birth weight (Lw0), 30th day body weight (Lw30), 60th day body weight (Lw60) and 90th day body weight (Lw90) and birth - 30th day body weight (Lw30 - DBWG), birth It was observed that there was a positive improvement in 60th day body weights (Lw60 – DBWG) and birth - 90th day daily body weight gains (Lw90 – DBWG).

Keywords: Zom, Vitality, Lamb , Female, Twin

Morfological Characteristics Of Coloured Angora Goat[1]

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Abstract

This study was carried out under the project leadership of the GAP International Agricultural Research and Training Center Directorate, in coordination with Siirt Province Sheep and Goat Breeders' Association and Siirt Provincial Directorate of Agriculture and Forestry.

This research is a morphological identification study carried out on Colored Angora goats reared in Siirt province and its districts in Turkey. In this study, which was carried out to determine the morphological characteristics of colored Angora goats according to different ages and genders, measurements were taken from 13 goats and 137 goats. In terms of some characteristics, mean and standard errors in goats and bucks were 39.3±0.30 and 52.4±1.6 kg, live weight, withers height 59.9±0.32 and 69.9±0.91 cm, body length 64.7±0.39 and 75.4±1.62 cm, chest width 15.5±0.16, respectively. and 18.8 ±0.55 cm, chest circumference 77.2±0.44 and 89.1±1.53 cm, shank circumference 8.2±0.08 and 9.7±0.24 cm, head length 16.3±0.1 and 18.4±0.39 cm, head width 11.2±0.09 and 12.6 ±0.35 cm, forehead length 5.5±0.07 and 6.7±0.31 cm, ear length 12.9±0.25 and 11.0±1.05 cm, ear width 6.7±0.11 and 6.2±0.47 cm, horn length 25.5±0.41 and 51.3±2.46 cm, back length 39.1±0.3 and 43.8±1.1 cm, pelvis width 18.8±0.2 and 21.1±0.6 cm, tail length 12±0.1 and 13.9±0.5 cm, scrotum circumference 25.6±0.84 cm, scrotum length 13.6±0.57 cm, and nipple length 2.6±0.1 cm. was done.

Keywords: Siirt, Coloured Angora Goat, Morfological Characteristcs

Determination of the Effect of Some Environmental Factors on Survival Until Breeding Age of Akkaraman Lambs: The Case of Karaman Province

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This study was carried out in order to determine the effects of some environmental factors on the survival of 1101 lambs left for breeding in 2019 in 27 farms in the Akkaraman-1 project (Project Code: 70AKK2011-01) carried out in the province of Karaman within the scope of the Nationwide Genetic Improvement of Small Ruminants in Farm Condition. In the study, Binary Logistic Regression Analysis, which is a multivariate statistical model, was used. In the analysis, maternal age (2, 3, 4, 5, 6, 7 and 8≤), gender (female, male) and birth type (single, twin) were evaluated as categorical variables, and birth and 120th day body weight as continuous variables.

In the study, it was determined that the effect of gender, which is one of the environmental factors, on survival is significant ($p<0.05$), while the effect of other factors is insignificant ($p>0.05$). It was observed that the survival of single born lambs was 1.611 times ($p=0.075$) compared to twin lambs, and the survival of male lambs was 2.117 times higher than female lambs ($p=0.039$). While the effect of maternal age on the viability of the lambs was statistically insignificant, the survivability of the lambs decreased as the maternal age increased. It was determined that the survivability of lambs born to 2, 3, 4, 5, 6 and 7 years old ewes compared to 8 years old ewes was 1.629, 1.152, 1.407, 1.502, 1.031 and 0.764, respectively. It was determined that 907 (82.38%) of 1101 lambs reached breeding age and 194 (17.62%) died.

As a result, it was concluded that attention should be paid for the care and feeding conditions of the twin and female lambs selected as breeders, more brood lambs should be separated considering the survivability until the breeding age and, the under-ram ewe should not be older than 6 years of age.

Keywords: Akkaraman, lamb survival, breeding lamb, birth weight, weaning weight

Methods Used to Protect Proteins From Rumen Digestion

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Abstract

This review has been prepared to examine the methods used to protect proteins from rumen degredation in ruminants. Microbial protein synthesis is insufficienttomeetthehighquality protein requirement in fastgrowingorhighyieldingruminants. Providing quality protein sources directly to ruminants without any processing will cause them to be converted into ammonia that can be obtained from cheaper sources and cause an unnecessary increase in feed cost (Morgan, 1985). For this reason, the protection of protein sources with high biological value from rumen fermentation, that is, the concept of by-pass protein gains importance. In this study, heat treatments, chemical applications and various coating methods used to protect high quality proteins from rumen digestion were compiled.

Keywords: by-pass protein, ruminant, digestion

INTRODUCTION

In order to meet the high quality protein requirement of fast growing or high yielding animals, more than the amount provided by rumen microorganisms is needed (Waltz and Stern, 1988). Providing quality protein sources directly to ruminants without any processing will cause them to be converted into ammonia that can be obtained from cheaper sources and cause an unnecessary increase in feed cost (Morgan, 1985). For this reason, the protection of protein sources with high biological value from rumen fermentation, that is, the concept of by-pass protein gains importance. To protect high quality proteins from rumen digestion; heat applications, chemical applications and various coating methods are used.

Heat Treatments

This treatments is the most common method used to reduce ruminal protein digestion and to provide postruminal amino acid supply (Mustafa et al., 2000). In this method, heat is applied in different ways to feed proteins consisting of different fractions. The optimum temperature applied varies from protein in one feed to another.

Dry Tempature Treatments: Dry heat is one of the first methods used to protect oilseeds from ruminal digestion. It has been reported that heat treatment of canola pulp at 110°C for 2 hours or at 120°C for 20 minutes reduces ruminal digestion (Mir et al.,1984). In a study examining the effect of rapeseed on ruminal digestion at different temperatures (100°C, 150°C, 200°C for 1 hour), it was stated that the heat applied at 100°C had no effect on ruminal protein digestion and rapeseed reduces ruminal digestion by 18% at 150°C and 52% at 200°C (Lindberget al.,1982).

Moist heat Treatments: Moist heat treatment (autoclave) is an alternative technique to dry heat treatment. MoshtagiNia and Ingalls (1992) applied heat to canola meal at 127°C for 15, 30, 45, 60 and 90 minutes at a steam pressure of 117 kPa. They found that heat application decreased ruminal dissolution, and increased the absorption of canola meal in the small intestine without having a negative effect on dry matter consumption and crude protein digestion. MoshtaghiNia and Ingalls (1995) studied the effect of moist heat on ruminal and intestinal degradation of amino acids in canola meal. They found that the lysine concentrations decreased by 15.9%, 29.2%, and arginine concentrations by 8% and 15.2%, respectively, in canola meal which was heat treated at 127°C under 117 kPa pressure for 15 and 45 minutes.

Extrusion: Extrusion is the process of kneading moistened feed materials in a tube using a combination of moisture, pressure, temperature, and mechanical shear. Aldrich and Merchen (1995) stated in their study that the RUP (Rumen Undegerable Protein) rate of whole-fat soybeans extruded at 104°C was 54.3% in in-situ environment. This rate is 3.4 times the RUP rate of raw soybean.

Jet-Sploding: It is the application of rapid steam heat under high pressure in a short time using the moisture in the seed. The residence time of the seed in the Jet-Sploder and the applied temperature vary according to the core temperature of the seed (Mustafa et al.,2000).

Micronization: It is the rapid treatment of the inside and outside of the feed material with infrared light (Mustafa et al.,2000). Wang et al. (1999) stated that micronization reduces the rumen digestion of total and essential amino acids in full-fat canola seeds by reducing dissolution and increases the slow-digesting amino acid fraction.

CHEMICAL TREATMENTS

Various chemicals are used to protect proteins from ruminal digestion. It is divided into 2 groups as chemicals that combine with proteins and change their structure by denaturizing proteins (Waltz, and Stern, 1989). While formaldehyde application can be given as an example to the group of chemicals that combine with proteins, NaOH (Sodium Hydroxide) (Mir et al., 1984) and acid applications (Waltz and Loerch, 1986) can be given to chemicals that denaturize the proteins and change their structure.

Formaldehyde Treatments: The use of formaldehyde is the most widely used chemical method. Formaldehyde forms reversible cross-links between amine groups and amino acids that reduce digestion in the rumen (Antoniewicz et al., 1992; Waltz and Stern1989). These bonds are generally broken in the acidic environment of the abomasum. Mir et al. (1984) conducted a study on the quality of canola meal protein after formaldehyde application. They stated that although formaldehyde applied at the rate of 0.8g/100g CP (crude protein) reduces ruminal digestion, it has harmful effects on actual digestibility. CP degradability rates of 0%, 0.3%, 0.6% and 0.9% formaldehyde treated soybean meal after 48 hours of incubation were found to be 87,67%, 79.98%, 68.42% and 58.61% respectively (Yörük and Gül,2003). As a result, it is stated that formaldehyde treatment significantly reduces protein and dry matter degradability in the rumen, and this decrease is directly proportional to the formaldehyde level.

NaOH Treatments: Alkaline treatments end with the racemization of amino acids such as methionine and lysine. Mir et al. (1984) reported that NaOH had a protective effect against rumen digestion by treating soybean meal and canola meal with 50% NaOH.

Treating with Blood: Blood is resistant to destruction in the rumen. Therefore, coating the feedstuffs with blood provides physical protection from rumen microorganisms. In a study, fresh blood with sodium citrate was added to soybean meal and canola meal at the rate of 0,5; 0,75; 1,5 and 2L/kg DM, after mixing for 3 minutes in a hobart mixer, it was dried in an oven at 70℃. It has been observed that the application provides rumen protection at all levels (Mir et al.,1984)

Treatment with acids: It is thought that acid treatments reduce protein digestion by changing protein structure and solubility. Waltz and Stern (1989) added 5% propionic acid in dry matter to the rations of Holstein cattle. In their study, they stated that rumen digestion decreased and total amino acid flow increased in the small intestine.

COATING AND ENCAPSULATING METHODS

Films used to encapsulate food to protect against ruminal digestion must have certain properties and characteristics. Coating material; It should not be digested in the rumen of the animal, dissolve in acidic conditions (pH 1.5-2) in the abomasum, provide resistance against microbial attack, prevent other interactions with the content of the mixture, and have mechanical properties such as flexibility-elongation. In addition, the encapsulated product should have a soft surface and appropriate specific weight (Sykora et al., 2007).

Encapsulation Methods

Encapsulation is defined as the encapsulation of the content (main substance) into a second material (encapsulant matrix) (Augustin et al. 2010). Desai and park (2005) explained two basic concepts in microcapsule formation. The first of these concepts is the covering of a single piece (core) by the thin

uniform wall and expressed as "Hen's egg" encapsulation model. The second concept is the embedding of multiple cores into the matrix of the covering material. Various encapsulation methods are currently used. These methods are spray drying, spray freezing/icing/freezing, fluidized bed coating and coacervation.

Spray Drying: Spray drying is based on the principle of mixing the material to be coated and the carrier solution homogeneously and spraying it onto the dryer area. Encapsulation is also a widely used method, as it is effective and economical.

Spray Freezing/İcing/Freezing: Spray freezing is similar to spray drying. However, cold air is used here, as opposed to hot air. The content to be encapsulated and the coating content are mixed homogeneously. The homogenized mixture is sprayed in the spray cooler with an injector or a spinning wheel. Thus, solidification occurs between the coating material and the coated. Oils with low melting points (such as hydrogenated vegetable oil) are used as coating material in encapsulation products produced using this technique. Spray cooling uses 45-122 °C, spray icing uses 32-45 °C (Gibbs et al., 1999), and spray freezing uses very low temperatures at negative °C (Blaine, 2007).

Fluidized Bed Coating: Fluidized bed is an expensive technology based on the method of suspending the coated material from the high velocity air chamber where the sprayed coating material is, by controlling the temperature and humidity (Desai and Park, 2005). The amount of coating applied to be coated the material depends on the time spent in the drying chamber. Because the particles go through the cycle many times, the change in direction of the particle in each pass provides a uniform coating (Shahidi and Han, 1993). Using this method, pH sensitive polymer coated methionine products have been developed.

Coacervation: Coacervation is a complex but effective encapsulation method. A solution formed with 3 immiscible chemical phases is used in coacervation (core, coating and solvent phase) (Blaine, 2007). The coacervative phase then precipitates around the core content, after the coacervative wall is hardened and the microcapsules are isolated from the solution. Core material should not be dissolved in coacervation (Madene et al., 2006).

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Investigations on the Light and Scanning Electron Microscopic Structure of the Lingual Papillae in the Angora Goat (*Capra hircus*): II. Mechanical Papillae.

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Abstract

This study was conducted to examine the light (LM) and scanning electron microscopic (SEM) structures of mechanical papillae on the tongue in the Angora goat (*Capra hircus*). In this study, the tongues of four adult female Angora goats were used. Tongue samples were taken for light and scanning electron microscopic examinations on the dorsal surfaces of the apex, body, root and torus of the tongue and the ventral surfaces of the lingual apex. Three types of mechanical papillae as filiform, lenticular and conical were observed on the tongue of the Angora goat. The filiform papillae were detected in the dorsal surface of the tongue from lingual apex to lingual torus, in the ventro-lateral of the lingual apex and on both sides of the lingual torus. The morphological differences were observed in filiform papillae according to their location in the tongue. The lenticular papillae settled on the center of the lingual torus. Two types of these papillae, irregular-round and pyramid-shaped were identified. The conical papillae were scattered all over the lingual torus, except for the central part and were also seen on the root of the tongue. In the light microscopic examination, it was found that mechanical papillae had a stratified squamous epithelium and a varying degree of keratin layer on epithelial surfaces. By examining the light and scanning electron microscopic structure of the mechanical papillae in the Angora goat tongue their similarities and differences with other domestic and wild ruminant species were determined.

Keywords: Angora goat, tongue, mechanical papillae, light microscopy, scanning electron microscopy

National Project of Anatolian Buffalo Breeding in Farm Conditions

1st Period Findings (2013-2017)

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Abstract

In this study, it is aimed at breeding the Anatolian water buffaloes in Kütahya Province by selection, as a sub-project of the "National Project for the Breeding of Anatolian Buffaloes in Farm Conditions" initiated by the General Directorate of Agricultural Research and Policies under the Ministry of Agriculture and Forestry. Increasing milk yield per lactation and extending lactation period have been chosen as preferred targets. In this study, 1736 data of buffaloes reared in Kütahya province between 2012 and 2016 were used to assess the lactation period and milk yield. The mean lactation period in buffaloes was found to be the highest (226.43±1.45 days) in 2014 and the lowest (194.23±0.91 days) in 2016. Average milk yield per lactation was 842.67±14.79 lt in 2014 and the lowest average yield was observed in 2016 with 783.14±6.83 lt.

Average 1-year-old live weight of Anatolian buffaloes was determined as 191.11±2.11 kg in 2016 and the lowest liveweight was 138.27±2.59 kg in 2014. In female buffaloes, the highest liveweig was recorded as 187.8±1.7 kg in 2016 and the lowest value was 138.68±2.26 kg in 2014.

Keywords: Anatolian Buffalo, Breeding, Lactation Milk Yield, Lactation Period,

Live Weights of the First Breeding Period of Akkaraman Sheep Breed in Cankiri Province

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Abstract

Sheep breeding has an important place in Turkey's animal husbandry and constitutes approximately 57% of farm animals. Although there has been a decrease in the number of sheep in recent years, it has entered a recovery period as a result of the promotion of sheep breeding in the last few years. Akkaramans, which constitute 40-45% of Turkey's sheep stock, are mostly spread in Central Anatolia. Although it is desired to have a high adult body weight in farm animals, some difficulties in reproduction (difficult birth, etc.) and cost increases (more space in housing and transportation, nutrient needs, difficulty in shearing, etc.) will cause growth rate such as genotypic structure and feeding. effects should be taken into account. There is always a need for up-to-date studies to determine the yield and morphological characteristics of sheep.

This study was carried out in 4 elite Akkaraman herds in 2019 and 2020, which were raised in Çankırı Province within the scope of Public Animal Breeding Project. Initial Breeder Weight (IBW) were determined of 299 female and male sheep. As environmental factors affecting these weights, gender, birth type, year of use in breeding and management were taken into account. The IBW values of sheep were found to be 56.95 kg in general. In this period, the effect of gender and year was found to be significant (P<0.001). The IBW values of female and male sheep were determined as 52.11 kg and 61.80 kg, respectively, and 59.01 kg and 54.89 kg in 2019 and 2020. The effect of birth type on IBW was found to be insignificant, 56.86 kg in singles and 57.04 kg in twins. In the study, the effect of enterprises on BWF was found to be significant (P=0.028), and IBW values in these farms were calculated as 55.14, 56.85 57.76 and 58.05 kg. According to the results of this study, it can be said that the IBW values of Akkaraman sheep in these enterprises, which are bred by the public in Çankırı and whose breeding studies are carried out, are at a level that can be considered sufficient.

Keywords: Akkaraman, Birth weight, herd

Maternal Behavior and Its Genetic Basis in Sheep

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Abstract

Sheep are one of the first domesticated animals. Throughout the history, they have been selected for some yield traits, therefore, have evolved into various sheep types and breeds. The ancestors of domestic sheep are Muflon (Ovis ammon musimon), Arkal (Urial) and Argali (Ovis ammon ammon) wild sheep.

Sheep live in social groups with close relationships among their individuals. They demonstrate their basic behaviors in the environment they live in and adapt to the environment. Dam-lamb relations have an important role in social relations and behaviors. Animal behavior is a combined interaction of genetic and environmental factors. Behavior makes it possible for the animal to adapt to changes or in environmental conditions. Experimental studies have shown that specific genes or gene groups can influence animal behavior. Genetic selection involving behavioral traits can be an advantageous strategy to increase the productivity of livestock in various farming conditions by minimizing adverse reactions to changes in the social and physical environment of sheep such as limiting excessive fear of humans and increasing sociability.

Establishment of a strong bond between the dam and lamb soon after birth is very important in reducing lamb deaths. Since lamb deaths are high in the first a few days of life, it is necessary to know that maternity behaviors during lambing is vital to minimize environmental negative effects. It will also be helpful to comprehend that the behavior of the dam and lamb allows controlling the behavioral mechanisms and solving the problems. There are significant differences between breeds and individuals within the same breed in terms of mother and lamb behavior characteristics, which are important for the survival of newborn lambs, however, environmental stimuli also affect these behaviors significantly.

When sheep owners are aware of how sheep behave under various environment conditions, they will use this knowledge to increase the productivity of their animals.

Keywords: Behavior, Dam-lamb relations, Genetic selection, Maternal, Sheep.

The Effects of Fixed-Time Artificial Insemination Protocols on Pregnancy Rates in Sheep

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Abstract

This study was carried out to determine the effects of some fixed-time artificial insemination protocols on sheep pregnancy rates. Five heads of Karacabey Merino rams and 101 heads of Karacabey Merino sheeps were used. The sheeps were reared in the same care and feeding conditions in the Sheep Breeding Research Institute. Sheeps were divided into 4 study groups according to age and weight. Sponge (Esponjavet®, Hipra, Spain) was applied to sheeps in the sponge group (n=26) for 13 days and 300 IU PMSG (Oviser®, Hipra, Spain) was injected on the removal of the sponge. Sheeps in the prostaglandin group (n=26) were treated 2 times with PGF2α (Dinoprost, Enzaprost®; CEVA Sante Animale, France) 7 days apart. Sheeps in the Ovysynch group (n=28) were injected with GnRH (Ovarelin®, CEVA Sante Animale, France) on day 0, PGF2α (Dinoprost, Enzaprost®; CEVA Sante Animale, France) on day 5, GnRH on day 7 (36 hours after PGF2α). Sheeps in the natural oestrous group (n=21) were examined twice a day and the sheeps in oestrus were determined. After the last application, fixed-time artificial insemination was performed in the groups at 55th, 57th, 12th hours and 12 hours after oestrus detection, respectively, using the laparoscopic method and 100×10^6 dose of frozen ram semen. After the insemination, between 12th and 25th days, oestrus was re-examined to detect non-return rate. In the birth period, birth rates were calculated. In the presented study, the oestrus rates were determined as 100%, 80.77%, 7.14% and 100%, respectively. Non-return rates on 25th day were detected as 80.77%, 42.31%, 32.14% and 66.67%, respectively, while birth rates by group order were calculated as 46.15%, 26.92%, 17.86% and 47.62% respectively. As a result, there were no statistical differences between natural oestrus and sponge groups, but higher fertility rates were obtained compared to the prostaglandin and ovysynch groups.

Keywords: Sheep, synchronization, oestrous, progesterone, prostaglandin, Ovsynch, laparoscopy, Fixed-time artificial insemination

The Use of Feed Additivies to Mitigate Heat Stress in Poultry

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Heat stress is one of the most important environmental factors in the poultry industry, affecting poultry performance and causing economic losses. Poultry are homeothermic animals and their body temperature varies between 40.6-41.0°C. The acceptable thermo-neutral ambient temperature for poultry is between 18-22°C for broilers and 19-22°C for layer hens. When the ambient temperature exceeds the thermo-neutral temperature, the temperature balance in the body is disturbed and heat stress begins to be experienced. Since birds do not have sweat glands, when they are exposed to high environmental temperatures, they try to reduce their body temperature by means of conduction, convection, radiation, evaporation, feces and egg laying.

Behavioral, immunological and physiological changes occur during heat stress. Heat stress adversely affects health, welfare and performance in broilers and laying hens. While the body temperatures, blood circulation and peripheral blood circulation of poultry exposed to heat stress increase, visceral blood circulation slows down. These changes lead to limited feed intake and reduced bird production performance, nutrient digestibility and weight gain. In birds exposed to heat stress conditions, body temperature rises, causing an increase in reactive oxygen species (ROS) levels at the molecular level and a decrease in the effectiveness of the antioxidant defense system. The body begins to produce and release heat shock proteins (HSP) to try to protect itself from the harmful cellular effects of ROS. It is known that heat stress increases intestinal permeability and disrupts intestinal integrity, causing the absorption of toxins and the entry of pathogenic bacteria into the body. It has been reported to cause carbohydrate and DNA oxidation in the liver, lipid peroxidation and protein oxidation in the muscles. Various feeding strategies are applied to reduce heat stress. Adding feed additives (such as vitamins, minerals, natural antioxidants, phytobiotics, probiotics, oils and proteins) to the ration is one of the most applied nutritional strategies.

Keywords: heat stress, poultry, feed additives, oxidative stress, HSP, gut health

Effect of Progesterone Added to Ovsynch Protocol at the time of or 2 days after GnRH Injection on Conception

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Abstract

FSH, one of the gonadotropins, plays an important role in the growth of the follicles from the follicular pool to the growth process dependent gonadotropins and reaching the dominant follicle stage. After the dominant follicle (DF) is selected, the effect of LH is very high in the completion of the final maturation of the dominant follicle and in the occurrence of ovulation. High progesterone (P4) (Diestrus and pregnancy CL) suppresses the frequency of LH pulsation. The decrease in blood P4 level leads to an increase in the frequency of LH pulsation and estrogen level. Thus, DF enlarges more and stays longer. When DF reaches a certain size, preovulatory LH increases and ovulation occurs. In this study, it is aim that preventing the suppression of LH pulsations caused by GnRH treatments by applying P4 (Ovsynch+P5 group) 2 days after GnRH injection and if there is a follicle sensitive to LH, this follicle will grow, and sufficient time will be allowed for this follicle to ovulate. Thus, it was thought that more pregnancies would be achieved in Ovsynch+P5 group compared to Ovsynch+P7 (P4 application with GnRH injection) group. In the study, animals were randomly allocated to 3 groups. The first group was named Ovsynch+P5 (n = 19) and PRID was performed 2 days after the GnRH injection. Group 2 was named Ovsynch+P7 (n = 19) and PRID was inserted at the same time as the first GnRH injection of the ovsynch protocol. The third group was the control group (no PRID) and only the ovsynch protocol was performed. The mean pregnancy rates of the groups were respectively 26.3% (5/19), 15.8% (3/19) and 7.1% (1/14). There was no statistically difference between the groups (P>0.05). As a result, although there was no statistically significant difference, the pregnancy rate in the Ovsynch+P5 group was numerically higher than the other groups.

Keywords: Dominant Follicle, GnRH, Ovsynch Protocol, Progesteron

The Occurance of Arsenic, Lead and Cadmium Residues in Cattle Feed Collected in Kirikkale, Turkey

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Abstract

The aim of this study is to investigate the occurance of arsenic, lead and cadmium metal residues in 15 cattle feed collected from some ruminant enterprises within the borders of Kırıkkale Province. The quantitative analysis of the arsenic, lead and cadmium levels of the samples were analysed by ICP-MS. Arsenic and lead residues were found in all of the collected samples, while cadmium residues were found in 13 (86.67%) of the collected samples. In the samples with heavy metal residues; the mean value±standart deviation for arsenic was found as 0.1475±0.1060 mg/kg ranged from 0.027-0.385 mg/kg. The mean value±standart deviation for lead was found as 0.1944±0.1074 mg/kg ranged from 0.050-0.403 mg/kg. The mean value±standart deviation for cadmium was found as 0.0382±0.0079 mg/kg ranged from 0.023-0.053 mg/kg. The maximum tolerable limit for arsenic in feed is 2 mg/kg, for lead in feed stuff is 5 mg/kg, for cadmium in cattle feed is 1 mg/kg (The Republic of Turkey's Ministry of Agriculture and Forestry Announcement No: 2014/11). The results of this study showed that the detected values were below the tolerable limit. Therefore it is suggested that the heavy metal pollution in terms of arsenic, lead and cadmium is not pose a risk for consumer health.

Keywords: Arsenic, cadmium, cattle feed, heavy metal, lead.

The Effects of Addition of Silymarin and Thymol-Carvacrol Extracts to Saanen Goat Diets on Body Condition Score, Feed Consumption, Live Weights of Born Capricorns and Breeding Season

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In saanen goats in which silymarin and thymol-carvacrol extracts were added to their mixed feeds during approximately one month from the 120th day of pregnancy to birth and one month after birth, feed consumption increase rates and body condition scores in the postnatal period, birth weights of newborn kids and kids Evaluations and comparisons were made by examining their reach to mating season weight. When compared with the control group and considering the previous year, significant differences were observed in these parameters. The weight of the born kids increased significantly compared to the control group, which indirectly caused less pneumonia and diarrhea cases in the herd. In the herd, which is above the ideal birth weight average, these young kids who reach puberty are over the desired mating weights and have been mated during the season to conceive. All these positive aspects are due to the rapid increase in feed intake observed in the mother after birth and the rapid replacement of 1 lost condition score. Silymarin caused positive effects on the written parameters by minimizing the effects of negative energy balance, while thymol-carvacrol preserving intestinal health and increasing the activity of beneficial microorganisms in the intestine. In this research conducted in a goat farm with 500 heads, 100 saanen goats were given a total mixed ration containing silymarin and thymol-carvacrol extract. The other 200 female animals were fed with a total mixed ration without these extracts.

Keywords: silymarin, thymol, carvacrol, kid, saanen goat

Adding Economical Value to Sheep Production: Processing Sheep Fleece for Producing Fertilizer, Lanolin, Keratin, Textile and Insulation Material

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Sheep fleece, a nature created nano-technological, smart fibre natural and environmentalist, which is a source of products and by-products for meeting numerous needs of medicine, dentistry, pharmacology, cosmetics, agronomy, textile, defensive, civil and mechanical engineering, architecture, and fine arts.

Parts of fleece, dust is a combination of wool particles, manure powder, body secressions, organic and mineral salts and hormones contains all constitutional l components mainly C and N to trace elements like Zn, Fe, Cu Se, ideal for natural plant feed fertilizer.

The greasy part surrounding wool fibre which comes out during washing is mainly consisted of lanolin is an important product for medicine, pharmacology, cosmetics and automotive industry.

The resuming part is wool, a valuable textile source, a unique material for thermal and acoustic insulation, fire resistant, pollution preventer and ventilation substance. Wool is also a very good source of keratin, a fibrous structural protein. Sheep wool originated keratin is 91% compatible with human keratin, mainly used for repairing structural damage and also maintaining or improving hair, skin, and nail health. Keratin is water insoluble and used in covering materials for strengthening. Keratin is also a very good source of sulphur containing amino acids as plant fertilizer. Unfortunately, most of the sheep fleece shorn every year is dumped without processing beneficial products and by-products. This article is devoted on drawing attention to sheep fleece's indispensible value, combined with a detailed economical analysis, such as every tone of sheep fleece may be able to provide €6100, while 80.000 tones is dumped to rubbish per year.

Keywords: Sheep fleece, keratin, lanolin, insulation material.

The Effect of In-Ovo Injectıon of L-Thyroxine and Triiodothyronine in Broiler Breeder Eggs on Broiler Performance

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In the present study, it was investigated the effects of in-ovo injection L-thyroxine (T4) and triiodothyronine (T3) in fertile broiler eggs on broiler performance. Totally 600 fertile eggs used in present study were obtained from a Cobb-500 broiler breeder flock at 40 weeks of age. Eggs were randomly divided into tree groups as control group, triiodothyronine (T3) group and L-thyroxine (T4) group. Control group was non – injected group, triiodothyronine (T3) group eggs were injected with 25 ng T3 on 17 d of incubation and L-thyroxine T4 group eggs were injected 50 ng T4 on 17 d of incubation. Eggs were incubated for 21 days under standart incubation condition. Then all hatched chicks from each treatment were reared on standart broiler management procedure.

Results have shown that in-ovo injection of T3 or T4 hormones did not significantly effect feed conversation, carcass traits and organ weights. However, chicks from T4 group had significantly higher body weight (0-6 weeks), body weight gain (1-3 weeks) and feed intake (1-3 weeks) compared to control group ($P < 0.05$).

These results have indicated that in-ovo injection of thyroid hormones may be used to improve broiler performance.

Keywords: Broiler, L-thyroxine, triiodothyreonine, in-ovo injection, hatchability, incubation performance

Determination of the Effect of Some Environmental Factors on Daily Live Weight Gain of Central Anatolian Merino Lambs-The Case of Karaman Province

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This study was conducted to determine the effects of some environmental factors on the daily live weight gain (DLWG) of 11,659 lambs born in 2020 and 2021 in 18 farms in the Central Anatolian Merino-02 project (Project Code: 70OAM2012-02) carried out in Karaman within the scope of the Project of Nationwide Genetic Improvement of Small Ruminants in Farm Condition. Analysis of variance was performed using the General Linear Model to calculate the effect of year (2020, 2021) enterprise (18 different enterprises), age (2, 3, 4, 5, 6, 7 and 8≤), gender (female, male) and birth type (single, twin) factors on DLWG. The least squares averages were used to calculate the effect of amounts.

The effect of all factors on DLWG until the 60th day was significant ($p < 0.05$). In the period from the age of 60 days to 120 days, the effect of all environmental factors, excluding maternal age ($p = 0.109$), was significant ($p < 0.05$). The effect of year on DLWG was ±4.8 g up to 60 days of age and ±31.2 g up to 120 days of age. The effect of enterprise on DLWG was between -43.0-80 g up to 60 days of age, while it was between -45.3-48.8 g up to 120 days of age. 4-year-old mothers had the highest (5.2 g) effect on DLWG, while 8-year-old mothers had the lowest effect (-9.1 g). The effect of gender on DLWG was ± 4.3 g until 60 days of age and ± 4.1 g until 120 days of age, and this effect contributed positively in favour of male lambs in both periods. The effect of birth type on DLWG was ±7.3 g in favour of twin lambs up to 60 days of age and ±2.7 g in favour of single lambs until 120 days of age.

It has been concluded that improving the care and feeding conditions in the farms will enable to prevent DLWG losses and increase the weaning weight of the lambs, and that the 8≤ years old and older sheep should not be bred.

Keywords: Middle Anatolian Merino, lamb, birth weight, weaning weight, daily live-weight gain

Use of Rosemary Essential Oil in Feeding of Broilers

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Abstract

Consumer preferences and legal regulations have led manufacturers to turn to natural additives. Studies on aromatic plants, including rosemary, and essential oils obtained from them, on poultry nutrition have been conducted for a long time and are still up-to-date. Essential oils are natural additives that positively affect the performance of animals by regulating the functions of the digestive system and the microflora of the small intestine with the active components they contain. The essential oil obtained from the rosemary plant grown in our country is one of the natural additives used for this purpose. The effectiveness of rosemary essential oil applications in broiler feeding depends on various factors such as the composition of the active metabolites it contains, the level used in the feed and the feed content. Difficulties arise when comparing different studies using rosemary essential oils due to differences in the composition of active metabolites and the use of raw materials, so the potential biological effects of compounds contained in rosemary essential oils may be different. However, data from studies support the potential role of rosemary essential oils as natural, non-antibiotic growth promoters in broiler nutrition. The aim this review is to evaluate the current scientific data on the use of rosemary essential oil in broiler feeding.

Keywords: Broilers, rosemary, performance, carcass traits

In Ovo Feeding Treatments

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The perinatal period is very important for the development of the chick embryo. During this period, the chick needs high energy for hatching and basal metabolism. In contrast, glucose reserves and various nutrient levels in egg yolk decrease significantly towards the end of embryonal development. In addition, keeping the chicks in hatcheries for about 24-48 hours until the end of the sex determination and vaccination processes prolongs the time to reach external feed, further exacerbating the deficiencies present in the embryonal period. The response of the chicks, which reach feed and water late, to vaccination decreases, the development of the immune system and gastrointestinal tract slows down, and their resistance to diseases and pathogens decreases. As a result, animal performance is adversely affected in the long term.

Although the digestive system organs constitute less than 10% of the body weight in this period, they use 50-70% of the energy. Therefore, a high amount of energy is required for the development of the digestive organs in the last days of incubation. However, the available energy source for embryo development is limited. Eggs are rich in lipids and proteins, but insufficient in carbohydrates. Therefore, the amount of carbohydrates naturally found in the egg is insufficient to provide the metabolic needs of the embryo. For this reason, it may be useful to give carbohydrates by in ovo feeding treatment. Substances such as amino acids, carbohydrates, vitamins, minerals, hormones, antibodies can be injected into the amnion or yolk sacs of the embryo with in ovo feeding method.

It is aimed to enlarge the effective area of the villi by increasing the function and digestive capacity of the small intestine before hatching with the in ovo feeding treatment. In addition, in ovo feeding treatment; it can be use for many purposes such as increasing the hatching efficiency and hatching weight, increasing the feeding efficiency of the chick, reducing the death of the chick, improving the immune system after hatching and preventing early diseases. In this review, the treatment of in ovo feeding, the advantages of the treatment, the nutrients that can be given with the treatment and the effects of these substances are focused on.

Birth Season Effects on Growth and Development Characteristics in Angora Goats

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Ankara (Angora) Goat Breeding program under the breeding program of the General Directorate of Agricultural Research and Policies has been carried out under farm conditions since 2005. In this study, data obtained from 13 farms and 2806 animals belonging to sub-projects carried out in Güdül, Polatlı, Beypazarı, and Ayaş districts of Ankara were used. In this study, the effects of Birth Season (BS) which consists of february, march, april and may on Birth Weight (BW), Daily Live Weight Gain (DLWG) and Weaning Weight (WW) were investigated. BW and WW were measured by using an electronic weighing scale, and DLWG was measured by obtained data. Statistical analysis were carried out using Minitab 16. As a result of analysis, significant statistical differences were found in BW, DLWG and according to birth seasons ($p<0.001$). While BW was higher with 2.49 ± 0.575 in April, DLWG and WW were higher with 0.14 ± 0.023 and 11.36 ± 2.153 respectively in February. Considering the birth weight by months, it was seen that April was followed by March with 2.45 ± 0.384, May with 2.37 ± 0.391, and February with 1.98 ± 0.527. In WW and DLWG, February was followed by April, May and March. It is thought that this situation is due to the better valuation of pasture by kids born in February and kids born in April cannot make good use of the pasture. Angora goat is very important purebred and genetic resourse for our country and its investigations should be continued.

Keywords: Angora goat, birth season, birth weight, weaning weight, daily live weight gain

Effects of Dietary Glutamine and Quercetin on Growth Performance of Broiler Challenged with Lipopolysaccharide

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The aim of this study was to investigate the influence of L-glutamine or quercetin supplementation alone or in combination on the growth performance of broiler chicks challenged with lipopolysaccharides (LPS) on day 21. In the study, 400 one day old male chicks (Ross 308) were allocated to one of 4 treatments as 10 chicks in replicate groups. The broiler chicks were fed with a maize-soybean meal based ration for 42 days. The treatment groups were C (Control - No supplementation); G (Glutamine - 1% of the ration), Q (Quercetin – 0.05% of the ration) and G+Q (Glutamine+Quercetin – 1%+0.05% of the ration).

The supplementation of G and/or Q resulted in difference in weekly body weight (BW) or body weight gain (BWG) among the treatments ($P<0.05$). The challenge of the birds with *Salmonella*-based LPS on d 21 affected BW and BWG on days 21 and 42 ($P<0.05$). The mortality rates were low between 0 and 21 days and did not differ across the treatments ($P>0.05$). On the other hand, LPS injection increased mortality rates between 21 and 42 days. The lowest mortality rate was recorded in G and Q groups.

In conclusion, the supplementation of L-Gln and/or quercetin alone or in combination in general influenced the growth performance of the broilers.

Keywords: Broiler, Growth, L-Glutamine, Lipopolysaccharide, Quercetin

Growth performance of Karacabey Merino and Tahirova x Doğu Frisian Crossbred Lambs Under Intensive Management in Turkey

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Abstract

Growth of farm animals is fundamental to all aspects of production in the future. This study was therefore carried out to determine the growth performance of Karacabey Merino (KM) and Tahirova x East Frisian crossbred (TxEF) lambs. KM herd consisted of 130 lambs and TxEF herd had 404 lambs. A grower concentrate based on mainly maize, soybean meal and barley and specially formulated for lamb fattening (18.1% CP and 2900 Kcal ME/kg), vetch hay, wheat straw and water were offered *ad libitum* throughout the study. TxEF and Karacabey Merino lambs were weaned at 70 and 100 days of age, respectively. All the lambs were vaccinated at 15 and 30 day of life against Enterotoxemia. Fifteen lambs from KM (6 female; 9 males) and 20 lambs from TxEF (8 female; 12 males) were selected based on birth type, birth weight and sex and weighed at three growth periods (64, 88 and 107 days of age) during the study. The daily weight gain of the lambs was 0.314 kg for days 0-64, 0.363 kg for days 64-88 and 0.366 kg for days 88-107 in KM and, 0.380 kg for days 0-64, 0.371 for days 64-88 and 0.397 for days 88-107 in TxEF crossbred. Male lambs (42,38 kg for KM and 45,24 kg for TxEF) were heavier than female ones (37,32 kg for KM and 42,44 kg for TxEF) at the end of the study. No mortality or urolithiasis case was recorded in the study. The results of the study indicate that the daily weight gain of the lambs were higher than those of the same breeds from other studies for both sheep breeds throughout the study. Better growth performance of the KM and TxEF lambs can be attributed to the intake of nutrients from the grower concentrate specially formulated for lamb fattening. The results also showed that TxEF crossbred showed a better growth performance than did Karacabey Merino breed.

Keywords: Growth; Lamb; Sheep; Tahirova; East Frisian; Karacabey Merino

An Overview of Poultry Industry in Turkey

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Abstract

The most important problem of the world population is to meet the rapidly increasing food demand, without harming the environment and with sustainable production. The importance of animal protein in adequate and balanced nutrition is indisputable. The world's annual meat consumption per capita consists of 41% poultry meat, 36% pork, 19% beef and 5% mutton. Poultry and pork consumption constitute 77% of total meat consumption. In Turkey, this situation is 63% poultry, 26% beef and 10% mutton consumption. According to OECD data, annual poultry consumption in Turkey is 19.3 kg per person, which is above the world average of 14.2 kg. In Turkey, the ratio of broiler chickens in the total number of poultry in 2020 was 67% (258 million), the ratio of laying hens was 31% (121 million) and the ratio of other poultry was 2% (7 million). When poultry meat production in 2020 was examined, it was seen that chicken meat production was 2.14 million tons and turkey meat production was 58 thousand tons. Chicken egg production, on the other hand, increased by 1.3% in 2019 compared to the previous year, reaching a record level of 1.2 million tons (19.9 billion units). In the January-November period of 2020, it was 1.21 million tons (18 billion units). Fresh chicken eggs accounted for 91.8% of the 273 thousand-ton egg export of Turkey, which is an exporter country in the poultry industry. Turkey is foreign-dependent in terms of breeding material in chicken eggs. Most of the imports are from the UK and Canada. In the January-November period of 2020, 1,584 tons of breeding eggs were imported. Turkey ranks 6th in world chicken meat exports with 457 thousand tons of poultry meat export in 2019. Turkey has no chicken meat imports. In this review, in the light of current data, the past, present and future of the poultry industry in Turkey were evaluated and it was also aimed to create an information resource for researchers.

Keywords: Poultry Sector, Poultry Production, Poultry Trade, Turkey

The Fleece Yield and Live Weight of Kids in Angora Goats with Controlled Mating Program

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Abstract

This study carried out scope of National Small Ruminant Breeding Angora Goats Breeder Conditions Beeding Project. The flecee yield and kids live weight was examined in enterprise which used controlled mating program in Kızılcahamam District in 2019. The animal material of the study consisted of 385 head Angora goats and born kids. The animals were fed on pasture for 12 months and no additional feed was given. The kids were fed only milk for first month and then fed milk and pasture grass. The goats were sheared in March and fleece yield weighed by eletronic scales and recorded. Birth season of animals took place in March-April. Within 24 hours after the birth, the kids were tagged and weighed electronic scale and recorded. Likewise, 90 days live weight was recorded by weighing with electronic scale. The fleece yield of goats were 2.38 ± 0.04. The birth weight of kids were 2.64 ± 0.02, 90 days live weight were 12.80 ± 0.16. While the birth type and sex effect was significant to kid birth live weight ($p<0.05$), birth live weight was; 2.72 ± 0.46, 2.40 ± 0.30, 2.71 ± 0.45, 2.56 ± 0.43 in single, twins, male and female kids respectively. The sex was significant to 90 days live weight on kids ($p<0.05$). Ninetieth days live weight was; 13.51 ± 2.45, 12.03 ± 2.55 in male and female kids respectively. As a result of the study, birth type and sex was significant on the kids birth weight, while only sex was significant on 90 days live weight.

Keywords: Angora goat, kid, live weight

The Effects of Gender, Birth Type and Maternal Age on Birth Weight, Weaning Weight and Live Weight Gain in Güney Karaman Sheep (Karakoyun)

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This study was carried out using the data of the year 2020 of Mersin Güney Karaman-2 (Karakoyun) project, which is a sub-project of the national sheep improvement project. For this purpose, on the birth and 90th-day weaning weight of 6898 lambs in 50 farms and the live weight gains in this period; The effects of maternal age, gender and birth type factors were investigated. The birth and 90th-day weaning weights of the lambs and the daily live weight gains in this period were evaluated in the GLM model using the SPSS package program, taking into account the factors of maternal age (2-7), gender (female, male) and birth type (single, twin). Tukey's multiple comparison test was used to determine the differences between subgroups. The average birth weight in the examined farms was 3,71 kg, the weaning weight on the 90th day was 23,98 kg, and the daily live weight gain was 0.225 kg. Birth type significantly ($p<0.000$) affected birth weight and LWG, while 90th days weaning weight was unaffected statistically (0.059). While the effect of the gender factor was significant ($p<0.000$) on birth weight and 90th-day weaning weight, LWG was not affected. The effect of maternal age on birth weight, 90th-day weaning weight and LWG was significant ($p<0.000$).

Keywords: Güney Karaman, Birth Weight, Weaning Weight

Determining Some Morphological Characteristics of Karakoyun Sheep (Shouthern Karaman)

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This research was carried out to determine the head and ear measurements of different ages and sexes on Karakoyun sheep (Southern Karaman) in Mersin. In the study, measurements were taken from 43 rams and 133 sheep. The mean head length was found 27.65 ± 0.184 cm, the head width was 15.31 ± 0.103 cm, the ear length was 17.08 ± 0.143 cm, and the ear was 8.99 ± 0.095 cm. According to the measurements made, age, gender and age*gender interaction were not effective on ear length and width. Although, age had no effect on head length and width, it was determined that the effect of gender ($p<0.0001$) and age*gender interaction ($p<0.01$) was significant.

Keywords: Karakoyun, Southern Karaman Sheep, head and ear measurements

Growth Rates of Hair Goat Kids

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The aim of this study was to determine growth characteristics of kids of native Hair goats at extensive management conditions. The criteria examined to define the growth characteristics of kids are birth weight, live weights at 90 and 150 days of age, and average daily gains from birth to 90 and 150 days of age. The evaluation was made using data from 27,132 kids born between 2018 and 2020 in 80 breeder herds in Aydın and Denizli provinces. The least square means for birth weight, live weights at 90th and 150th days of age were 3.03, 19.76 and 24.28 kg, respectively. The least square means for average daily gain from birth to 90th and 150th days of age were 160 and 150 g, respectively. Live weight and average daily gain at different ages were significantly affected by province, flock type, year and gender that included in the model as fixed factors. On the contrary, the effect of birth type was not significant. The effect of all fixed factors on birth weight was found to be significant. In terms of birth weight, 90th and 150th day live weights and average daily gains, kids reared in farms at Denizli province have a higher value than those in Aydın. It seems possible to improve growth traits of kids by improving environmental conditions and genotype.

Keywords: Hair goat, growth, birth weight, live weight, average daily gain

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The Effect of Year and Maternal Age on Birth Weight, Weaning Weight and Daily Live Weight Increases in the "Public Breeding of Akkaraman Sheep Breeding Project" carried out in Aksaray

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This study was carried out in order to evaluate the changes in birth weight, weaning weight and live weight gains of this period according to year, maternal age, birth type and gender in breeder herds within the scope of public breeding projects carried out in Aksaray province.

A total of 12077 lambs were born in the farms investigated; birth weights, 120th day body weights and daily body weight gains during this period were examined in the GLM model, including year (2017-2018), maternal age (2-9), birth type (single-twin), gender (female, male) factors.

In the study; mean birth weight 4.76 ± 0.008 kg, mean of the 120th day body weight 35.98 ± 0.070 kg and the mean daily live weight gain on day 120 were determined as 0.260 ± 0.001 g/day. In the evaluations, it was determined that the year, maternal age, birth type and gender were effective on the birth weight, 120th day live weight and daily live weight gain ($P<0.01$).

Keywords: Akkaraman Sheep, Birth weight, Maternal age.

Scandinavian Red Cattle Breeds and Their Importance in the Cattle Industry

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Scandinavian Red Cattle; They are cattle including Norwegian Red, Swedish Red and Danish Red. Norwegian Reds are not a pure breed, but a breed that was formed by crossing Norwegian Red and White, Red Hornless Eastland Cattle and Ayrshire, including domestic and imported breeds. Later, Swedish Red and White, Fresian and Holstein were included in the gene pool. Swedish Red; It is closely related to the Red Cattle Breed in eastern Norway. Swedish Red Cattle are similar to Norwegian Red cattle and Western Finnish cattle. Danish red was obtained by crossing Angeln cattle from Ballum, Tonder and Schleswig cattle in the 19th century. Holstein breed cattle used in crossbreeding practices with Scandinavian Red cattle are originated from the cattle raised in the lowlands of the North Sea coasts of the Netherlands, Germany and Denmark, and are the most common cattle breed in the world. Scandinavian Red cattle breeds are used effectively in the world to eliminate the deformations that occur in culture breeds and to regulate yields. It is thought that it would be appropriate to use Scandinavian Reds in crossbreeding studies in order to eliminate the reproductive and health problems seen in Holstein in Turkey as well as in the world. In crossbreeding studies, the selected breeds with genetically and physiologically emphasized features, breeds that complement each other and paying attention to the superior characteristics of the bulls to be used will increase productivity even more.

Keywords: Scandinavian Red Cattle Breeds, Crossbreeding studies, Holstein

Polymorphism of the CAST and GDF9 genes in Akkaraman sheep breed

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Abstract

Growth rate and litter size are important traits in sheep production. This study aimed to investigate genetic polymorphisms of the CAST and GDF9 genes related to growth rate and litter size, respectively. Blood samples were collected from 40 Akkaraman sheep belonging to two subprojects (TAGEM/66 AKK2011-01 and AKK2012-02) carried out in Yozgat region and supported by the Directorate General of Agricultural Research and Policy (TAGEM).

DNA was obtained using a DNA extraction kit. All samples were subjected to PCR analysis and then genotyped for the CAST and GDF9 genes by the PCR-RFLP method using the *Msp1* and *Hha1* enzymes. The digestion of 622 bp and 462 bp fragments with restriction enzymes revealed two genotypes, MM and MN in the CAST locus and GG and GA in the GDF9 locus.

The frequencies of the GG and GA genotypes were 87.5% and 12.5% respectively. The frequencies of genotypes MM and MN were estimated to be 32.5% and 67.5%, respectively. The homozygous genotypes, NN for the CAST gene and AA for the GDF9 gene was not detected.

Keywords: Akkaraman sheep, *CAST/Msp1*, *GDF9/Hha1*, PCR-RFLP

The Effect of Some Seasons on Milk Components and Quality of Anatolian Water Buffaloes in Çorum Province

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In this study, 86 buffaloes aged 5 to 7 years were used for the 3rd and 4th lactations, which are included in the Breeding of the Anatolian Water Buffaloes (AWB) Improvement Project carried out in Çorum province. The effects of spring and autumn seasons on the milk components obtained from these AWB were investigated. As the material of the study, 86 head AWB were divided into two groups. Each milk sample was taken in the 2nd month of lactation. Milk analyzes were carried out within 3 hours at the latest. Data of 46 (Experiment Group 1, EG1) milk components belonging to April were used in the group whose lactation started in spring. For AWB that started lactation in autumn, 42 milk components (Experiment Group 2, EG2) of October were used. This study was performed to compare the these two groups. Milk component analysis; density (g/ml), fat (%), non-fat dry matter (NFDM) (%), protein (%), lactose (%), salt (%) were measured with an ultrasonic milk analyzer (Milkotester Master Classic LM2, Turkey). The coefficients of variation for density, fat, NFDM, protein, lactose and salt values were found to be 26.82, 7.52, 21.82, 4.32, 4.67, 4.50, 7.65 in the EG1 group, and 41.14, 11.27, 30.50, 9.73, 10.11, 9.86, 11.22 in the EG2 group, respectively. The mean milk density was 28.82 ± 0.319 g/ml in EG1, and 23.90 ± 0.416 g/ml in EG2. Milk density of the buffalo, which started lactation in the spring, was found to be significantly ($p<0.05$) high. There was no significant ($p>0.05$) difference between the groups in terms of milk fat ratio, which was 7.37 ± 0.237 in EG1 and 7.81 ± 0.368 in EG2. In the rate of NFDM, the difference between the group mean scores of 9.94 ± 0.063 and 8.64 ± 0.130 in EG1 and EG2 ($p<0.05$) is significant. The mean ratio of milk proteins was 3.59 ± 0.025 in EG1, 3.13 ± 0.049 in EG2, and the difference between the two groups ($p<0.05$) was significant. Finally, the difference ($p<0.05$) between the group means of 5.41 ± 0.036 and 4.70 ± 0.071 in EG1 and EG2 in milk lactose ratio is significant. As a result of the study, it was determined that the AWB bred in Çorum province, which start lactation in the spring, have a more dense consistency and richer content in terms of other components except oil. It has been concluded that it may be wrong to determine the commercial value of AWB milk by only looking at the fat ratio in Çorum province, and that milk density, NFDM, protein and lactose ratios

should be among the pricing criteria. It is necessary to raise awareness of AWB breeders and their representatives to consider this situation in raw milk sales.

Keywords: Anatolian water buffalo, milk components, milk quality, milk fat, milk protein.

The Effect of Different Dilutions of Follicule Stimulating Hormone and Luteinizing Hormone on Development Oocyte Maturation in Cattle

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Embryo Transfer (ET) is the transfer of embryos obtained *in vivo* or *in vitro* to recipient animals. Slaughterhouse material is a very important opportunity in ET studies in cattle. Maturation of oocytes (IVM) in in vitro embryo production is one of the most important steps for successful embryo production. TCM-199 is one of the most common complex media used for maturation. The basis of these maturation media are buffer solutions, tissue culture media and embryo culture media. They contain Follicle Stimulating Hormone (FSH) in different concentrations, as well as Luteinizing Hormone (LH) and, in some protocols, Pregnant Mare Serum Gonadodotropin (PMSG). FSH and LH can be obtained from sheep, pig, human origin. The use of FSH and LH in oocyte maturation is more because some of its side effects are less than PMSG. In this study, FSH 500µg / LH 100µg hormone (Reprobiol SPRL, Stimufol®, Ouffet, Belgium) was added to the TCM-199 medium used for maturation, at the rates of 2µl/ml (Control Group, CG) and 1µl/ml (Experiment Group, EG), respectively. For the study, 32 ovaries taken from 16 cows brought from the slaughterhouse were used. The ovaries were brought to the laboratory for the maximum time (2-3 hours) in 0.9% saline containing 100 mg/L Kanamycin Sulfate (Vetaş - KANOVET®, Istanbul, Turkey) at 30°C. A total of 182 oocyte aspirations were performed. 160 (87.9%) of the oocytes were evaluated as A-B quality, 22 (12.9%) as C quality and degenerate. The oocytes taken for maturation are in 4 separate drops for each group, with 20 Cumulus Oocyte Complex (COC) in each drop; 80 oocytes CG, and 80 oocytes EG were randomly distributed. Oocyte Maturation was performed in 24 hours. As IVM criteria, oocytes were evaluated under stereo microscope for enlargement of cumulus cells surrounding the oocyte and for I. polar body in some oocytes. As a result, oocyte maturation was 69/80 (86.25%) in the KG group and 57/80 (71.25%) in the DG group. In the experiment, it was observed that reducing the amount of FSH by half during IVM in bovine oocytes resulted in a 15% reduction in oocyte maturation. It is recommended that attention should be paid to the use of hormones in the maturation of bovine oocytes.

Keywords: Bovine, embryo production, oocyte maturation, follicle stimulating hormone, luteinizing hormone.

Live Weight and Morphological Characteristics of Koceri Sheep Raised in the Breeders Conditions

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This research was carried out to determine the live weight and morphological characteristics of Koçeri sheep. In the study, the adult live weight and morphological characteristics of 274 head sheep and 74 head rams belonging to 13 sheep farms were determined in the villages of Batman provinces and its districts. Body weight (kg), body depth (cm), chest depth (cm), withers height (cm), back height (cm), rump height (cm), body length (cm), chest circumference (cm), chest width (cm), rump width (cm), pelvis width (cm), shin circumference (cm), head length (cm), head width (cm), forehead length (cm), ear length (cm), ear width (cm) were measured as 63.7, 40.9, 35.6, 73.2, 69.8, 70.9, 68.9, 97.9, 23.2, 22.7, 24.9, 9.2, 25.2, 13.2, 8.2, 24.0 and 11.8 in females, 84.2, 44.9, 39.5, 80.6, 76.7, 78.2, 74.5, 109.2, 26.4, 26.0, 29.6, 11.4, 29.2, 15.4, 9.2, 25.4 and 12.9 in males, respectively. The scrotum length and circumference in males, nipple length in females were measured as 24.4, 32.6 cm and 6.2 cm, respectively. Generally assessed, it was observed that there was a positive correlation between body weight and body measurements, the highest correlation was between rump height and back height (0.815), and the lowest correlation was between ear length and body length (0.058). As a result, when compared to other native breeds reported in previous studies in terms of adult body weight and body measurements, overall above average results were obtained.

Keywords: Koçeri Sheep, live weight, morphological characteristics, body measurements.

Determination of Biofilm Formation and Antibiotic Resistance in *Klebsiella* Strains Isolated from Bovine Mastitis Cases

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Abstract

Mastitis is one of the most important diseases of cows and causes the highest economic loss in many national dairy industries. *Klebsiella* species as one of the causative agents of mastitis, are mostly opportunistic pathogens commonly found in the environment. This study was performed to determine the biofilm properties and antibiotic resistance of the *Klebsiella* isolates obtained from bovine mastitic milk samples around the province Konya. A total of 483 cows were included in the study for causative isolation and identification. Thirty-six milk samples positive by California Mastitis Test (CMT) out of 464 cows were obtained. In addition, 19 milk samples of clinical mastitis were included in the study. The samples were transferred to the laboratory under cold chain conditions and inoculated on trypticase soy agar medium containing 5% sheep blood and then incubated for 24-48 hours at 37 °C under aerobic conditions. According to the colony morphology and gram staining characteristics, the isolates suspected of coliform were passaged into McConkey Agar and incubated at 37 °C overnight. Considering their biochemical properties, 15 out of 37 suspected coliform isolates were identified as *Klebsiella ssp*. These strains were also confirmed as *Klebsiella spp*. by PCR analysis. The double disc synergy method was used for the antibiotic susceptibility tests and the Extended Spectrum β-Lactamase (ESBL) production in concordance with the procedures stated by the Clinical and Laboratory Standards Institute (CLSI). In order to determine the in vitro slime forming properties of the isolates, cultivation was performed in Congo Red Agar (KKA) (BHI agar containing 37 g/L, 5% sucrose and 0.8 g/L Congo Red) to obtain single colonies. As to antibiotic resistance of the isolates; resistance to Ampicillin was observed in 78.5% of the isolates while corresponding figures for others were as follows; Carbenicillin 78.5%, Cephotaxime 35.7%, Chloramphenicol 42.8%, Erythromycin 100%, Gentamicin 7%, Neomycin 7%, Oxytetracycline 50%, Sulphamethoxazole/Trimpethoprim 14%, Amoxicillin-Clavulanate 21.4% and Imipenem 7%. Biofilm formation was observed only in 3 of the studied strains. ESBL production by double disc synergy method showed an inhibition zone and ESBL production between Amoxicillin–Clavulanate and Cephotaxime in 4 samples. *Klebsiella* is principally an opportunistic pathogen that

causes severe clinical mastitis which generally respond poorly to treatment. Therefore, an antibiogram before a treatment is recommended.

Keywords: *Klebsiella*, resistance, antibiotic, biofilm

Some Characteristics Factors of Hair Goats

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In this study, 3770 kid goats of Hair Mother Goats (HMG) from 24 farms in Corum province were examined and the relationship between collected data based on years, months, genders, and birth time and birth weight (BW), weaning weight (WW) and daily live weight increase (DLWI) is presented. All statistics in this research were analysed through Minitab package programme. In the study, based on evaluation yearly data, the averages were found to be as 3,12±0,02 kg WW 17,59±0,343 and DLWI 0,15 ±0,02 g . Gender based differences were found: female kid goats' average 3,06±0,02 WW 17.15±0.25 kg and DLWI 150±3 g, in male kid goats' average BW 3.17±0.05 kg, WW 18,7±0.24 kg and DLWI 170±0.24 g. There were statictical differences between females and males in BW, WW and DLWI; BW, WW and DLWI in males were determined to be higher (p=0.001). Significant statistical differences were found in birth type as average BW in signletons was 3.17±0.02 kg, in twins 3 ±0.03 kg and triplets 3,18±0.123 kg. and quadruplet 2,87±0,11. These findings are consistent with the literature.

Keywords: Çorum, Hair Goat, gid goat growe, birth type, birth weight

Effects of Apple Cider Vinegar on Ruminant Animals

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Summary

Recently, the widespread use of organic farming with animal product production step apple cider vinegar as alternating nature product of the application allows an increase is caused. Choice of organic animal products and animal nutrition and health preservation methods require the use of natural products. Vinegar is generally recommended to be used in animal feeding because it consists of low production raw materials. It is known that apple cider vinegar has no negative effects on human health and many biological activities. Also plays a role in the biological activity of the most important anti-microbial, antioxidant, anti-inflammatory, immune system stimulatory effect due to the effect of apple vinegar animal health and yield of positive effects could inhibitory.

In ruminant animals, the inadequacy of the immune system due to environment or nutrition leads to animal deaths and thus animal losses. Stimulation of the immune system, apple cider vinegar extract to induce the system to can use a positive effect on the health of the newborn, with a stronger immune synergistic efficiency level with influence on the positive effects. In addition, apple cider vinegar can create resistance against pathogenic microorganisms or cause inhibition of these microorganisms and positively affect the rumen and intestinal microflora. Other than this, it is recommended to add apple cider vinegar to the ration or water as it can prevent some metabolic diseases based on feeding, improve cellulose digestion, feed efficiency, feed consumption, live weight gain, digestion of feed raw materials and diarrhoea in small cattle. In our review, we tried to reveal the positive or negative effects of using apple cider vinegar in the drinking water or rations of animals.

Keywords: Apple cider vinegar, Immune system, internal parasites, animal nutrition, feed conversion ratio (YYO)

Investigation of the Effect of Conception Month on Birth Weight in Angora Goats

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Abstract

The Ankara Goat Breeding program within the scope of the breeding program of the General Directorate of Agricultural Research and Policies has been carried out under farm conditions since 2005. Growth and development informations of animals recorded in Güdül, Polatlı, Beypazarı and Ayaş districts of Ankara were used. Minitab 16 software was carried out for statistical analysis. In this study, the effect of the month of conception on the birth weight of the Angora Goat was investigated. The farms, birth type and kids gender, which affect the month of birth, were tested according to the least squares. As a result of the analysis, it was found that the farms and gender had an effect on birth weight ($p<0.001$); the effect of birth type was found to be insignificant ($p>0.001$). The variation between the month of conception and birth weight was investigated after correcting for birth weight, farms and goat gender. According to the successful conception months of the female goats, the average birth weights are respectively; September, 2.41; October, 2.51; November was 2.44 g and December was 2.28 g. As a result of these data, the month of conception was found to be statistically significant ($p<0.001$).

Keywords: Angora goat, conception month, birth weight

The Potential Use of Spray Dried Plasma in Broilers

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Abstract

The increasing importance of a diet formulated with amino acid values instead of crude protein value in poultry has brought the use of natural resources to the agenda. This is important for the immune system, intestinal health and basically performance of the animals. Spray dried plasma has come to the fore frequently in recent years and has been used in poultry nutrition. Spray-dried plasma is a dry functional ingredient obtained from blood collected and processed to preserve the functional characteristics of the proteins. In this sense, many trials have been carried out in different production and challenging conditions and statistically significant results have been achieved. Studies have shown that spray dried plasma is very effective in improving gut health, supporting the immune system response, and reducing the number of bacteria and mortality, especially in disease states such as *E. coli* and *Salmonella*, thereby benefiting growth, feed efficiency. Dietary spray dried plasma in the starter phase is effective to increasing overall broiler performance. In this poster presentation, the use of spray dried plasma as a feed additive in poultry, nutrient content and its effects on body weight gain, feed conversion ratio and intestinal integrity were reviewed.

Keywords: alternative protein, antioxidant, gut health, immunomodulatory, performance

The Relationship Between the Number of Bovine and Ovine Animals Milked and the Amount of Milk Produced in Turkey

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Abstract

Milk is a secretion secreted from the mammary glands of animals and is used together with the type and name of the animal, regardless of which animal it is obtained from. For example such as cow's milk, sheep's milk, goat's milk. Known as an indispensable nutrient for babies, milk is also the most important nutrient for adults. There are many factors that affect the composition and amount of milk, such as season, feeding conditions, milking method, milking time, lactation period, animal species and breed.

The total number of animals milked in 2000 is 25,062,037 increased to 31,968,157 in 2019. Number of milked animals increased by 27.56%

In the number of animals milked in 2000, 21.07% bovine, 63.52% sheep, 15.13% goat and 0.28% buffalo were milked. In the number of animals milked in 2019, 20.59% cattle, 62.05% sheep, 17.11% goats and 0.25% buffaloes constitute. Although there is not much change in proportion, there is only an increase in the number of goats.

While a total of 9,793,961 tons of milk was produced in 2000, a total of 22,960,379 tons of milk was produced in 2019. The increase in milk production was 134.43% from 2000 to 2019. From 2000 to 2019, the number of animals milked increased by 27.56% and milk production increased by 134.43%. efficiency came to the fore.

In 2000, milk production was 89.16% bovine, 7.91% sheep, 2.25% goat, 0.69% buffalo proportionally. In 2019, milk production is proportionally 90.51% cattle, 6.63% sheep, 2.51% goats, 0.31% buffalo. While milk production increased in cattle and goats in 2019 compared to 2000, it decreased in sheep and buffaloes.

When we look at developed countries, the number of cattle and ovine animals is low, but there are countries that have a high share in consumption and trade. Milk production is more important than the number of animals. Number of milked animals and milk production data showed that 90.82% of milk production in Turkey is produced from bovine animals, while the rate of milked animals increased by

27.56%, milk production increased by 134.46% Considering the ratios, it has been shown that even if the number of animals milked does not increase much with the increase in productivity, the milk produced will be much more. In this study, the number of cattle and ovine milked in Turkey between 2000 and 2019, changes in the amount of milk produced are expressed in tables and graphics..

Effects of Mannan Oligosaccharides and B-Glucans with Vitamin C Supplementation in Breeding Japonese Quail (*Coturnix Coturnix Japonica*) Ration on Performance and Immunity

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This study was carried out to determine the effects of prebiotic and vitamin C supplementation in breeding Japonese quail (*Coturnix coturnix japonica*) ration on performance and immunity.. A total of 120, 10 weeks old, Japonese quails were assigned to four groups with 5 replicates of 6 (4 females, 2 males) quails each. Trial groups were created as follows: control (basal diet), prebiotic (4 g/kg MOS-β-glucan), vitamin C (300 mg/kg), prebiotic and vitamin C (4 g/kg + 300 mg/kg). The experiment lasted 8 weeks. No significant difference was observed in the live weights, live weight gains, egg weights, feed consumption and feed conversion ratios of the quails at the beginning and end of the study in the experimental groups compared to the control. An increment in egg yield was observed in MOS-β-glucan and vitamin C group as compared to the MOS-β-glucan group ($P<0.05$). MOS-β-glucan and vitamin C group showed a meaningful increment in egg mass as compared to the control group ($P<0.05$). There was no significant difference in serum IgG levels in all experimental groups compared to the control group. Serum IgA levels were observed to be higher in groups supplemented with prebiotic and vitamin C as compared to the control group ($P<0.001$). Immunglobulin A levels were found to be higher in the prebiotic + vitamin C group compared to the vitamin C group ($P<0.001$). The control group had a lower level of serum IgM than all the experimental groups ($P<0.001$).The prebiotic and vitamin C group had a higher serum IgM level than the other groups ($P<0.001$). Prebiotic group also had a higher serum IgM level than vitamin C group. As a result, it has been demonstrated that MOS-β-glucan and vitamin C have positive effects on immunological parameters when used in combination, in poultry. However, in order to determine their effects on poultry performance, new studies should be conducted in which preparations and doses containing different forms of these substances.

Keywords: Blood, breeding quail, ımmunity, performance, prebiotic, vitamin C

Freezing of Ankara Buck Sperm With Extenders Containing Trehalose And Carnosic Acid at Different Doses

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This study aims to determine the sensitivity of Angora buck semen in environments containing different additives. Trehalose and carnosic acid were used as additives. Progressive and total motility parameters were investigated after freze/thawing process by adding different ratios of trehalose and carnosic acid into the tris-based semen extender. In this study, 6 Angora buck (3 and 4 years old) were used as an animal material from the International Center For Livestock Research And Training, Lalahan/ANKARA. In the breeding season, semen was collected from the bucks with an artificial vagina, and the semen with more than 80% motility was used for freezing. In the freezing of semen, tris-based extender which contains 20% egg yolk and 5% glycerol was used as the main extender. Experimental groups were formed by adding carnosic acid (0.15, 0.30 mM) and trehalose (35, 70 mM) into the basic diluent. The dilution was done in a single step in a 37ºC water bath. After dilution, semen was filled into straws at room temperature (22 ± 2ºC) and placed in a cold cabinet at +5ºC for equilibration. After the temperature was reduced to +5ºC within 45-60 minutes, the samples were equilibrated for 2 hours at +5ºC. Then, the samples were frozen in liquid nitrogen vapour ($\sim$ -100ºC) and stored in liquid nitrogen (-196ºC). The semen samples were thawed at least one week after freezing, and objective examination was performed with the Hamilton Thorne version 1.2 CASA device by looking at five different regions for the semen in each Leja Lam. As a result of the analysis; Total motility for the control, CA0.15, CA0.30, TR35, and TR70 groups were 30.25, 27.5, 22.5, 33.5, 47.12; progressive motility was found as 7.37, 7.75, 5.25, 11.12, 16.9, respectively. In our study, a significant difference found between the group with 70 mM Trehalose supplementation and the other groups in terms of total motility and progressive motility ($P<0.05$).

In conclusion, it was observed that the addition of 70 mM trehalose to the extenders of buck semen, which is very sensitive to cold shock during the freezing, improves motility parameters after freezing-thawing.

Growth and Development Characteristics of Hair Goats Breed in Diyarbakır Province[1][*]

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Abstract

In this study, it is aimed to increase the yield amount by breeding hair goats breeding in Diyarbakır province according to their growth and development characteristics between 2016 and 2020. It is aimed to increase the efficiency of birth, growth and development characteristics in the study.

Birth weights of yeanling according to 2016, 2017, 2018, 2019, 2020, was determined to be, respectively; 3,10±0,011a, 2,82±0,011d, 2,93±0,013c, 2,65±0,011e, 2,96±0,010b, 30th day weights were 8,29±0,039b, 8,92±0,050a, 7,83±0,030c, 6,47±0,025d, 6,31±0,023e, 60th day weights 12,82±0,057a, 12,74±0,072a, 12,80±0,058a, 10,07±0,041c, 10,26±0,039b, and the 90th day weights were 15,64±0,086b, 14,68±0,188c, 16,86±0,085a, 13,89±0,064d, 14,03±0,047d. Again, according to the male and female in the study, daily live weight increase; birth – 30. daily was 150,00±0,752b and 155,11±0,777a, birth – 60. daily was 286,27±1,169b and 293,27±1,198a birth - 90. daily was determined to be 394,41±1,607b and 408,48±1,732a.

As a result of this study, which was carried out for five years, it was seen that the desired progress did not come out clearly due to some technical difficulties in the project. In the examination, it was determined that there is a wide variation in live weight and live weight gains within the herd. It has been shown that progress in growth and development can be achieved using this variation.

Keywords: Hair goat, goat growth, live weight, yield control

Determination of Non Spining Syndrome in Silkworms in Kulp District

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Abstract

In this study, the pesticide relationship was investigated in the cocoon not spinning problem in silkworms in Kulp district of Diyarbakır province in 2021. S-Hydoprene substance was detected in the laboratory examinations of the samples taken from silkworm larvae and mulberry leaves in the fifth larval stage. This substance, which is defined as a pesticide, is thought to be in the structure of insecticidal drugs. S-Hydoprene substance affects growth and development by having an effect similar to the Juvenile hormone found in silkworms. It has been observed that S-Hydoprene substance causes Non Spinning Syndrome by preventing cocoon spinning and metamorphosis in the fifth larval stage. It is known that pesticides were not applied during the silkworm breeding period, and it is thought that the severe dust storm in the region both polluted the leaves with dust and transmitted pesticides to the leaves in this way. In silkworms that eat these leaves; It was observed that they did not spin a cocoon around themselves with the silk thread they secreted, they formed a color change from yellow to purple and black, respectively, and the tips of the larvae merged to look like a half moon and died. According to the amount of eggs distributed in 2021, while the wet cocoon yield is expected to be close to 60 tons, it is reported that due to the relevant situation, around 45 tons of products were purchased and approximately 25% yield loss was experienced.

Enviromental Effects on Pre-Weaning Growth Traits and Fibre Diameter in Anatolian Merino Sheep

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Abstract

In this study, the effect of enviroment on preweaning growth tratis (birth weight, weaning weight and average daily weight gain) the fiber diameter. The fixed enviromental effects were sex, birtyh type, year and dam age for for pre-weaning growth traits and year and age for the fibre diametrer. The records of birth and weaning weight were collected from approximately 30.000 lambs and the wool samples were collected nearly 4.000 sheep from 20 different farms within "National Small Ruminant Improvement in Public Condition of Middle Anatolian Merinos Sheep" project implemented by the General Directorate of Agricultural Research and Policies, were analyzed in terms of fibre diameter, then they were compared among different age groups. Samples were collected between 2016 and 2020. Measurements of fibre diameter were performed with OFDA 2000 instrument. The difference between fibre diameter the age group and year were found to be significant (P-value < 0.01). For birth weight the effect of year, dam age and birth type were significant (P-value < 0.05). while, the effect of sex was not found to be significant (P-value > 0.05). All effects were found sitatistically significant for weaning weight and average daily weight gain (P-value < 0.05). Considering the current population size of Central Anatolian Merino and its growth traits and fleece characteristics reported by former studies as well as our study, the pre-weaning growth and the wool production of the breed is strategically important for small ruminanat industry.

Keywords: Central Anatolian Merino, Fleece Diameter, Pre-weaning growth traits.

Omics Technologies and Some Omics Approaches in Livestock

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Abstract

Omics refers to a very broad field of study that covers the collective technologies used to reveal/analyze the functional roles and relationships of the cellular molecular that make up an organism. 'Omics' is derived from the Latin suffix '-ome', meaning 'many' and denotes 'all' of the entity to which it is added. Omics naturally necessitates the use of high-throughput technologies as it requires working with very large data such as a large number of genes, gene expression and proteins. Omics technologies mainly consist of genomics, transcriptomics, proteomics and metabolomics.

Together with the advancements in omics technologies from year to year, the use of omics technologies in the context of animal husbandry is increasing and the volume of information that can be obtained from studies is expanding rapidly. For example, genomics allows the identification of candidate genes for a desired trait in fertility-related reproduction programs. By using post-genomic tools, it is possible to identify genes, resulting proteins, and metabolites that are differentially expressed between the two conditions of a given situation. The integration of these technologies enables full screening of animal, tissue or cell metabolism from genotype to phenotype. By using proteomics, the proteins behind desired properties such as milk protein composition and meat tenderness can be identified, and the quality of dairy and meat products or the effects of environmental factors such as nutrition, sex, welfare and temperature on the physiology of animals can be analyzed at the molecular level. In addition, the highly efficient nature of these techniques has increased the availability of this information in terms of time and cost. In order to draw more comprehensive conclusions about biological processes, these datasets need to be integrated and analyzed as a holistic system.

Keywords: omics technologies, genomics, transcriptomics, proteomics, metabolomics, livestock

Some Growth Yield Traits in Kıvırcık Sheep Breeding and Genetic Resource Conservation Herds in Public Hands

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Abstract

This study was carried out by comparing the average of 2019 birth and weaning weights and daily live weight gain in lambs with the averages of İzmir Kıvırcık, Manisa Kıvırcık 1 and Manisa Kıvırcık 2 herds within the scope of Public Hand Breeding Project of the pure curly herd kept in the Sheep Breeding Research Institute as animal genetic resources protection herd. This study was carried out in order to have an idea about the yield increase obtained in the breeding.

In this study, data on birth weight, 90th day weight and daily live weight gain were evaluated. The daily live weight gain of male lambs was found to be 0.278±0.005, 0.378±0.001, 0.267±0.001, 0.249±0.001 in the guard herd raised under the institute intensive conditions and in the Public Hands Improvement İzmir, Manisa1 and Manisa2 herds, respectively. Again, the daily live weight gain of the female lamb was found to be 0.263±0.006, 0.381±0.002, 0.252±0.001, 0.239±0.001, respectively. The same evaluations were made for birth weight and weaning body weight, and the same findings were found.

In the light of these findings, it has been observed that the cross meat breeds have a high effect on the yield in the Breeding herds in Izmir Public Hands.

The values obtained from the Manisa 1 and Manisa 2 herds in high altitude, pasture-based, extensive breeding conditions and the Institute pure protection herd are in line with the literature values.

Keywords: Kıvırcık Sheep, Birth Body Weight, Weaning Body Weight, Daily Body Weight Gain

ANKARA GOAT FROM PAST TO PRESENT

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Abstract

The Ankara Goat, which has an important place in the historical process, was brought to Ankara and its vicinity from the eastern region of the Caspian Sea in the 13th century by the Turks, and it gained the existing high quality structure and mohair characteristics by adapting well to the geographical and climatic conditions in this region. Over time, the climatological features in and around Ankara, from which it got its name, gave Ankara (Mohair) goats various breed characteristics and for many years created an important source of foreign currency for the country's economy. The Angora goat, which has preserved its existence as a value unique to Turkey for centuries, has lost its importance today, with the removal of the country from the middle of the 1800s and some negative developments. Turkey, which was the sole producer for a long time, had around 6 million animals in the 1960s, but over time it lost this advantage and started to take its place behind South Africa and the USA. Due to the insufficient income from mohair yield, the number of Angora goats decreased to less than 1 million in the 1990s. Angora goat, which is a valuable domestic gene source upon the necessity, has been started to be raised under the conditions of the institute (ex situ in vivo) in the International Center for Livestock Research and Training (Lalahan-Ankara) since 1997, within the scope of the Protection of Pet Gene Resources Project. In 2005 and 2011, in situ in vivo conservation studies were started in the Ayaş and Beypazarı districts of Ankara. Although the presence of Angora goats has not experienced a serious decline in the last 20 years, it has decreased to 241.055 heads in 2019. The fact that the Angora goat, which is raised for its mohair, provides a special weaving product due to the geographical conditions in Ankara and its immediate surroundings is still considered as an important privilege of this creature. As a result, it is necessary for the breeding enterprises to carry out a profitable economic activity and to give the necessary importance to the Angora goat, which is the gene source of our country.

Keywords: Angora goat, Mohair, Goat history

Growth Characteristics of Zom Sheep from Project02 in Farmer Conditions

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Abstract

This study was aimed to determine growth characteristics of Zom sheep in farmer conditions using data spanning the year from 2013 to 2021, in Diyarbakır, Turkey. Materials of this research was consisted of 44 308 lambs born in 68 flocks. Live weights of lambs were taken from birth to 180th day of age by every two months. The projects was suported by the General Directorate of Agricultural Researches and Politics (TAGEM).

The data were analyzed by *GLM* procedure in SAS (2017) and *Tukey* test was used for the comparison of subclass means of environmental factors. Birth, 60th, 120th and 180th day of age live weights in females and males were 3.91 and 4.11, 14.85 and 15.60, 24.28 and 26.76, 33.94 and 38.23 kg, respectively. Survival rate until weaning were 97%.

Birth, 60th and 120th day of age live weights were affected by flock, birth year, birth season, type of birth and sex of lamb (P<0.05), while the live weight of 180-day of age lambs were affected by flock, birth year, type of birth and sex of lamb (P<0.05). In addition, coefficients of regression of 60th, 120th and 180th day of age live weights on birth weight were 0.964±0.0260, 1.385±0.0480 and 1.493±0.0977 kg, respectively (P<0.01).

Keywords: Zom sheep, Growth, Survival

Roughages and Their Importance in Animal Nutrition

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Abstract

In animal feeding, the substances that are necessary for the life and efficiency of the animal, that constitute one or more of the nutrients, and that do not harm the animal when given to the animal are called feed. Feeds are generally divided into roughage and concentrate feeds. A general definition of roughage is a bulky feed ingredient that has a high concentration of slowly degradable fiber that content more than 18% cellulose, low-protein, low in readily available carbohydrates . Green-dry grasses, silage, straw and roots and tubers of some plants can be used as roughage. Roughages cause mixing the food by expand and contract of the muscles in the wall of the rumen that is called the roughage effect. It allows the microorganisms there to break more of the food down. This allows more of the nutrients to be absorbed and used by the animal.Another benefit of roughages is when a ruminant regurgitates the long fibers to rumination. When this happens saliva is mixed with it which acts as a buffer when it returns to the rumen. The benefit this buffer provides is that it helps keep the acidity from getting to high. Most roughages can be effectively incorporated into at least one type of ration.Its appropriate amount in the ration provides regular digestion and mechanical saturation. For mechanical saturation 75% of the digestive tract should be filled.In case of insufficient or excessive bulk in ration cause digestive problems.

Effect of Birth Type, Maternal Age and Gender on Birth Weight, 120th Day Weaning Weight and Daily Live Weight Gain in Akkaraman Sheep

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This study was carried out using the data of the year 2020 of the Akkaraman-2 project (Aksaray), which is a sub-project of the national sheep development project. For this aim, on the birth and 120th day weaning weight of 4985 lambs in 18 farms and the live weight gains in this period; The effects of maternal age, gender and birth type factors were investigated. The birth and 120th day weaning weights of the lambs and the daily live weight gains in this period were evaluated in the GLM model using the SPSS package program, taking into account the factors of maternal age (2-7), gender (female, male) and birth type (single, twin). Tukey's multiple comparison test was used to determine the differences between subgroups. Average birth weight in the examined farms was 4.371 kg, weaning weight on the 120th day was 31.03 kg, and the daily live weight gain was 0.259 kg. It was observed that birth type and gender had an effect ($p<0.000$) on birth weight, daily live weight gain and weaning weight at day 120, while maternal age did not have any effect on birth weight, weaning weight and daily live weight gain.

Keywords: Akkaraman, Birth weight, Weaning Weight

Daily Distribution of Birth in Hasmer and Hasak Sheep

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Abstract

This study was carried out to investigate the distribution of births during the day in Hasmer and Hasak sheep raised in Konya Bahri Dağdaş International Agricultural Research Institute. Considering all the births (total 562 births) in two breeds in a two-year period in the study, 8.71% of lambs were born between 13:00-14:00, 6.94% between 11:00-12:00 and 6.76% of lambs were born between 14:00-15:00. The hours with the lowest birth rate are between 17:00-18:00 and 24:00-01:00 with 1.25%. It has been determined that 59.4% and 55.1% of Hasmer and Hasak ewes gave birth between 06:00 and 18:00, respectively.

The effect of maternal age on the time of birth was significant, while on lamb gender, birth type and time of birth was insignificant. In Hasmer sheep, the births mostly occur during the daytime (06:00-18:00) (59.4% vs. 40.6%, P<0.01), while the difference between day and night births (55.1% vs. 44.9%) in Hasmer sheep is statistically significant, there was no significance between day and night births (55.1% vs 44.9%) in Hasak sheep.

Key words: Birth time, Birth Type, Gender, Hasmer, Hasak

Evaluation of Blood Parameters in Sheep and Goat With Pseudotuberculosis

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Abstract

Pseudotuberculosis in sheep seems very common disease around of world. Although it is not a debilitating disease, it can cause to severe economic loss in sheep production by decreasing daily liveweight gain and making sheep prone to other diseases. To the author's knowledge, there is no vaccine available against pseudotuberculosis. Therefore, disinfectant solutions applied to sheep during shearing is the only way to prevent sheep from the disease.

In this poster presentation, we reviewed the studies on some blood parameters in sheep and goat with pseudotuberculosis. It is noted that sheep with pseudotuberculosis have lower vitamin D level in blood compared to the control group (P<0.001). C. pseudotuberculosis and PLD (phospholipase D) have a negative impact on the goat's health in general reflected by all those changes recorded in the hemogram, leukogram, and the blood chemistry.

Keywords : Blood, Goat, Pseudotuberculosis , sheep

The Miracle of a Silkworm ''Sericin''

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Abstract

Silk is a product being excreted by most members of Arachnida class and Lepidoptera genus. Silk in nature; it is a biopolymer synthesized in special epithelial cells by silkworms and spiders. It is most commonly obtained from the *Bombyx mori* silkworm and some spider species such as *Nephila calavipes* and *Araneus diadematus*. Silk contains two different proteins in its structure. The first of these is fibroin protein in fibrous structure, and the other is sericin protein.

Sericin protein, which is a very valuable raw material, is a globular protein in a sticky structure and in a form that covers fibroin proteins. It consists of 18 aminoacids and its structure includes a great number of hydrophilic amino acids such as serine, glycine, lysine, etc. The main amino acid in the structure of sericin is serine, which is a natural moisture factor in human skin. Due to this, sericin is used as an ingredient in various cosmetic products. Sericin is a biomaterial that is biocompatible with human tissues, can be used in cosmetic and medical fields, is resistant to oxidation and biological degradation, has antibacterial properties and UV resistance. In addition, sericin easily absorbs and releases moisture, has the potential to be used in medical applications.

Although sericin is used in the pharmaceutical, biomedical, food, cosmetic and textile industries, it is currently mostly disposed of as waste in silk processing plants. Recovering the silk series, which has a high market value, and making its production in our country will provide important economic and social benefits.

Keywords: Sericin, Silk, Silk proteins

Some Reproductive Characteristics of Hair Goats and Survival Ability Rate of Their Kids at Breeders Conditions

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The aim of this study was to determine the reproductive characteristics of Hair Goats and survival ability rate of their kids at weaning in Hair Goats at Breeders Conditions flock in Karaman province.

In this study, within 2019 and 2020 years totally 11.100 head of goats and 10.306 head of their kids data obtained from 38 Hair Goats breeder flocks in Karaman province were used. The number of born and dead kids were recorded by breeders. Survival ability rate and reproductive performance were determined by project crew. According to results for 2019 and 2020 years; The lambing rate of the goats, twin birth rate, weaning survival ability rate of kids and fecundity were found % 90, 83, % 12.7, 14.5, % 86.3, 87.5, 1.07, 1.08 respectively. While the effect of year and sex of kids on the survival ability was insignificant. Type of birth and age of mother were found to be statistically significant ($p<0.05$)

The Current Statues, Some Yield and Structural Properties of Ankara Goat Farms: Case of Ankara Province

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The purpose of this research was to determine the general characteristics and care and feeding practices of 22 Ankara Goat farms located in Ankara, within National Sheep and Goat Breeding Project of Turkey, coordinated by Agricultural Research and Policy General Directorate (TAGEM). Within the scope of this purpose, a questionnaire study was conducted with the owners of 22 Ankara Goat enterprises. The questionnaire consists of general information was determined about business owners, herd management, animal care and feeding methods and the effectiveness of the National Sheep and Goat Breeding Project. 45.45 % of the producer's ages are between the ages of 41-60. 45.45% of the farmers are primary school graduates and 27.27% of them are university graduates, and all of them keep regular records for herd management. While approximately 55.54% of the farmers have sufficient land, 36.36% have land but it is not sufficient. All of the farmers do not give additional feeding to goat and he-goat in pairing season. In addition, all of farmers are not milking. All of the farmers sell Angora woolthey have obtained to the relevant sales cooperative. National Sheep and Goat Breeding Project is positively affected on record keeping, business breeding characteristics, and Angora Goat care and feeding methods. For this reason, all of the farmers find possitive and desire to continue National Sheep and Goat Breeding Project.

Keywords: Ankara Goat, Care-Feeding Conditions, National Sheep and Goat Breeding Project, Ankara Province

Use of Yeast in Calf Rations

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The use of probiotics, prebiotics, organic acids and enzymes as feed additives in calf rations has become increasingly important, especially since the use of antibiotics as feed additives was banned in 2006. Developmental retardation due to mistakes made at critical points during the milk drinking period in calf nutrition continues after the milk drinking period. In this period, specific points such as dry matter consumption, fecal scores, metabolic changes, stress and small intestine microbiology are very important in calves. The research findings obtained in recent years report that the use of yeast as a feed additive provides significant benefits in calves. It has been shown to have positive effects in a wide range of areas such as live weight gains in calves, dry matter consumption, improvement in fecal scores, increasing microbial productivity in the large intestines, balancing electrolyte levels in diarrhea, feed utilization and contribution to energy metabolism. Due to the positive health effects of using yeast as a feed additive, the treatment requirements of calves are decreasing. As a result, using yeast as a feed addition in calves delivers significant growth-development and health benefits.

Keywords: calf feeding, feed additive, yeast

Some Reproductive Production Characteristics of Holstein, Brown-Swiss And Simmental Cattle Breed Grown at Lalahan Center For Livestock Research and Training

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Abstract

In this study, it was aimed to determine some reproductive traits of cows raised in Lalahan International Center for Livestock Research and Training. For this purpose, records of 28 Holstein Friesian (HF), 20 Brown Swiss (BS) and 14 Simmental (SIM) breeds of cows were used. In the study, Insemination Number (IN), Insemination Number Per Gestation (INPG) and Gestation Length (GL) were determined. In determining these values, environmental factors such as breed, year, season, calf gender, lactation order were taken into account. A total of 266 inseminations were made in the study, of these IN values were 112 positive and 154 negative. The positivity rates from these values were determined as 42.86%, 36.47% and 47.37% in these breeds, respectively. INPG values in animals were found to be 1.82, 2.19 and 1.69, respectively. These values were found to be 1.55 in heifers, and these figures were higher in lactation cows. The mean GL was found to be 277.6 days in general. The effects of breed and gender on GL values were significant ($P<0.05$), while the effect of pregnancy number, birth season and birth year was not significant. These values were determined as 271.0, 282.7 and 279.2 days in HF, BS and SIM breeds, and 277.2 and 279.6 days in females and males, respectively. The results of the research showed that the breeding conditions in the Institute were in good condition in terms of reproductive traits, and the phenotypic and genotypic parameters calculated for the farming were also within acceptable limits.

Keywords: Fertility, Insemination, Gestation Period

The Effect of Carprofen Treatment on Conception Rate Following Short Term Progesteron Administration in Hungarian Merino Ewes During the Breeding Season

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The present study was aimed to investigate the effects of carprofen treatment on conception rate in Hungarian Merino ewes during the season.

In the study, 94 adult Hungarian Merino ewes were treated with vaginal sponge containing progestagens (60 mg medroxyprogesterone acetate, Espojavet®, Hipra, Spain) for 7 days during the season (July) (day 0). PMSG 500 IU (Oviser®, Hipra) was injected intramuscularly on the day of removal of the sponge (day 7). Ewes in oestrus were mated with a proven fertile Merino rams (ewe:ram ratio of 5:1). Then animals were divided into two groups. Ewes in Control Group (n = 46) were not administered any nonsteroidal anti-inflammatory drug. Ewes in Carprofen Group (n =40) were given 1.4 mg/kg carprofen (Rimadyl XL, ZOETIS) on day 9 post mating. In all goats, transabdominal ultrasound examination (Hitachi EUB-405, 3.5 MHz convex probe) was performed to diagnose pregnancy on day 55 post mating.

The results obtained in the experiment showed that oestrus rates in all groups were 91.5% (86/94). The conception rates were 73.9% (34/46) in Control group and 75.0% (30/40) in Carprofen group, respectively. These results revealed no significant differences between the groups (p>0.05).

In conclusion, following short-term progesterone administration during the season, carprofen treatment on day 9 post mating did not have a remarkable effect on the conception rate.

Keywords: Carprofen, Ewe, Medroxyprogesterone Acetate, Conception Rate

Women Grooms at the Hippodrome

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Abstract

Horse breeding and races have become a sector that employs thousands of people with 3 thousand horse owners, 16 thousand Purebred Arab and British horses, 9 thousand grooms, 900 jockeys, 1500 trainers and over 2 thousand ganyan dealers in our country in recent years. Horse breeding, breeding and breeding activities are carried out in 4 private stud farms belonging to the state and 500 private stud farms belonging to individuals and institutions. There are currently 9 hippodromes belonging to the state. In addition to Antalya, which has been under construction recently, the projects for the construction of new hippodromes in Samsun, Konya, Eskişehir and Tekirdağ and other metropolitan cities are continuing. In other words, horse riding has become a considerable business line of our country and therefore our city with its 3 billion turnover. However, female groom breeding and appetite in horse breeding and racing sector is almost nonexistent. With this study, a new business area for women's employment in equestrian and its positive results will be evaluated.

Keywords: Female, ganyan, groom, horse