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In Memory of
Prof.Dr. M. Rifat OKUYAN

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PREFACE

Esteemed Stakeholders of Livestock Industry and Dear Colleagues,

The livestock industry has considerable importance in our people's healthy and balanced nutrition, food security, and in our country's development. Agriculture is the art and science of farming that involves functions of cultivation and animal breeding by benefiting from soil, producing products from plants and animals, and turning these products into semi-finished and finished products. Zootechnics is the scientific art of rearing, maintaining and feeding, breeding and reproducing domesticated farm animals to produce animals and animal products in an economic way through the agricultural production. Those who complete a four-year bachelor's degree program in a department of zootechnics are entitled to become a "Zootechnician".

Animal production is of great importance for the development of a country, and Zootechnicians and veterinary physicians are essential for improving productivity in the animal production. Increasing the animal production and producing healthier and more qualified animal products are needed for a growing population to have a sufficient and balanced diet including animal products. Therefore, an effective cooperation among partners in the industry is required for using up-to-date information and modern technology, analyzing existing problems in animal production, improving productivity, and ensuring sustainability.

In this context, Animal Science Congresses have started to be organized since 1992 and the first ten of the Animal Science Congresses have been organized by Animal Science Departments in different universities of our country. The first of the congress, which has been organized as an international level by the Animal Science Federation since 2018, was held in Antalya and the second was held in Cappadocia in 2019. 12. National and III. The International Animal Science Congress was planned to be held face-to-face, but was postponed due to the ongoing Covid-19 pandemic conditions at the first, and then decided to be organized online with the participation of you our valuable industry stakeholders between 27-28 November 2021 by Uludağ Animal Science Association with Bursa Uludag University Faculty of Agriculture Department of Animal Science (https://uludag.edu.tr/zootekni) and the Animal Science Federation (http://www.zooteknifederasyonu.org.tr).

In the Congress, all stages from producing to consuming animal products, which are tremendously important for raising mentally and physically strong and healthy generations, will be discussed. The Congress aims to get together stakeholders of the livestock industry, including scientists, producers, producers' associations, professionals in the sector, governmental bodies, media members, non-governmental organizations, and consumers, in order to discuss the problems related to animal production and find solutions, to share the latest scientific studies on animal production around the world and in our country, and to introduce new technologies in the field of animal production.

Therefore, your participation and contribution is very important for the Congress to achieve its abovementioned objectives both at a national and international level. We invite you to attend our traditional organization where many stakeholders of the livestock industry will come together for a productive and sustainable future in animal production. We, on behalf of the organization committee, would like to express how excited we are to meet with you in the Congress.

Best regards,

On Behalf of The III. Internaional and XII. National Animal Science Congress Regulatory Board

Prof. Dr. İbrahim AK
Chairman of the Congress Organizing Committee

Dr. İsmail MERT
Chairman of the Animal Science Federation

Prof. Dr. M. Rifat Okuyan

Prof. Dr. Rifat Okuyan was born on 20.03.1937 in Ermenek. He completed his primary and secondary education in Ermenek and his high school education in Konya. He started his university education in 1955 in Ankara University Faculty of Agriculture (AÜZF) Department of Animal Raising and Breeding and graduated in 1959. In the same year, he was appointed as the "Assistant Candidate" to Feeds and Animal Nutrition Chair.

He completed his doctorate in 1964 and did his military service between 1964-1966. Between 1968 and 1970, he worked in George August University Institute of Animal Physiology and Animal Nutrient in Germany. In 1970, he received the title of "University Associate Professor". He was appointed to the "Associate Professor" position in Feeds and Animal Nutrition of Ankara University Faculty of Agriculture in 1971 and to the "Professor" position in 1976. He served as a board of directors of Ankara University Faculty of Agriculture between 1974-1976 and as a member of Ankara University Faculty of Agriculture Senate between 1977-1981. In 1981, he came to Bursa with

8 faculty member appointed by Ankara University Senate to establish Uludağ University Faculty of Agriculture (UÜZF). By serving as our Faculty's Dean between 04.06.1981-29.09.1988, he became the "Founding Dean". Between 01.11.1981-01.12.1982, he was the Head of Department of Zootechnics at Uludağ University Faculty of Agriculture. He served as a member of Interuniversity Councillorship as the representative of Uludağ University between 1982-1990.

Returning to Ankara University Faculty of Agriculture in 1990 and retiring in 2004, Prof. Dr. M. Rifat OKUYAN passed away on 18.01.2013.

We commemorate Prof. Dr. M. Rifat Okuyan with grace and mercy for his valuable contributions to the Animal Nutrition Science and Zootechnics.

INVITED SPEAKERS

M.Ülkü KARAKUŞ, President of Turkish Feed Manufacturers Association
Dr. Andrea ROSATI, Secretary General of the European Federation of Animal Sciences
Yuriy NESTEROV, FAO
Prof. Dr. Rüveyde AKBAY, President of the Scientific Poultry Association of Turkey
Özge PAMUKÇU, BESD-BİR
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Otto SCHMID, FiBL
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Associate Prof. Dr. Sümer HAŞİMOĞLU, Germany
Dr. Mette VAARST, Aarhus University
Cihan SOYALP, TMO Assistant General Manager
Prof. Dr. Muhittin ÖZDER, National Dairy Council
Prof. Dr. Nizamettin ŞENKÖYLÜ, Animal Nutrition Science Association
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Bilsay KANCI, Animal Science Federation
Yıldırım ORAN, President of Bursa Breeding Sheep Goat Breeders Association
Mehmet Fatih TATARİ, California University – USA

INVITED SPEAKERS

Unnoticed and/or Ignored Reality: Error Bound PC Population and Food Consumption Evaluations vs. New Metric - Per Adult Human Unit Method (PAHUM)/Age and Gender Corrected Per Capita (PCagc): Cereal Production/Sufficiency Evaluation of Equally Populated Turkey vs. Germany

Sümer Haşimoğlu
Retired Academician, 19053 Schwerin, Germany

Abstract

The aim at developing a framework for evaluating food security, food demand/sufficiency & nutrition monitoring systems on developed **PAHUM (copyright©1989-USA)** versus PC, AE/AME metrics evaluations. Among the criteria used for evaluations are the capacity for data processing, validity/reliability analysis & reporting timely generation of information to decision makers of Turkey and Germany. The previously published articles, reports & communications & also this article based on innovated/developed method – PAHUM addresses the following problem: How can equally populated (2016) target countries Turkey & Germany social structures/policies be used to enhance social capacities for economic development by evaluating not only the population also the cereal production/consumption not on error bound PC but PAHUM, in the process, eroding the intrinsic values of the social ends that policy makers purport to address? To emphasize the difference between developed & developing countries, two almost equally populated countries are considered: Germany 80,722,792 & Turkey with 80,274,604 populations for the year-2016. Although the population numbers (PC) are quite similar (498,188) - (0.99 percentage unit difference), the PAHU (20-24-year M/F) population numbers showed huge differences (68,555,575 & 65,074,752 respectively – 3,480,823, difference 5.0 percentage unit) due to especially in the age groups, under 20 (17.8 % and 26.4 % for Germany &Turkey respectively). Since world average 42% of produced cereal is consumed PC grain consumption comes to 184.5 kg/PC/Y which is under the average world PC grain consumption (200 kg/Y) even though PAHU is 227.7 kg/Y above the world PC average requirement. PC and PAHU grain consumptions for Germany is over the PC grain consumption (200 kg/year) 236 and 277.9 kg/Y PC and PAHU respectively higher than Turkey. A radical evaluation method change in global/EU food systems is needed to meet the global challenges and food security, including Turkey & Germany.

Key words: Population, Per Capita, Per Adult Human Unit, Cereal

The importance of animal nutrition in animal production

Nizamettin Şenköylü
President of Animal Nutrition Science Association, Turkey

Abstract

The world population is growing dramatically and is expected to reach 9.7 billion by 2050. Thus, nourishing the fast-growing population and improving health are essential. The human body consists of 17% protein and depends on animal-based products, such as meat, milk, egg, and fish. An adult man of 80 kg requires at least 70 g dietary protein per day and 28 g of this should be derived from these animal products. According to FAO, the global annual meat consumption could reach 373 Mt by 2030 and 465 Mt by 2050. Similar amount of increase is expected in milk, eggs and fish production to nourish the world. This huge amount of production should aim healthy food without any compromise to the environment. Inequality in animal products consumption among developed and other countries is unfair and the existing huge gap should be decreased.

Animal feeding and nutrition is becoming top priority to manage the enormous amount of animal production provided no health risk for environment and no risk for humans and animals health have been left. Inadequate/erroneous feeding and nutrition might result in growth retardation, reproductive failure, impaired defence system, metabolic disorders, unproductivity and even death. Therefore, the chemical composition and the methods of processing of the feedstuffs significantly affect nutrient availability and overall animal performance.

Feed is the most prominent input in animal husbandry. Generally, feed cost accounted for 60 to 70% of the total cost in animal production and therefore substantially affect farm economy by increasing or decreasing profit margin. A study conducted with broilers in Scotland demonstrated that the increase in feed raw material prices particularly in wheat, soybean and feed fat resulted in a reduced profit margin from 112% to 104% point in relation to the recommended balanced protein. Since the profitability of broiler production is the value of the end product minus the input costs to produce that product, profit margin is decreased as the feed price is increased in order to reach the same performance. Feed conversion ratio (FCR) which means as kg amount of feed consumed per kg of live weight gain is a distinct indicator of animal productivity. FCR for fish, poultry, pig, rabbit, sheep and cattle is respectively about 1.5, 2.0, 3.0, 4.0, 6.0, 7.0 and determine the preference of basic animal husbandry depending on the local conditions of a given region.

Vitamin mineral and energy deficiency or erroneous nutrition can easily cause several symptoms such as ketosis, perosis, osteoporosis, muscular dystrophy, encephalomalacia, obesity and other diseases, which affect animal health and significantly decrease farm profitability. Another important point to be considered is the likelihood of feed contamination by pathogens, heavy metals, dioxin or pesticides that can affect the quality and safety of animal foods and cause potential risk to human health. Feed quality inspection has to be carefully monitored in order to avoid these types of health hazards in human and animals.

New concepts in animal nutrition and metabolism require interdisciplinary collaboration, and some challenges have been reported that need to be addressed: comparative nutrition, relationship between endocrinology, immunology and nutritional diseases and nutrigenomic treatments for metabolic diseases. Such scientific areas in animal nutrition can be attractive particularly for young nutritionists since they require perseverance study and meticulous approach.

Key words: Animal nutrition, Animal production, Animal products,

Animal welfare and reducing the use of antibiotics in dairy cattle

Mette Vaarst
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Why focusing on reducing antibiotics in animal farming?

Antibiotics was discovered in 1928, and developed during the first half 20th century and saved human lives. Later, antibiotics was included in the treatment of animals, among others farm animals. It gradually became a management tool, not only to save lives, but to a very large extent to make it possible to produce animals in industrial farming and under conditions, which put them at risk of getting diseased, and to produce more and grow faster. It is better for animals to be raised under conditions, which keep them healthy and meet their natural needs. This is the animal welfare argument for reducing antibiotics.

One major side effect from using antibiotics in this way also clearly developed in terms of increasing problems with antibiotic resistance (AMR), and this is a threat for humans and animals. The risk of losing antibiotics as a life saving tool has been pointed to for years, and the first described cases of antibiotic resistance was among others from Abraham & Chain, 1940. Today, large quantities of antibiotics are getting into the environment after having been used in farm animals. In some cases, the animals only "use" as little as 30% of the applied antibiotics, and the rest goes as the original antibiotic or as fractions into soil and water through slurry and milk, in terms of residuals which then form a risk in the surroundings and for ecosystems.

The connection between Animal Welfare and the Use of Antibiotics

Healthy animals in good welfare conditions do not need antibiotics. In this way, there is an obvious and strong connection between animal welfare and the use of antibiotics. On the other hand, if antibiotics cannot be used for treating sick animals, they will suffer. This is the main argument for keeping the possibility open to treat animals with antibiotics, e.g. in organic farming in Europe.

How can we reduce antibiotic use?

There are many strategies on herd and animal level to reduce the use of antibiotics, and they can be used in parallel. In the following a few explanations of each of them.

Emphasis on health and welfare promotion: The most important strategy to reduce the use of medicine is promotion of animal health and welfare. This is for example reached by giving them space, air, good quality feed, clean water, hygienic surroundings, possibilities for exercise, and stress-free handling. The housing and grazing should be carefully thought through and organised to meet the animals needs in all ways, e.g. physically, physiologically and socially.

Intervene immediately if something wrong is noticed: Fast intervention by analysing the situation and taking action is paramount. Dairy cows and calves have vulnerable periods in their lives, e.g. around calving, and when being newborn, and these animals have to be observed closely. Appropriate action should be immediate, and this requires knowledge and skills, e.g. about epidemiology and ethology. It requires time and good collaboration e.g. with veterinarians and other advisors.

Antibiotics is not always the best option for intervening in case of disease: A decision to treat animals is based on observations and evaluation of the options. Support treatment or pain relief can in many cases be appropriate and enough to treat a sick animal.

Needs institutional support – it cannot only be the individual farmer who should take action

Some of the strategies above require special efforts from more actors, and may require a higher price for products, because antibiotics is often cheaper than investing in more space and more labour hours. On societal level it may require more or different education of farmers and vets, and maybe regulation of prices of antibiotics to stimulate the development of solutions, which are in society's interest, among others because of the reduced risk for AMR.

Key words: Animal welfare, dairy cattle, milk, antibiotic,

Organic livestock in the European Union and Europe – development, challenges, research and recommendations

Otto Schmid, with support of Barbara Früh, Helga Willer and Leiber Florian
Research Institute of Organic Agriculture FiBL, Frick, Switzerland

Introduction

In the first part, an overview of the development of organic livestock in the European Union and Europe is given. It describes the state of the regulatory framework for organic animal production and some relevant ongoing EU research projects for organic animal husbandry. In a second part, some key challenges are highlighted and how the Research Institute of Organic Agriculture FiBL in Switzerland, in collaboration with other institutes in Europe, addresses them in key projects.
In a third part, the results of discussions at and recommendations from the Pre-Conference of the international platform "IFOAM International Animal Husbandry Alliance" (IAHA) - linked to the Organic World Congress in Rennes, France in September 2021 are summarised with a focus on European and international challenges, research and dissemination needs.

Part I Development of organic livestock production and regulatory framework

The yearly updated book "The World of Organic Agriculture" (Willer et al., 2021), published by FiBL and IFOAM - Organics International, reports a steady growth of the organically cultivated land in Europe (in 2019, 16.5 million hectares, 5.9% or +0.9 million hectares increase from 2018 and 2019) and in almost all regions in the world (except Asia). Also, there has been steady growth in the animal sector, and the number of certified organic animals grew substantially in Europe from 2010 to 2019. Tab. 1 gives an overview of organic livestock in Europe in 2019.

Table 1: Development of organic livestock in Europe and the European Union 2010-2019

	Europe				**European Union**	
	Animals [head]	**Organic share of total [%]**	**Change 2018-2019 [%]**	**Change 2010-2019 [%]**	**Animals [head]**	**Organic share of total [%]**
Bovine animals	5'079'962	4.0%	4.1%	80.9%	4'852'303	6.0%
Sheep	5'413'520	3.5%	-9.7%	55.3%	5'214'634	5.3%
Pigs*	1'586'702	0.9%	13.7%	109.6%	1'544'573	1.1%
Poultry**	62'317'071	2.5%	8.0%	110.0%	59'666'753	4.2%

Source: FiBL survey 2021 based on Eurostat and national data sources (Willer et al. 2021)

Notes: *Data for the calculation of organic shares are based on Eurostat and FAOSTAT. The numbers for the organic shares of all livestock are based on FAOSTAT data. FAOSTAT only provides totals for bovine animals, sheep, pigs, and poultry, without further specifications. Please note that growth rates from 2010-2019 were similar for Europe and the European Union. In the case of pigs and poultry, in the official statistics, no clear distinction is made between the number of animals slaughtered and the stable places or average numbers of stock over the year, and it is not always clear which of these is given when "livestock numbers" are quoted. Therefore, adding up the data for pigs and poultry over all countries is not entirely reliable, and country data are not necessarily comparable. Therefore, the data presented here should be treated with caution and are only an approximation of the overall picture.*
** According to the Agricultural Market Information Company AMI, based on average stock, there were 621'000 fattening pigs in Europe and 584'000 in the European Union.*
*** Also, for poultry, there is no consistent reporting. According to the Agricultural Market Information Company (AMI), there were 15.1 million broilers in Europe and 14.6 million in the European Union (based on average stock). There were 27.3 million laying hens in Europe and 25.4 million in the European Union (based on average stock.)*

The strongest growth was seen in the poultry sector, explained by strong market demand for organic eggs in many countries. Bovine animals saw a medium growth rate, and sheep showed the lowest (with a slight decline from

2018-2019). In 2019, the share of organic animals compared with all animals in Europe was 4% for bovine animals, 3% for sheep, 2.5% for poultry and 0.9% for pigs. However, these organic shares are only estimations (with insecurities for pigs and poultry) (Willer et al., 2021).
The low organic shares can be explained by several factors: high investments in pig and poultry houses/stables compared to conventional stable houses, high price premiums for organic animal products for consumers, too little consumer demand and thus low market potential and insufficient local organic feed supply. Differences between countries (regions) are significantly high, e.g. the largest number of organic bovine animals (over 5 million head in Europe) was in Germany, France and Austria with high shares of over 20% organic cattle in Austria, Greece, Liechtenstein, Latvia and Sweden.

Organic cow's milk production has almost doubled since 2007 due to the strong demand for milk and dairy products (Willer et al. 2021). It counted in 2019 for 5.6 million metric tons (European Union 5.5 million), which is about 3.4% of the European Union's milk production, as shown in Fig. 1.

Europe and European Union: Development of organic cow's milk production, 2007-2019
Source: FiBL-AMI surveys 2009-2021

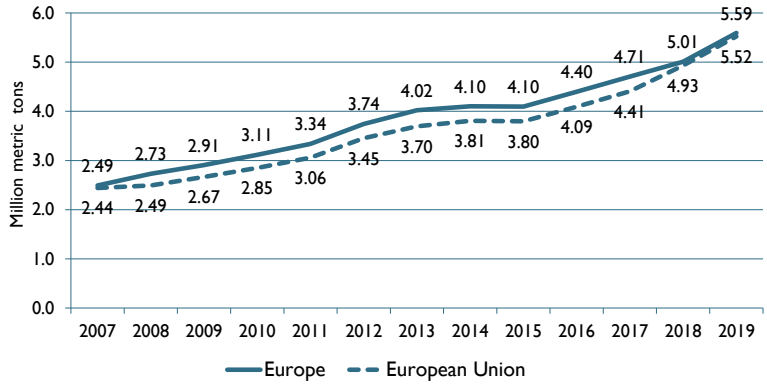

Figure 1. Development of organic cow's milk production 2007-2019 in Europe and the European Union (Source: FiBL & AMI Surveys 2009-2021, Willer et al. 2021)

Regulatory framework for organic agriculture and organic products
Until the end of 2021, the main regulatory framework for organic production in the European Union (EU) was Council Regulation (EC) 834/2007 and Commission Regulation (EC) 889/2008, which are relevant for all EU organic farms and EU organic imports. A new EU organic regulation 2018/848 was adopted in 2018. It will come into force on January 1, 2022. Additional implementing and delegated acts will complement the regulation. There will be a transition period (5 years) to negotiate agreements with countries currently recognised as equivalent. These countries have to change to a compliance system, which means the stricter application of the EU rules with less flexibility for country-specific conditions.
What will technically change for organic livestock? There will be slightly stricter requirements for the indoor and outdoor area and stocking densities, in particular for laying hens, broilers and pigs (with transition periods for old buildings). Furthermore, there will be a phasing out of the use of non-organic protein feed for poultry and pigs. Also, more animal categories are now covered by the EU organic regulation, such as detailed rules for rabbits. Under the new EU organic regulation, imports of organic products into the EU will be monitored more intensively. One of the tools will be increased sampling and residue testing.
Some European private standards and labels, that are relevant mainly for export, have additional requirements for animal husbandry, which are stricture than the EU organic regulation(s), e.g. Bio Suisse (CH), Demeter International, Bioland (DE), Naturland (DE) and Soil Association (UK).
On the international level, the Codex Alimentarius (an FAO/WHO Programme) has worked on and published Guidelines for organically produced foods since 1991, which provide guidance for governments. In the private sector, the International Federation of Organic Agriculture Movements (today: IFOAM – Organics International) has common worldwide principles and standards, which are also relevant for the IFOAM Accreditation Programme.
It might be interesting to mention that some basic principles are reflected in most standards and regulations. One of the principles is that ruminants transform green fodder unsuitable for human consumption into high value-added human foods and nutrient-rich fertilisers. However this transformation is only partially achieved. The EU organic regulation limits the use of concentrated feed still up to 40 % whereas the private BIO SUISSE standards in

Switzerland allow only a maximum proportion of 5% concentrate in the feeding of bovine animals from the year 2022 on ("Feed no food" approach).
Another principle is the system approach for securing animal health. In EU regulations 834/2007 & 889/2008 for organic production, there is a prioritisation regarding means to achieve animal health:

- Long term: Animal breeding (robustness, longevity)
- Medium-term: Prevention of diseases and parasites on animal herd-level (feeding, management)
- Short term: Complementary medicine for individual animals (phytotherapy, homoeopathy)
- In cases of emergency: Current medicine => marketing restrictions (double withholding period)

Overview of some relevant EU projects on organic animal husbandry 2018-2022

In the last years (2018-2022), the European Union has supported a significant number of organic animal husbandry projects. These projects have presented their results in two recent international conferences of the IFOAM International Animal Husbandry Alliance (IAHA) in September 2020 and 2021. Here is a list of some relevant projects:
EU Core Organic Co-fund Projects:

- GrazyDaiSy - Dairy cattle meet their natural needs through grazing, dam-rearing and health support
- ProYoungStock - Promoting young stock and cow health and welfare by natural feeding systems
- MIX-ENABLE - MIXEd livestock farming for improved sustaiNABiLity and robustnEss of organic livestock
- POWER - Power to strengthen welfare and resilience in organic pig production

Other EU projects under Horizon 2020 research programme:

- Organic-PLUS - Pathways to phase out contentious inputs in organic agriculture in Europe
- RELACS – Replacement of Contentious Inputs in Organic Farming Systems
- OK-Net EcoFeed - Organic Knowledge Network on Monogastric Animal Feed

It can be expected that the support of such research projects for organic farming and animal husbandry will help achieve the ambitious goal of the European Union to reach a 25% organic area share by 2030 (2019: 8.1%) stated in the EU "Farm to Fork Strategy" (Willer et al. 2021).

Part II: Technical and research challenges – FiBL projects

The Research Institute of Organic Agriculture FiBL in Switzerland has been, for several years, addressing challenges of animal husbandry; however, it has changed its focus over the years. This is done with research, consulting, continuing education and development cooperation. Research is done using modern infrastructure at the main site in Frick, Switzerland (e.g. new experimental stables) and on over 150 Swiss organic farms with different animal categories and themes. FiBL in Switzerland (with 220 employees) cooperates with other FiBL institutes in Austria, France, Germany, Hungary (ÖMKI), as well as FiBL Europe in Brussels.
At FiBL Switzerland, the Department of Livestock Sciences works on livestock breeding, animal welfare and husbandry, nutrition and health (with more than 30 employees). In Tab. 2, key projects are listed and how they respond to critical challenges.

Table 2. Key challenges and key projects in animal husbandry of FiBL (FiBL, 2021)

Key challenges	**Key projects of FiBL**	**Specific focus areas**
Land-use with livestock	Grassland-based ruminant production -> site adapted breeds, organic cattle breeding Development of an alternative pig breed	Breeding of animals that fit into the organic farming system.
Resource efficiency	Reduction of concentrate feed for ruminants Alternative protein sources: insects and duckweed/water lentils (as means of nutrient recycling)	Roughage in chicken farming - effects on protein utilisation/-efficiency in hybrids and dual-purpose breeds
Emission reduction	Dairy cow longevity as a measure to mitigate CH4 per product unit through increased lifetime daily milk yields	
Animal welfare	'Degrees of Freedom': how much feed choice or social choice can a farm animal have?	Mother-bonded calf rearing, Support for free-range pig farming,

Animal ethics Animal health	How to reduce antibiotic/anthelmintic use by management and/or by phyto-therapeutic solutions?	Farm and pasture slaughtering for improved animal welfare
Climate change	How to tackle heat stress of farm animals?	Behavioural indicators of early heat stress in dairy cows in pasture-based systems. Agroforestry systems with animals

Part III: Recommendations and conclusions from IAHA Conference in September 2021

At the Conference "Organic Animal Husbandry Systems – Ways to improvement" organised by the IFOAM Animal Husbandry Alliance in Rennes, France, in 2021, research and dissemination needs were identified in several workshops. Furthermore, recommendations were made for farmers, researchers, market actors, civil society and public authorities (IAHA, 2021):

- Emphasise the whole-system approach across all areas: to the sector, in policy and research.
- Organic livestock production: adapted domestic breeds or crossbreeds should be supported.
- In organic farming, pasturing should become mandatory, and grassland management needs to be improved
- Climate issues of organic systems should be seen from more systematic perspectives – looking not only at greenhouse gases but as well at animal welfare and biodiversity.
- Communication activities and events should be increased in order to raise consumers' awareness.
- In some countries, controls and audits need improvement to increase consumer`s trust.
- Governmental support for organic animal husbandry should be increased (in terms of funding & research programmes).
- Conduct on-farm and close-to-farm relevant research (e.g. involve universities, advisors and farmers) and communicate practice results back to the farmers (co-learning).
- Make the tools of the European platform "Organic Farm Knowledge" better known for farmers and advisors (organic-farmknowledge.org).

The conclusions of the IAHA conference were summarised in the ***Rennes Declaration of IFOAM Animal Husbandry Alliance*** (IAHA, 2021), where participants (ca. 100) concluded that:

- The centrality of animals/livestock in sustainable agriculture must be well recognised in all initiatives and strategies for organic farming.
- Healthy animals and healthy plants are vital for sustaining the health and vitality of soils, people and cultures.
- Organic animal husbandry systems have the potential to enhance environmental protection & sustainability. Evaluation of the environmental impact of livestock production should focus on the impacts and outputs of the whole system and not focus on individual products.
- Livestock species and breeds must be appropriate for resilient performance under organic management. They must be carefully selected and be well adapted to local conditions and feedstuffs.
- Traditional farming practises, including those followed by pastoralists, must be respected if well adapted to locality, ecology, culture and scale. We support the sustainable use of global grasslands and grazing systems while acknowledging and protecting the contribution of traditional pastoral systems to organic food production.
- The opportunities to learn from traditional production systems need to be understood well for integrating them with modern scientific knowledge, including effective prevention and treatment of diseases.
- In many territories, organic livestock production systems still follow conventional models. We call for the development of new approaches or a return to traditional practices that better fulfil the organic principles. Livestock should be reared in holistic systems that better fulfil the behavioural needs of animals.
- Good welfare for animals should be assured by using tools such as welfare outcomes assessment and appropriate support for farmers to improve their management.
- Policymakers, consumers and farmers need to be supported in understanding the nature and importance of ecologically sustainable livestock production, especially how and why this differs from other production systems.
- Research approaches should be informed by a stronger dialogue and formal collaboration between practitioners and researchers from all relevant disciplines. Also, this calls for enhanced funding for organic livestock research, including capacity building of practitioners of organic livestock production.

Acknowledgements
I want to thank Barbara Früh, Florian Leiber and Helga Willer from FiBL Switzerland for their support.

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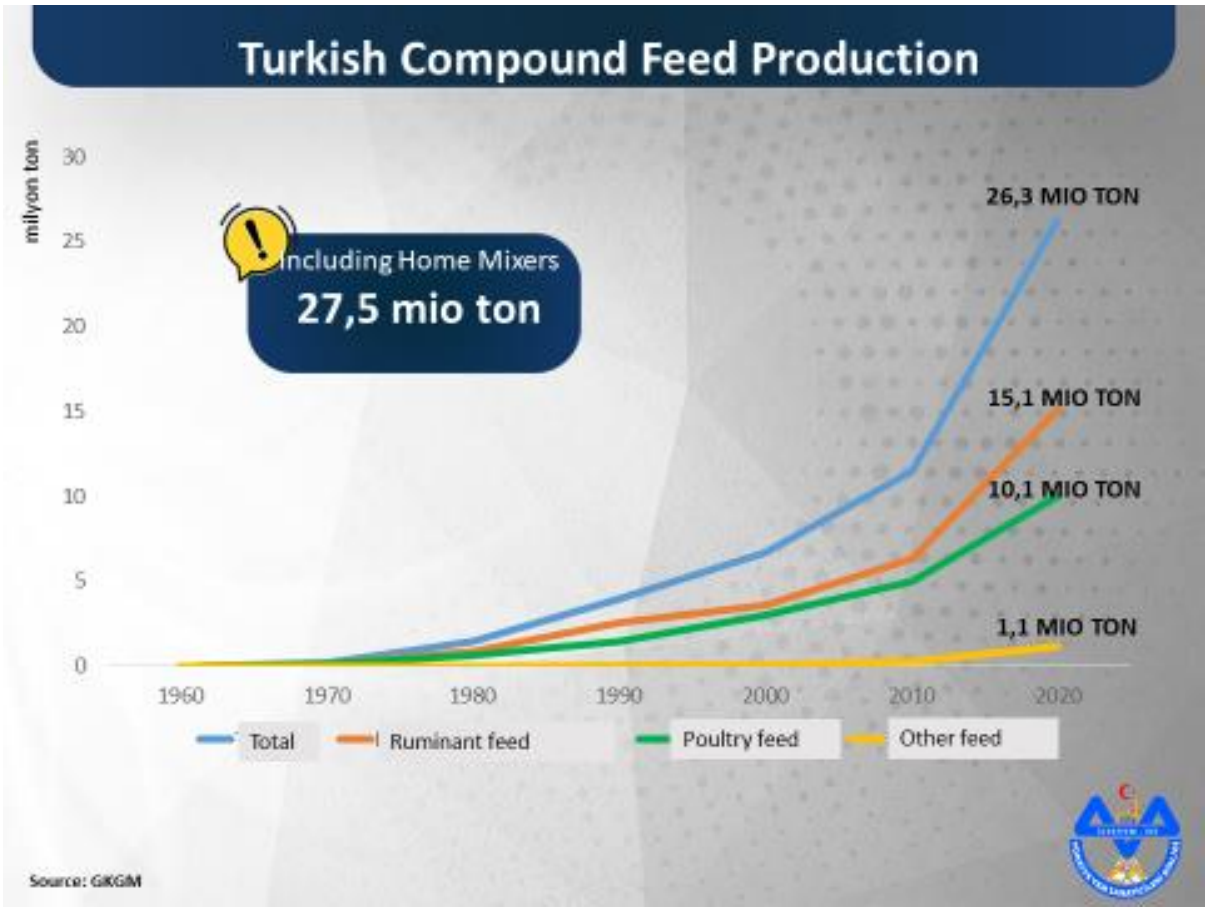
Turkish Compound Feed Industry

M.Ülkü Karakuş
President of Turkish Feed Manufacturers' Association

As it is known, there is an ongoing population growth in Turkey and in the world, and the world population is expected to reach 10 billion by 2050. Along with this population increase, the animal protein demand increases due to the increase in the quality of life of people. With the pandemic, it has emerged how important food security is, and people have realized that they cannot give up food products even if they give up everything.

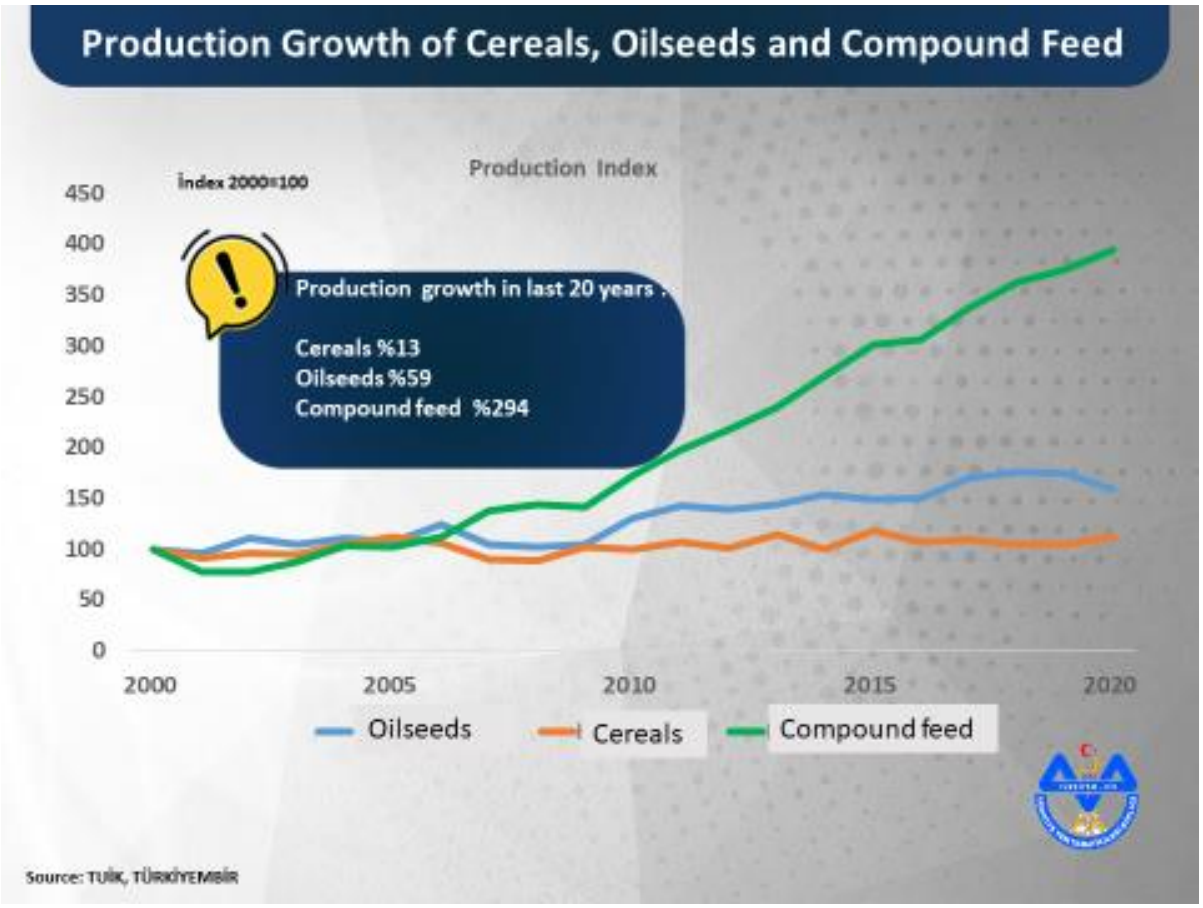
While we are producing more to meet the growing demand for protein, there are challenges ahead on the way. There are many developments in the world on climate change that we became aware of after the Paris Agreement. As we all know, the climate change causes an increase in temperature and changes in precipitation patterns and reminds us that we need to pay more attention to the world we live in. While these changes are taking place, the problem of resource scarcity continues in the world. One of the await challenges is the production of animal and plant protein from these scarce resources. Apart from this, the issue of waste recycling is an important global environmental problem and it is increasing every year. Finally, irregular migration also creates problems in terms of food security in the world. Turkey is the country that suffers the most from this situation, and it undertakes this burden by transferring a resource of almost 100 billion dollars with great devotion. We receive a lot of immigration from the Middle East, especially from countries such as Syria, which have difficulties in living and lack of public safety. We host nearly 7 million immigrants in our country, and we try to meet their health, food and security needs better than they have in the places they come from. This migrant population accounts for almost 10% of Turkey's population and will have a significant impact on food demand in the coming years. In addition, the issue of perception management is one of the critical issues that we struggle with, and public perception is misdirected by exaggerating insignificant issues especially in the media.



The compound feed sector is an environmentally friendly sector that transforms the by-products of various industries into compound feed. It ensures continuity in crop production and contributes to the training of producers. It also greatly supports animal husbandry. As of 2020, our country has become the number one in Europe in terms of compound feed production. When we take into account home mixers, our compound feed production is approximately 27.5 million tons/year. Our country ranks seventh in global compound feed production. Ruminant feeds account for approximately 15 million tons of our total compound feed production, and poultry feeds for 10 million tons.

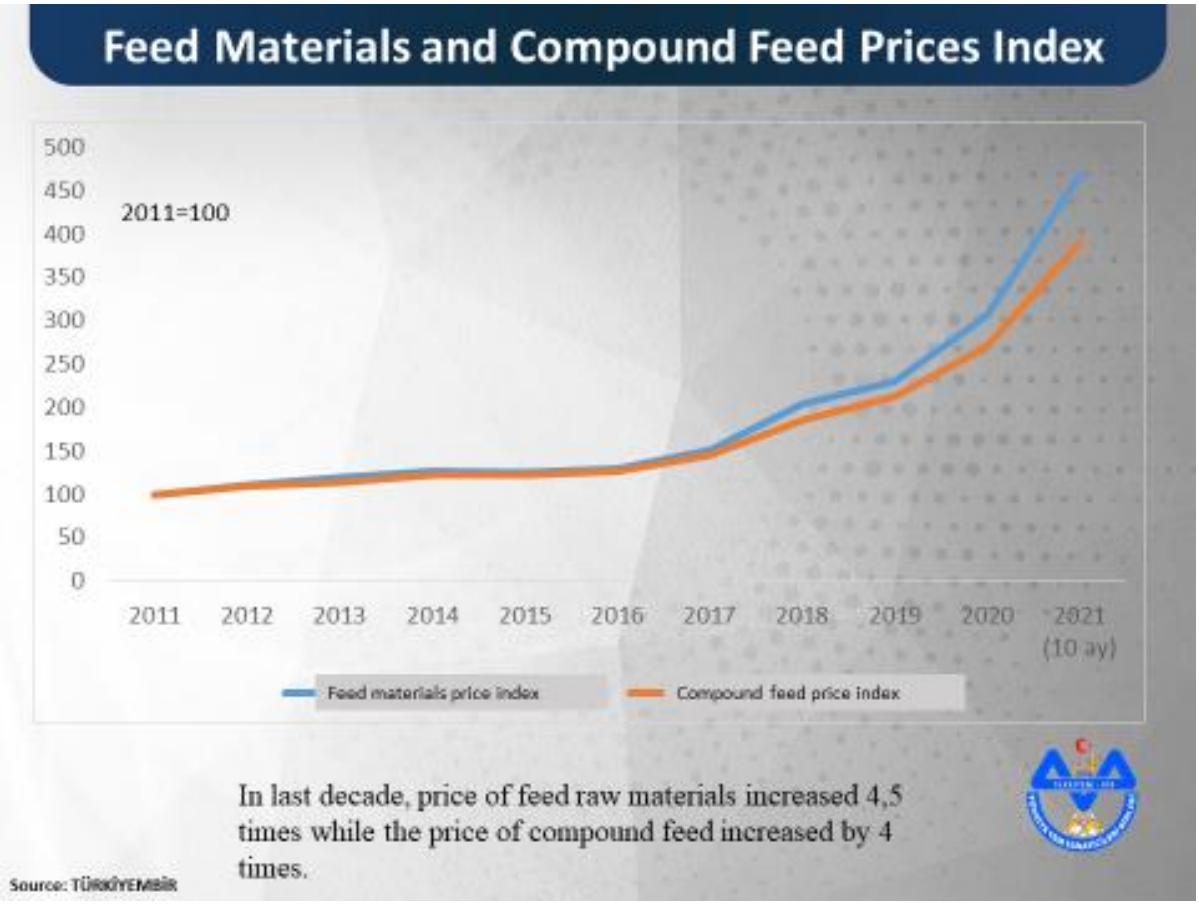
The established compound feed production capacity of Turkey is about 37 million tons and it is expected to reach 40 million tons by 2023. Because in our country, while 50-100 tons/hour high capacity factories are increasing, the small capacity ones are decreasing.

The turnover of our compound feed industry in 2020 was at the level of 54 billion TL, and for 2021 it is estimated to be around 90 billion TL. Considering that we made this 90 billion TL turnover with 90-day deferred sales, will provide a better understanding on feed industry's support to the livestock producers in Turkey. When we look at the production amounts by years, we see that the increase in compound feed production is higher than in the production of grain and oilseeds, so that the production gap has gradually increased and now we have to import feed materials to compensate for this.

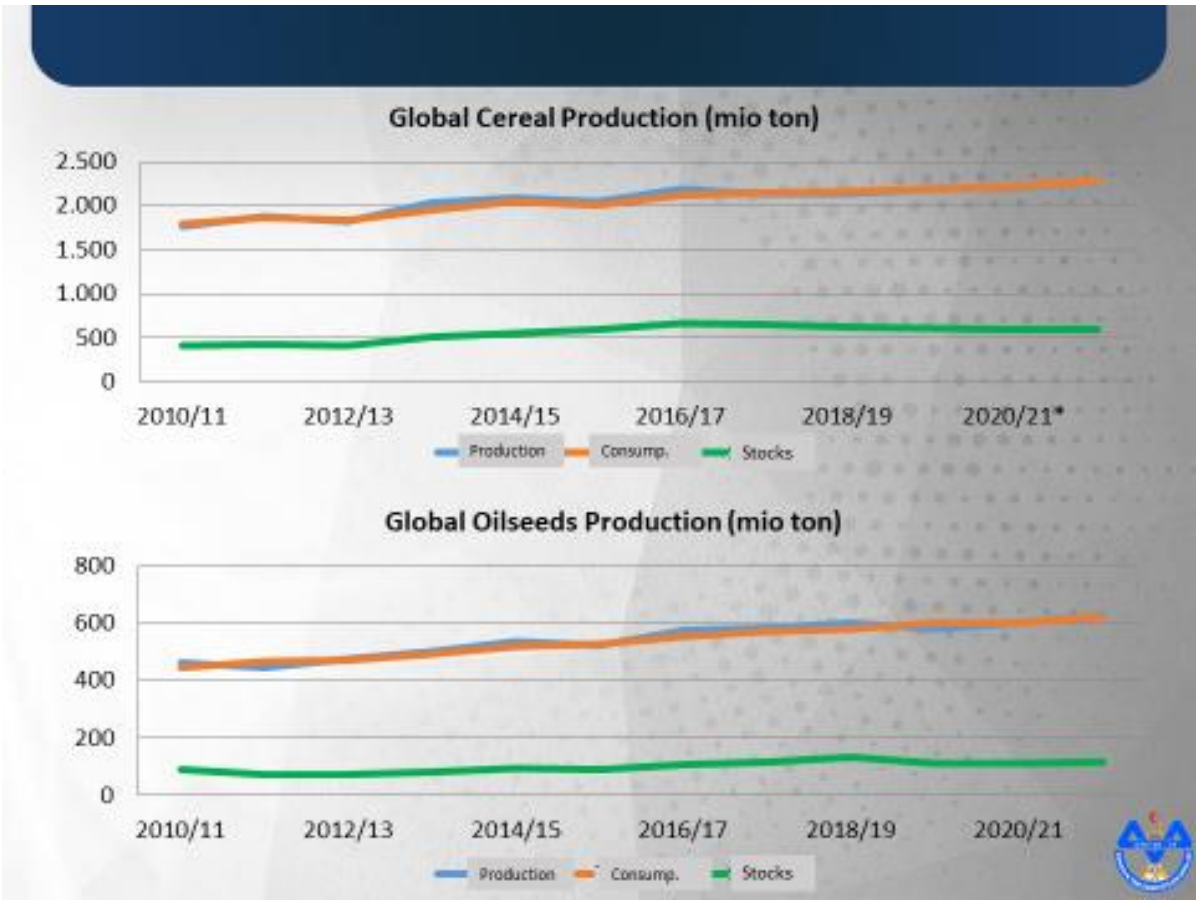


We pay approximately 4 billion dollars for 12 million tons of feed materials imported. Among the imported feed materials, the product which we are most dependent on foreign sources is soybean, and in terms of local soybean production, there is no enough improvement in our country. This shows that we will have to continue our position as an importer of soybean in the coming years. We pay around 1.5 billion dollars for the imported 3.5 million tons of soybean and soybean meal. In addition, we also import feed materials such as corn and its by-products, barley, bran, sunflower seed meal. As you know, we had to import more barley and wheat this year due to the drought in Turkey in 2020, and we guess this situation to continue this year as well.

In our country, we are trying to keep up with the extreme price increases in the world, in this sense, the same thing is happening in Turkey as in the world. Since the beginning of the pandemic, the price increase rate of feed materials in Turkey has been around 70% in dollar, and when we take into account the devaluation conditions in Turkey, it is seen that there has been an increase of around 160% in terms of TL. The price increase rate of feed materials in Turkey has been 163% since the beginning of the pandemic. Compound feed industrialists can predict food inflation before anyone else, taking into account the factors such as fertilizer prices and low productivity in the field. Therefore, looking at the developments in this year, we estimate that the same price increases will be experienced also in 2022.



Cattle feed and dairy feed prices are very important items that affect animal food prices, and similar price increases are observed in these two feed groups. When the compound feed and feed material prices in the last 10 years are analyzed, it is seen that the feed material prices increased 4.5 times in this period , and the prices of compound feed increased 4 times. The reason why compound feed prices have increased less than feed material prices is the reflex of producers in the feed sector to keep prices low due to competition. However, it is a fact that price increases in both feed materials and compouns feed will continue in the coming days. In addition, the fact that the dollar/TL parity changes every day has become an important factor affecting price increases.



There is 2.3 billion tons of grain production in the world, which continues to increase regularly in the last 10 years, so there is no decrease in production. When we look at the global grain stocks, it is seen that the grain stocks, which were 400 million tons 10 years ago, increased to 600 million tons currently. The same is true for oilseeds, there is 600 million tons of production and an increase is seen in stocks. However, there has been a 250% increase in oil prices, and this situation cannot be described by economics. The supply is increasing, but the demand is not increasing at the same rate, but there is a tremendous rise in prices. While we expect a decrease in prices according to the current production and stock data, the reason why this decrease did not occur is the uncontrolled release of 20 trillion dollars due to the pandemic. This money, which has been put on the market, is invested in various commodities such as barley, soybean, iron, steel and plastic. Therefore, there has been a disruption in the markets and the prices of all products become 2 times higher than their ideal value.

We are at the global average level in terms of per capita meat consumption, this amount needs to be increased even more. We see that the share of agriculture in economic activities has decreased to 7% and this is no longer a sustainable situation. The fact that the rural population has fallen to around 7% inadequacies in agricultural production and therefore rise in prices.

Since the rate of plant production is insufficient for the animal production, imports are gradually increasing in Turkey. The people in rural areas cannot earn regular money from agriculture, so they give up production and migrate to metropolises; this makes us even more dependent on imports. With the efforts on land consolidation and efficient use of water, we can prevent some decrease production. Agricultural statistics and inventories need to be reviewed. In irrigable areas, it is necessary to abandon wild irrigation and switch to controlled irrigation methods. It is important to give agricultural support in advance. Implementing the basin-based production model in a reasonable and efficient way is one of the issues that should be given priority. In order to ensure sustainability in agricultural production, people working in the agricultural sector should be allowed to earn regular and sufficient income.

Distinguished representatives of our country's agriculture and livestock sector and distinguished participants of the meeting,

Cihan Soyalp
TMO Assistant General Manager

First of all, I would like to thank the officials of the Animal Science Federation of Turkey for their kind invitation and greet you all with respect.

Task of TMO

As known, TMO, primarily regulates the grain and pulses markets; operates the state monopoly on opium and narcotic substances that **fall under its field of tasks**; keeps the grain stock that can be used in emergency situations; provides food aid to countries in need in cooperation with AFAD and Red Crescent; and in addition, continues to fulfill the duties (hazelnuts, raisins, dried apricots, etc.) as given by Presidency Decree.

Within the scope of these duties, as the Turkish Grain Board, we have a regulatory role in agricultural markets.

While ensuring that, our people have access to basic food at affordable prices, we take actions in the market to ensure continuity in production.

In this way, we know that the importance of animal husbandry cannot be denied as it is a part of our people's nutrition and agricultural production.

Animal Husbandry in Turkey

The livestock sector constitutes 55% of the 550 billion TL agricultural productions realized in Turkey only in 2020. (TURKSTAT)

In the last 5 years, the production value of the livestock sector has almost doubled.

The production of our feed industry alone reached 26 million tons in 2020.

The production of approximately 304 billion Turkish Liras of live animals and animal products means that our people consume domestic products produced by our own people and an increase in employment.

As TMO, we are aware of the importance of the livestock and feed industry.

In this way, we continue to pay attention to consultation with our sector stakeholders and produce proactive policies.

World Grain Markets

You know the extraordinary conditions that the world and therefore our country are passing through this season.

We experienced the hottest year of the last 40 years in 2020.

In 2021, agricultural production was affected globally by drought and heat.

Wheat and barley production of the main exporting countries decreased by 5-36%. Corn production, on the other hand, increased by 7-34% on average.

While exporting countries experiencing product loss are turning on export tax and quota applications in response to the decrease in production in the global market, on the other hand, importing countries, whose demands have increased, have switched to practices that facilitate imports.

In summary, while the supply of raw materials contracted, the demand for raw materials increased rather than decreased.As a result, there was an annual increase of 20-100% in international grain prices and an increase of 160% in freight.

Turkish Grain Markets

Unfortunately, **agricultural production of our country** was also affected by drought and extreme heat, and wheat production decreased by 14% to 17.7 million tons, and barley production decreased by 31% to 5.7 million tons.

Production in corn remained at the same level of the previous year (6.5 million tons).

Within the significant growth in the production of our livestock sector in the last 10 years and its production for export, the dependency on imported raw materials and the importance of exports have increased even more.

Since half of the feed raw materials used in the sector depend on imports, global risks directly affect our livestock sector.

As TMO, we are monitoring these markets closely and evaluating possible risks. As I have just mentioned, there are extraordinary conditions this season. Our domestic prices would be above the world prices normally.

When we announced our purchase prices, we preferred to announce a level above the world prices.

However, this season, while the demand of grain importing countries in the world increased, they also switched to practices that facilitated imports; on the other hand, exporting countries that experienced product loss turned to additional export tax and quota applications.

As a result, world prices rose to levels above domestic prices. Naturally, this situation was reflected as an increase in the prices of raw materials supplied through imports in previous years due to high import costs.

Actions Implemented by TMO

As TMO, we took quick steps to eliminate the market-distorting effect of the global and domestic supply/demand imbalance.

Right after announcing our **procurement** prices, we announced our sale prices so that the industry could see the way ahead.

In June, we started to back up TMO stocks in line with the country's needs.

Due to the market prices exceeded the TMO's procurement prices, there was no significant grain procurements happened into the stocks of the institution. The corn market, whose harvest began in August, was closely monitored. Since our corn producers had the opportunity to sell their products at increasing local prices, so TMO was not announced **a procurement price for corn**.

Since the beginning of the season we have made the **necessary amount of import connections**, that we do not normally make during the harvest period.

The another action that we do not normally do was, without waiting for the end of the harvest, we have started to sell the products in our stocks as of July, within the scope of **the feed market stabilization campaign** that we started to support our meat, dairy and feed producers who adding value to our country's livestock sector.

Moreover, we consulted with other public institutions and organizations on the regulation of customs duties in order to provide the sector to import its own product independently from TMO with low costs.

Feed Market Stabilization Campaign

Our aim here was primarily to reduce the costs of our farmers dealing with animal husbandry, which is another branch of agricultural production.

In addition to our farmers, we sold our stocks to feed industry sector.

Hence, with these sales, we observed some stabilization in feed prices in July and August, when the campaign started.

As of November, we added corn beside our barley and feed wheat sales.

Considering the actual consumption figures of poultry sector companies, we have allocated amount of corn sales. We continue to supply products especially to our facilities and also to the breeders, producers, and feed industry.

With the Campaign, we provided 2,6 million tons of wheat, barley and corn for breeders, producers, feed mills and poultry integrated facilities.

While contributing to the nutrition of approximately 4.5 million animals, we also provided affordable raw materials to 200 poultry integrated facilities.

According to our calculations, we prevented an additional 2 billion TL cost that may occur in the livestock and feed sector.

Dear participants

As TMO, we will continue to follow the markets closely in the upcoming period.

We are going through a period forced by pandemic conditions. I would like to thank you in advance for your cooperation in this process.

Thank you to everyone involved in the organization.

Meat and Dairy Sector in Turkey

Kamil Özcan
President of Turkey DSYB

Cattle Breeders' Association of Turkey is a farmer's organization organized in 81 provinces in the form of Association, operating in cattle breeding since 1995, with more than 1 million members and more than 1800 employees, providing service to breeders.

Beside carring out breeding development studies jointly with the Ministry of Agriculture and Forestry, it successfully represents our breeders in the international arena. As Cattle Breeders' Association of Turkey Technical Affairs Branch Directorate, within the scope of the Regulation on the Establishment and Services of Animal Breeding Assosiations for Breeding Purposes in force;

Information within the scope of breeding developmant studies is collected by the Technical Affairs Branch Directorate of the Association or the technical affairs unit, and recorded in the e-breed database, which is the heardbook and pre- heardbook registration system. Due to the study and analyzes obtained at the national level on the data, evaluation studies can be made on many issues, especially the general situation of the province, the breeding value estimation, and subsidies.

As you know, in the face of the recent cost increases as well as the developments in the feed market, Cattle Breeders' Association of Turkey Board of Directors exerts an intense effort to ensure that our breeders can get their money's worth and sell the milk they produce at a value price. In the face of increasing feed prices, our goal is to provide relief to our breeders by increasing the raw milk price a little more. In this regard, our initiatives continue at the Ministry.

We consider the demands we have received from our breeders as our duty, and we carry them to the relevant authorities, especially the Ministry of Agriculture and Forestry, and we make an intense effort for the solution. With the power we get from our Provincial Assosiations and breeders, we continue to work resolutely and consistently in order to bring the cattle industry in Turkey to the place it deserves in the national and international arena.

The pandemic process we have been going through for the last two years has once again shown us how important food reliability is as well as food safety. All over the world, countries have stopped activities in many sectors by taking measures within themselves. However, in order to provide the necessary food supply for people to continue their lives, agriculture, especially the livestock sector, has always continued production. This once again showed how hard work does the people engage in agriculture and animal husbandry. Despite all this, we know that the producers is not able to get thier money's worth, or even incurs a loss, especially due to the high input costs.

Due to the efforts of Province Cattle Breeders' Associations and Cattle Breeders' Association of Turkey, which is trying to carry the country's livestock to higher levels, we see that the average milk yield in cattle was 7 liters in the past, but today it exceeds 20 liters. It is an important and strategic issue that cannot be sacrificed to policies that provide short-term solutions and regulations far from scientific infrastructure.

SECTION I

BEEKEEPING

(ORAL PRESENTATIONS)

Factors affecting the yield and quality of bee venom

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Today, beekeeping has a great importance in agricultural activities and rural development processes in many developing countries. Beekeeping; It is a branch of agriculture that provides cheap and easy employment opportunities, is not dependent on land, is a sole source of livelihood for families with landless or little land, and has no harmful effects on the environment and 31ort h. As a result of beekeeping activities, many bee products such as royal jelly, honey, pollen, propolis bee venom are produced. Although bees use these products for their own development and protection, they have many positive effects on human health. While these products meet the basic needs of our body for energy and nutrients naturally, they also enable individuals to be resistant to diseases with their antibacterial, antiparasitic and antiviral effects. Mainly honey is produced in beekeeping enterprises, but it is important to produce other bee products, which are at least as valuable as honey, and to diversify their products in terms of economic gain. Bee venom, which is among these products, is used as a great source in Apitherapy, which is one of the traditional and complementary medicine applications that has made great progress in recent years. Various studies have been carried out on bee venom, especially in recent years, on its use in apitherapy and its chemical structure. It is used in some neurological disorders such as Parkinson's Disease, MS, ALS, which affect the musculoskeletal system, especially in studies performed in apitherapy, rheumatic diseases such as Ankylosing Spondylitis and Rheumatoid Arthritis, Lyme Disease, diseases such as myalgia, fibromyalgia, arthralgia, neuralgia. 31ort his reason, it is important to produce this product as a quality product. There are many factors that affect the quality of bee venom. Bee venom production conditions, the devices used in the production of bee venom, the location of the device in the hive, the voltage level of the device, the harvest time (season, time), the bee race to be collected and the age of the bees, the storage conditions of the collected venom are the factors affecting the venom production capacity and quality of the bees. In this paper, the factors affecting bee venom yield and quality.

Key Words: Beekeeping, bee venom, apitherapy

Usage of apilarnile in animal husbandry

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Apilarnil; It is the product obtained by collecting and homogenizing the honeycomb cells with drone brood together with their food in 3-7 days. What makes Apilarnil important is the amino acids in its structure. These amino acids are among the amino acids that cannot be synthesized by humans and animals. Scientifically, researches are carried out on various functional food sources in order to eliminate the nutritional deficiencies that cause diseases in human health, the residues left by synthetic drugs in humans and animals, the imbalance and protein deficiency in the human and animal body. The use of drugs that leave residues, especially in the ailments encountered in animals, by breeders not only causes harm to animals, but also negatively affects human health with the consumption of animal products obtained. For this reason, considering the negativities encountered, it is important to use natural products as treatment and support in both human and animal health. According to the researches, drone larvae play a complementary role in the solution of various health problems such as cell renewal, energizing the body, treatment of neurodegenerative disorders, regulation of reproductive physiology, as they contain highly valuable nutritional components. Studies on the importance of apilarnil in animal health have been researched and compiled in order to create a resource for future studies.

Key Words: Beekeeping, apilarnil, bee

Important issues about olfactory conditioning of the proboscis extension response (per) experiment in bees

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Classical conditioning is a form of conditioning in which a creature learns to associate a neutral stimulus that does not initially elicit a behavioral response, with the stimulus of biological significance, which is innate, usually a reflexive response. Learning and memory are understood by the proboscis extension response (Proboscis extension reflex = PER) in bees. The first stage of PER protocols begins with capturing foragers from the beehive, they are immobilized on ice, fixed to bee holder tubes, fed with sugar syrup after being kept in the dark before the application, at the final stage, exposed to odors and sugar syrup, and allowed to learn. Although more than 70 years have passed since the first conditioning study in bees, different results were obtained even when the same questions were asked in different studies. Bees are highly affected by environmental and genetic factors. Due to the protocols applied are still not fully standardized, variations may occur at the end of the studies, as well. PER studies to be carried out are crucial in terms of better understanding of bee behaviors whose populations are decreasing day by day and to protect their populations.

Keywords: PER, proboscis extension reflex, bees, classical conditioning, olfactory

The viability of spermatozoa in the spermathecae of the honey bee queens (*apis mellifera* l.) at different ages

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The storage of spermatozoa and keeping alive for years in the spermatheca by the honey bee queen is a phenomenon allowing her to fertilise eggs throughout her life. The number of spermatozoa stored in the spermatheca determines the fecundity and longevity of the queen. Studies on the changes in the viability of spermatozoa in the spermatheca of the queen over time are limited. In this study, the queens that were 2-week, 1-year and 2-year old were analyzed to determine the changes in the viability of spermatozoa in the spermatheca over time. The sister queens that were reared by the grafting method were instrumentally inseminated with 8 µl fresh semen when they became 6 days old. One week after instrumental insemination, one batch of queens (2-week old) was dissected for spermatozoa viability test. Another set of queens was introduced into production colonies in Langstroth hives after starting to lay eggs in the mating nuclei. The queens were maintained in production colonies until dissection for spermatozoa viability test at one year and two years. The viability of spermatozoa was measured by the dual staining method. The spermathecal contents of each queen were stained with fluorescent dyes. Then the number of live and dead spermatozoa were counted to calculate the viability of spermatozoa. We determined that the mean viability of spermatozoa in 2-week, 1-year and 2-year-old queens were 97.3%, 91.1% and 88.1%, respectively. The viability of spermatozoa in queens decreased with age, and the differences between the viability means were significant ($P<0.001$). However, we did not detect a steep decline in the viability of spermatozoa in queens (6% in one year and 9% in two years) in a wide range of timescale in contrast to previous research reports. Furthermore, we found pretty high viability of spermatozoa in the spermathecae of queens at the start of their lives.

Keywords: Honey bee, queen, *apis mellifera*, the viability of spermatozoa, spermatheca

The impact of biopesticides on pollen and nectar consumption preferences in *bombus terrestris*

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As an alternative to chemical pesticides, biological pesticides are thought to be less harmful to beneficial insects, including bees, due to their natural origin. Therefore their usage against pests in greenhouse cultivation is becoming more common day by day. However, the findings regarding the possible effects on *Bombus terrestris*, which are used extensively in greenhouse cultivation, are not certain. This study was carried out to determine whether five different biopesticides, which are commercially sold in our country and have been widely used in against pests in greenhouse crops, have any effects on the feeding consumption preference of B. terrestris workers. In this study, we aimed to determine the efficacy of 8-12 days aged workers exposed to five different biopesticides (*Beauveria bassiana* strain Bb-1, Isaria (*Paecilomyces*) fumosoreus strain PFs-1, *Lecanicillium lecanii* strain V1-1, Azadirachtin, and *Bacillus thuringiensis*) by using the microcolony method under controlled laboratory conditions. As a result of the study, which continued for 21 days, the differences were statistically significant in terms of nectar and pollen consumption values, and the number of dying workers within the colony and between the colonies ($P<0.05$). While the feeding consumption amounts varied between days, workers mortalities reached their maximum level on the 7th control day. The findings that can contribute to the interpretation of whether the desire of bumblebee to forage on flowers contaminated with these biopesticides will be reduced or not, guides other studies. The present study suggests that further studies are needed for well understanding of the effectiveness of these biopesticides about food consumption for bumblebees.

Keywords: Biological pesticides, bombus terrestris, food consumption, microcolony

RNAi as a potential struggle against the honeybee ectoparasite *varroa destructor*

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Damages caused by *Varroa destructor* and the bee pathogens it carries, inevitable colony losses and the increase in production costs in parallel with this create global economic problems in the beekeeping sector. Organic acids, chemicals that threaten human health, essential oils, mechanical methods and behavioral properties are used for many years against Varroa, which has been threatening the beekeeping industry. However, despite all these applications, the desired results could not be obtained. For these reasons, alternative and definitive solutions are sought in the struggle against Varroa. Continuously developing molecular genetic methods and technologies have recently been applied in this field and have yielded successful results. The latest situation in the struggle against diseases and pests is the use of genome editing and gene silencing technologies. From this point of view, in this study, the existing literature was reviewed to determine the potential of RNA interference (RNAi) technology, which is an RNA-mediated sequence-specific post-transcriptional gene silencing mechanism, in the struggle against Varroa.

Keywords: Honey bee, RNA interference (RNAi), Varroa mite

Evaluation of technical and functional features of bee hives used for beekeeping conditions in terms of bee health and welfare

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In this study, the technical and functional properties of migratory beekeeping, which is used in Aegean Region, were determined with laboratory and field studies. With this purpose, within the city of Izmir which has a big honey production potential in Aegean Region, a total of 24 hives, with 3 pieces each from 4 different types (Langstroth, Wood-plastic composite, Plastic, Styrofoam) were used. The temperature and moisture in each hive were recorded throughout the whole study with the help of the sensors placed at the bottom and top surfaces of the hives. So the structural and design characteristics, the effects for easing the bee activities, the interaction of inner hive conditions with outside conditions, the practical use of the hives in migratory beekeeping were determined. Additionally, the growth properties of the colonies in different types of hives were observed and the effect of the hive type on the colony was determined. In the study, it is initially determined that the wireless sensor can measure the temperature and moisture in different hives and can send the data to the main computer with Wi-Fi. This data tells us that styrofoam hives are the most suitable whilst Langstroth and wood-plastic composite are more suitable than the plastic ones. With the use of the data determined in this study, choosing the suitable hives for migratory beekeeping is determined.

Keywords: Migratory beekeeping, hive material, bee welfare, IOT technology

Apiteraphy and cancer

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Apitherapy, a complementary and alternative medicine approach, promises improved cancer survival and possibly cure. Determining the place of apitherapy in cancer research will contribute to the way for treatments to be developed in this area. However, the potential of numerous bee products merits more investigation, notably in cancer prevention and alternative medicine. The recommendations contained in the literature have been compared with the findings of published clinical trials. Pollen and propolis are frequently given to boost immune system strength and/or cancer nourishment. With such a little amount of precise data, none of them are provided adequate information when compared to what is known from bee product clinical studies. There has been no discussion of the key aspects of cancer treatment based on evidence. In many areas of cancer, apitherapeutic literature is not a credible source of knowledge. Not enough studies have been done. In this review, we have reviewed the work done so far.

Keywords: Apiteraphy, alternative medicine, cancer, bee product, Immune system.

Some yield and performance parameters of anatolian honey bee *(apis mellifera* l.*)*

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Although the homeland of the honey bee (*Apis mellifera* L.) is the African Continent, it is known that it has adapted to very different ecological conditions in almost every part of the world and that different populations have been formed in terms of morphological, physiological, behavioral and molecular genetic structure. The taxonomic definition of 27 subspecies (race) has been made, thanks to the morphological structure that has been especially evaluated in the last hundred years. From this point of view, every bee race is a product of the geography in which it was formed. In this sense, race is the population formed by the common effect of the genotype and the geographical conditions in which it occurs. For this reason, each bee race is defined by the name of the geographical region in which it occurs. The number of subspecies defined in the Anatolian geography is 5. Therefore, approximately 22-23% of the world's bee genetic diversity is unique to this geography. In this study, which was carried out within the scope of conservation and improvement studies of the original breeds in the regions where they are distributed, various breeding studies were initiated throughout Turkey. In this study, the performance data of the breeding candidate colonies selected in the isolated region within the scope of the breeding studies of the Anatolian bee, which spreads throughout the Central Anatolia region, were examined. The study was carried out on 200 colonies and honey yields, acrimony levels, development and hygienic behaviors of the colonies were examined. As a result of the study, the number of bee frames of the colonies included in the study was determined as 7.14±2.36 units, hygiene behavior 96.47±2.52 %, aggression behavior 1.03±0.23 and honey yield 9.71±2.55 kg during the period.

Keywords: Anatolian bee, performance values, honey yield, aggressiveness, hygienic behavior

Some yield and performance parameters of hatay honey bee *(apis mellifera l.)*

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Turkey has adapted to different geographical regions of the Caucasus (*A. m. caucasica*), Anatolia (*A. m. anatoliaca*), Syria (*A. m. Syriaca*), Iran (*A. m. meda*) and Carniolan (*A. m. carnica*) has important bee breeds. Although the homeland of the honey bee (*Apis mellifera* L.) is the African Continent, it is known that it has adapted to very different ecological conditions in almost every part of the world and that different populations have been formed in terms of morphological, physiological, behavioral and molecular genetic structure. The taxonomic definition of 27 subspecies (race) has been made, thanks to the morphological structure that has been especially evaluated in the last hundred years. From this point of view, every bee race is a product of the geography in which it was formed. In this sense, race is the population formed by the common effect of the genotype and the geographical conditions in which it occurs. For this reason, each bee race is defined by the name of the geographical region in which it occurs. The number of subspecies defined in the Anatolian geography is 5. Therefore, approximately 22-23% of the world's bee genetic diversity is unique to this geography. This genetic richness, which is the result of an advantage provided by the ecological structure and integrated with the agricultural culture, is also understood from the fact that the country occupies the second place in the world with its 7.5 million colonies and 100 thousand tons of honey production. Various breeding studies have been initiated within the scope of the conservation and improvement works of the original breeds in the regions where they are distributed throughout Turkey. In this study, the performance data of the breeding candidate colonies selected in Hatay city, which spreads throughout the Hatay city, were examined. The study was carried out on 200 colonies and honey yields, agressive levels, development and hygienic behaviors of the colonies were examined. As a result of the study, the number of bee frames of the colonies included in the study was determined as 9.76±2.39 kg, hygiene behavior 93.53±5.01 %, aggression behavior 3.36±1.48 and honey yield 17.76±3.62 kg during the period.

Keywords: Anatolian bee, performance values, honey yield, aggressiveness, hygienic behavior

Organic beekeeping in Turkey

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The necessity to produce more, which occurred in parallel with the rapid increase of the world population, has led to the possibility that certain characteristics such as safety and quality would be ignored in food production. However, over time, depending on the changes in awareness of nutrition and due to the high level of income, new demands have arisen in some societies. Organic beekeeping, which is shaped within this structure, is generally based on obtaining the product without exposure to any nutrients and chemicals other than organic honey, breeding in areas that are not deconstructed and vulnerable to pollutants, and inspecting all stages by the control and certification. Organic beekeeping, which allows to increase the income from beekeeping and allow consumers to supply products with the desired characteristics, is developing as a new model in Turkey. However, it is appropriate to make some plans for the much more efficient use of both natural and publicly resources. In this study prepared for this purpose, the current situation was evaluated by taking into account the relevant regulation, and on the other hand, recommendations were made for the efficient use of resources in the country where colony density is increasing.

Keywords: Turkey, honeybee, bee breeding, organic bee breeding, honey

In-vitro bioaccessible potential of chestnut honey on sunflower honey

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Honey is a unique food substance produced by the honey bees (*Apis mellifera*) from nectars of flowers and/or secretions of the plants. In the production, flower nectars or plant secretions are collected by the bees, then converted to honey in their bodies by incorporating the special substances. Thereafter, the raw honey is stored in the honeycomb until maturation. The value of the honey product and its effects on health are evaluated in terms of pollen and sugar sources. While sunflower honey is the most common and easily accessible honey, chestnut honey is a more valuable honey type that is not easily accessible by consumers. Spectrophotometric analysis of antioxidant capacity and total phenolic content put forth the bioactive potential and give the chance for evaluating food products in this context. Bioaccessibilty is term of substance that available to human body can utilize. By in-vitro bioaccessibilty evaluation of gastrointestinal enzyme of indicates the biological bioactive potential in food products. In this study sun flower and chestnut honeys have evaluated in terms of DPPH and Total Phenolic Content analysis. Results have showed that chestnut honey has a great potential over sun flower honey in a way that justifies the demand for honey.

Keywords: Chestnut honey, bioactive potential, DPPH, total phenolic content

SECTION II

BIOMETRICS - GENETICS

(ORAL PRESENTATIONS)

Estimation of genetic and phenotypic parameters for some growth, reproduction and production traits of anatolian buffaloes in yozgat province

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The objective of this study was to investigate the genetic and phenotypic parameters of some growth, reproduction and production traits of Anatolian buffaloes in Yozgat province. The reproductive and productive data belonging to 1139 Anatolian buffaloes and growth records of their calves were used for this purpose. 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. 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. Genetic and phenotypic parameters were estimated from univariate and bivariate animal model using REML procedure in Wombat software where village, year, season, sex, age of dam and age at calving were considered as fixed effects and animal additive genetic effect was taken as random. The heritability estimates for above mentioned growth traits were 0.28 ± 0.08; 0.45 ± 0.29; 0.56 ± 0.10; 0.76 ± 0.18; 0.32 ± 0.28; 0.54 ± 0.10; 0.69 ± 0.17 and 0.24 ± 0.19 respectively. The heritability estimates for two reproductive traits were 0.11 and 0.11 respectively. The heritability estimates for lactation milk yield and other production traits were 0.25 ± 0.02, 0.58 ± 0.55; 0.25; 0.25 ± 0.05; 0.25 ± 0.02 and 0.25 ± 0.02 respectively. Genetic and phenotypic correlations within their own categories of growth, reproduction and production traits were generally positive and varied between 0.06 ± 0.03 and 0.99 ± 0.17. The magnitudes of negative genetic and phenotypic correlations between these traits were among -0.04 ± 0.03 and -0.31 ± 0.12. In the light of these results, heritability, genetic and phenotypic correlations on growth, reproduction and production traits indicated that there were some opportunities for livestock improvement programs in buffalo breeding. It was concluded that these genetic parameters should be taken into account in selection programs and the yields can be increased by using the traits with high heritability as selection criteria.

Keywords: Anatolian buffalo, genetic parameters, animal model, heritability

Comparison of some heritability estimation approaches

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In this study, some (ANOVA, Epsilon squared, Omega squared, Maximum likelihood and Restricted maximum likelihood) heritability estimation methods were compared in terms of their performance in the one- way analysis of variance model. "Bias" was taken into account as a performance criterion. For this purpose, Monte Carlo simulation technique was used. In the study, four different number of groups (k=10, 20, 30 and 40), five different sample sizes (n=3, 5, 8, 10 and 20), two different variance ratios (max/min=1 and 10) and three effect sizes (f=0.10, 0.25 and 0.40), totally 120 different experimental conditions were examined. The performances of the estimation methods were evaluated over 10000 samples in each experimental condition. The simulations were made with the codes written in the R- Project. As expected, the performances of the estimation methods were positively affected by the increase in sample size and total number of observations. However, the ANOVA gave the most unbiased estimates in almost all of the experimental conditions considered. It was followed by Epsilon squared and Omega squared. Especially in cases where the total number of observations is small, Maximum Likelihood and Restricted Maximum Likelihood made estimations with serious deviations.

Keywords: Epsilon squared, omega squared, Intra-class correlation coefficient, restricted maksimum likelihood, simulation

Estimation of genetic parameters for embryonic mortality and hatching weight by using gibbs sampling in japanese quails (*coturnix coturnix japonica*)

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Embryonic survivability in incubated eggs is affected by the genotype of the embryo and eggs environment. Embryonic mortality (EM) due to anatomical changes and specific physiological needs on developmental stages are observed in 3 different stages: early, middle, and late stage. This study was conducted to estimate genetic parameters of the embryonic mortality stages, which are threshold traits, by using Gibbs sampling method. Total 2127 hatching eggs were used from the Japanese quail population in the COMUDAM poultry unit. Embryonic mortality was categorized as mortality, and no mortality. Early embryo mortality (EEM, 0-7 days), mid-term embryo mortality (MEM, 8-14 days) and late embryo mortality (LEM, 15-18 days) were determined in unhatched eggs. Bivariate analysis of embryonic mortality stages and hatching weights (HW) were performed using an Animal Model. Gibbs sampling method was used for the analysis of the traits. In the threshold mixed linear model, yi = w'iθ = x'iβ + z'i + ei, the yi value is assumed to be a latent or essentially unobservable variable x'i vector containing fixed effects (hatching date and gender for HW), z'i vector containing the effect of random additive genetic and maternal genetic effects, ei is the error effect with a mean of 0 and a variance of 1 and showing a normal distribution. The THRGIBBS3F90 program, which was developed for the analysis of threshold traits of Gibbs sampling based on Bayesian statistics was used in the estimation of the components of (co)variances. Using posterior distributions of variance-covariance estimates, additive heritability (h2a), maternal heritability (h2m) and genetic correlations were estimated. The direct heritabilities of EEM, MEM, and LEM from bivariate analysis with an animal model were 0.07±0.03, 0.06±0.01 and 0.06±0.01, respectively. Maternal heritabilities of these traits were 0.06±0.02, 0.02±0.01 and 0.03±0.01. The heritability of total embryonic mortality (TEM) was 0.15±0.04. While no genetic correlations between MEM and LEM was observed (-0.02±0.13), genetic correlations of EEM and MEM was 0.28±0.44; and between EEM and LEM 0.29±0.28. Genetic correlations between TEM and EEM or MEM or LEM were 0.26±0.39, 0.52±0.05 and 0.62±0.09, respectively. The direct heritability of hatching weight was 0.44 and the maternal heritability was 0.57. Genetic correlations between hatching weight and EEM or MEM or LEM were 0.81±0.12, 0.99±0.00 and 0.95±0.04, respectively. As with other vertebrates, whether birds or mammals, in this study also estimated low heritabilities for embryonic mortality in different incubation stages. Even if a slightly higher heritability for the TEM was estimated than for the incubation stages, the heritability for TEM is still in a low range. However, the genetic correlation between the embryonic mortality stages and the hatching weight is noteworthy. This means that these characteristics are determined by adjacent or even identical genes. These high genetic correlations between EM and HW and the relatively high heritability of HW, selection using this trait will also reduce embryonic mortality.

Keywords: Threshold model, bayesian statistic, poultry

Possibilities of using crıspr-based genome editing technologies in livestock

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Genome editing technologies are promising to improve the genetic structure of farm animals against diseases as well as increase economically important yields. Among these technologies, Clustered Regularly Interspaced Palindromic Repeats (CRISPR) has revolutionized the science of genome editing due to its numerous advantages such as accuracy, usefulness, and time-efficiency. Genome editing in large animals has always been complicated due to many technical and other complicated limitations. On the other hand, CRISPR may provide several alternatives to carry out the difficult task with more feasibility and better results. Many of the disease-promoting genes in animals have been knocked down using the CRISPR gene-editing technique thereby helping the animals to become resistant against the particular diseases. Moreover, genetic defects can be treated by knocking down the genes in animals by using CRISPR technology. Knocking down the defective gene in the embryo at an early stage helps the animals to grow and develop without any genetic diseases. Though the CRISPR technology is relevantly new, and it has not been used more comprehensively for genome editing in large animals, but still there are numerous studies making use of the CRISPR technology in chicken and pig genome editing. Furthermore, CRISPR-adopted gene editing has been used very extensively and it has generated favorable results to improve plant production to cope with the food security problem in the world. In this review, we discuss the methodology and feasibility of some of the CRISPR-based gene-editing technology and the success stories in animal science. Moreover, we will also discuss the future application of CRISPR genome editing in developing disease-resistant farm animals with more yield than before.

Keywords: Genome, Clustered Regularly Interspaced Palindromic Repeats (CRISPR), defective gene, gene-editing

Programmable gene editing techniques and their use in livestock

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In agricultural term, recombinant DNA technology or genetic engineering allows to increase resistance to diseases and pests, crop productivity, nutritional value and shelf life in plants and animals. This technology involves altering the hereditary synthesis of a cell to obtain desired properties. Traditional mutagenesis methods using tools such as chemicals and transposons are required intensive labor and cost to obtain target mutations. With the advent of relatively low cost and easily applicable gene editing technologies, cell lines carrying the desired modification can be obtained in almost a few weeks. ZFNs (Zinc Finger Nucleases), TALENs (Transcription Activator Like Effector Nucleases), CRISPRs (Clustered Regularly Interspaced Short Palindromic Repeats) are next-generation gene editing techniques that are widely used due to their flexibility, versatility and effectiveness. In this study, the latest developments of three main programmable gene editing technologies (ZFNs, TALENs and CRISPRs) in livestock are reviewed.

Keywords: Genome editing, livestock, programmable gene editing

The prediction of brody, logistik and von bertalanffy models by using the bayesian approach for modeling the growth curves in holstein calves

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The aim of this study is to estimate the growth curves of Holstein calves using the Bayesian Approach of Brody, Logistik and Von Bertalanffy models. The live weight data was collected from 34 Holstein calves raised at the cattle research farm of Ayhan Şahenk Agricultural Research and Application Center in 2019. Furthermore, for estimating the frequency modeling of the Holstein breed the predicted parameter values and standard deviation of parameters were used as the prior information. The Bayesian approach was used for making the statistical analysis. Monte Carlo Method Markov Chains (MCMC) algorithms was used to estimate the posterior distributions and it was 900,000 in total while excluding the 8000 burn-up periods. Moreover, for the results in this study distribution information of Brody, Logistik, and Von Bertalanffy model parameters was calculated. The results of the posterior distributions showed the comparative Deviation Information Criteria (DIC) values for the three models 55.19, 33.17, and 38.02, respectively.

Keywords: Bayesian approach, brody, growth curves, Holstein cattle, logistik, Von Bertalanffy

Development of a sensitive elisa for the quantification of a chicken specific troponin-t peptide epapppeekprıkltapkıpe in skeletal muscle tca extracts

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Proteolytic degradation of muscle during postmortem aging, results in the production of protein fragments that may affect meat qualitative specifications. Troponin T (TnT) is an important regulatory and structural component of skeletal muscle thin filaments and particular TnT fragments represent a widely reported marker of meat aging in different animal products intended for commercial distribution in the food industry. We have previously reported the development of a competitive enzyme-linked immunosorbent assay (ELISA) for the quantification of TnT (16–31) fragment identified in trichloroacetic acid (TCA) soluble beef skeletal muscle extracts. The development of a sensitive ELISA for the quantification of the chicken specific TnT peptide EPAPPPEEKPRIKLTAPKIPE in skeletal muscle TCA extracts, to be further used as potential indicators of meat aging. We used a synthetic 21 aa (EPAPPPEEKPRIKLTAPKIPE) TnT chicken-specific peptide (TnT-21), previously identified and related to meat quality. High affinity polyclonal anti- TnT-21 andibodies were generated in rabbits through a 3-dose immunization with a total of 750μg peptide conjugated to KLH according to established methodology. Whole anti-sera were collected and high affinity anti- TnT-21 antibodies were isolated from total IgG on a TnT-21 immunoadsorbent (4mg TnT-21 per ml of beads). Two milligrams of affinity-purified anti-TnT-21 was used for coupling with HRP (4mg) using glutaraldehyde. Antibody and enzymic activity were checked by direct non-competitive ELISA. The competitive ELISA procedure is based on inhibition of binding of the antibodies to immobilised TnT-21 by soluble TnT-21 peptide at serial dilutions leading to a standard curve with useful range 20pmol to 3nmol TnT-21/ml. The specificity and sensitivity of the developed ELISA was assessed by screening of the skeletal muscle extracts in different dilutions. Twenty muscle extracts were produced according to our previous reported TCA extract protocol. In brief, ten extracts were produced from fast-growing conventional chickens (Ross 508 genotype), and ten extracts from slow-growing free range chickens (Sasso genotype). Diet for both groups was wheat and maize-based formulated. The birds were raised under the same conditions (offered feed, drinking water, vaccination, lighting). After the end of the experiment, muscle tissue samples were collected, processed, and immediately stored at -80 oC until use. We developed a sensitive and specific ELISA for the detection of TnT peptide fragment EPAPPPEEKPRIKLTAPKIPE in a useful range 20pmol to 3nmol TnT-21/ml of aqueous solution. Our preliminary data indicate the presence of TnT-21 peptide in TCA extracts of both fast-growing conventional and slow-growing free range chickens ranging from 300pmol to 2nmol/ml depending on sample dilution. The concentration of the peptide was significantly higher in extracts derived from fast-growing conventional chickens although further analysis with larger sample number and an aging standard protocol is required. Our quantitative competitive ELISA for specific TnT-21 fragment in range poultry will be further used for the correlation analysis between TnT-21 concentration and qualitative characteristics of the meat during postmortem aging. This quantitative ELISA may prove advantageous for future use at both research and industrial level.

Keywords: Troponin-T, TnT, TnT fragments, TnT peptides quantification, meat quality, skeletal muscle degradation

Determination of tlr2 gene ecorv-rflp frequency distribution among Turkish native cattle breeds

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Determination of resistance and susceptibility to diseases is a time and money-consuming matter. Diagnosis and treatment of the diseases are also keeping up as operating expenses. At the same time, health is one of the most important components of animal welfare. Due to these facts protection against diseases has been focused in the research area for sustainable animal production and its profitability. In this sense rather than improving environmental conditions, genetic improvement of populations would be cheaper and permanent. In order to achieve a genetically disease resistant population once the genetic architecture of the populations for disease-resistance related genes should be characterized. The aim of the study, therefore, was to investigate allele and genotype frequency for SNP named rs55617172 located on an exonic region of TLR2 (Toll Like Receptor 2) by EcoRV-RFLP in five Turkish Native cattle breeds. In total 169 animals were analyzed from Native Southern Yellow (YGS= 29), East Anatolian Red (DAK=35), Anatolian Grey (BI=36), South Anatolian Red (GAK=34), Native Black (YK) (35). Samples were obtained from their original geographic region of breeding. The genotype and allele frequencies were calculated with the PopGene32 program and the Khi square test was performed to determine whether the populations were in Hardy-Weinberg equilibrium (HWE). Two alleles and three genotypes were found as C and A, and AA, AC, and CC, respectively. Their distribution also differed from breed to breed for the locus, the CC genotype and C allele are predominant in the majority of the breeds except for YK breeds. According to the Khi square test, YGS and GAK breeds showed derivation from HWE.

Keywords: Immune genes, cattle breeds, TLR2, genetic recourses,

This study was financially supported by the Scientific Research Project Council of Bursa Uludag University (Project number KUAP (Z)-2017/1).

SECTION III

LARGE RUMINANT PRODUCTION

(ORAL PRESENTATIONS)

Factors affecting milk composition in dairy cows

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Many factors affect the composition of milk, the main components of which are water, fat, protein, lactose and minerals. The diet or ration can easily change the fat and protein concentration of milk. The composition of milk, known for years and offered for sale, consists of 3.6% fat, 3.2% protein, 4.7% lactose. Fat concentration is most sensitive to dietary changes and can vary in the range of about 3.0 units. Dietary adjustments can result in approximately 0.60 percent unit variation in milk protein concentration. Concentrations of lactose and minerals, which are other solid components of milk, do not affect much from ration changes. Other factors affecting milk composition and component yields include genetics and environment, milk yield, lactation stage, disease (mastitis), season, and cow's age. There are several feed management practices that can increase the concentration of milk fat and protein in milk. Feeding strategies that optimize rumen function also maximize milk yield and milk components and their yield. This study is a summary article on how the biosynthesis of milk composition and changes in mammary gland or secretion affect milk composition.

Key words: Milk components, milk fat, milk protein, milk minerals, nutrition, dairy cow

Trypanosomosis challenge in relation to cow health and milk production: evidences from the gambia's agropastoral farming system

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The potential of agropastoral farming system towards sufficient milk production is great but many yet to be documented animal health related challenges still confronts this important agricultural system. This study with The Gambia as a case study examined African animal trypanosomosis challenge in relation to cow rearing with a view to improve design of animal health and milk production strategies of agropastoralists. Data were obtained with semi-structured questionnaires which were pre-tested and later administered in five regions where African animal trypanosomosis (AAT) challenge had been reported. Relationships among certain variables were statistically explored with Pearson chi- square test and strength of association quantified with Phi or Cramer's V coefficient.Based on the respondents' ethnicity, percentages for objectives of keeping cows was statistically different ($P < 0.05$) for breeding and draft purposes with Cramer's V coefficient of 0.258 and 0.276, respectively. Nearly all the interviewed persons (97.4%) indicated that lactating cows can be affected by AAT and tsetse fly was generally mentioned (92%) as the vector. The most consistent effect of AAT on milk was reduction in quantity (91.7% of the respondents). More than two-third of the respondents (75.8%) mentioned older cows with more than three calving as the most susceptible. About 64% of the respondents indicated that they do not milk their cows for human consumption when such animals are suspected to have been infected with AAT. There was no fixed number of times a cow is treated for AAT in a year as indicated by 85.2% of the respondents. Statistically significant positive but moderate association existed between milk reduction and late dry season ($P < 0.05$; phi coefficient of 0.221), between milk contamination and early dry season ($P < 0.05$; phi coefficient of 0.226), and also between wateriness and rainy season ($P < 0.05$; phi coefficient of 0.220). Meanwhile, milk discolouration was not statistically related ($P > 0.05$) to any of the seasons with highest AAT infection rates as perceived by the respondents. Farmers make decisions and adopt practices based on many integral factors. Within the context of trypanosomosis challenge, season of the year rather than lactation period seemed to capture effects of AAT on milk production. Analysis of socio-demographic factors especially by herd affiliation status and ethnicity is recommended for any intervention that targets improved milk production and veterinary practices of agropastoralists.

Keywords: Trypanosomosis, agropastoralists, cows, milk, challenge

Effects of some environmental factors on linear type traits in Holstein cows

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This research was carried out to determine the effects of parity and calving season on linear and non-linear type traits of Holstein cows. The research material consisted of a total of 230 Holstein cows born between June 2017 and January 2019 in a private dairy farm located on Kırşehir province. Linear type traits and non-linear traits in the study were performed at 30-150 days of their lactation in first parity, second parity and third and above parity cows. SPSS 17.0 package program was used to determine the descriptive statistics and affecting factors. The effect of parity on all linear type traits and non-linear traits was found to be statistically significant except dairy characteristics, rump angel, hock status, rear legs rear view, central ligament, and fore teat placement. Third and above parity cows had a low stature, wide rear legs side view, steep foot angle, deep udder depth, weak fore udder attachment, low rear udder height and long teat length, while first parity cows had narrow strength, shallow body depth and narrow rump with. From the non-linear traits, dairy form and mammary system were determined in the highest in first parity and second parity cows, and body conformation and feet and legs system in second parity and third and above parity, while the final score was determined the highest in second parity cows. In the study, the effect of the calving season was found to be insignificant except for rump with and rear legs rear view. As a result, it can be said that the parity should be taken into account in the selections for the type traits.

Keywords: Holstein, type traits, parity, calving season.

Acnowledgement: This study is summarized from the master's thesis made by Ramazan ERKMEN. In addition, for his contributions to this study, Assoc. Dr. Aziz ŞAHİN and Assoc. Dr. We would like to thank Assoc. Dr. Aziz ŞAHİN and Assoc. Dr. Serdar DURU because of their valuable contributions study.

The lactation curve parameters related to milk yield, fat and protein ratio in first lactation of Anatolian buffaloes

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This research was carried out to determine the lactation curve parameters related to milk yield, fat and protein percentage of Anatolian buffaloes. For this aim, 688 test-day milk yield records of 120 buffaloes were used. Data were obtained from Anatolian Buffaloes in first lactation. In the research, the estimation of the curve parameters were used the STATISTICA program. In all analysis Buffaloes with at least five data were taken into consideration and lactation curve parameters were calculated. The gamma model was used to determine the lactation curve parameters. In this research, parameters a, b and c 5.44±0.237, 0.65±0.123 and 0.27±0.044 for milk yield, 7.37±0.281, 0.07±0.106 and 0.03±0.037 for fat percentage, 3.97±0.179, 0.89±0.0118 and 0.16±0.048 for protein percentage has been determined. The mean of error squares was detected as 0.037, 0.089, and 0.017 for milk yield, fat and protein content, respectively. In the current study, the coefficient of determination was determined as 0.97, 0.62 and 0.79, for milk yield, fat and protein content, respectively. It is thought that the research findings will form the basis for future breeding studies in this field and will contribute to the animal breeding studies to be carried out in this farms.

Keywords: Anatolian buffalo, curve parameters, gamma model, milk yield, fat percentage, protein percentage

SECTION IV

ANIMAL PRODUCTION

(ORAL PRESENTATIONS)

Extensive grazing with anatolian Grey cattle for the revitalization and conservation of wet meadows - example of the village of Eskikaraağaç / Karacabey / Turkey

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The pastures and wet meadows in the surroundings of freshwater lakes exist as long as livestock is grazing there. Without grazing, bushes, reed and other plants with low feeding value spread over the area and spoil the pastures - as well for livestock as for the existing fauna and flora. Also around Lake Uluabat pastures, which had been used for centuries, got lost by the lack of grazing animals. The pastures and wet meadows around Lake Uluabat are also the feeding area for a lot of bird species, especially for white storks. The disuse of the pastures distinctly reduced the number of birds using the area. With the Project the spoiled pastures near the Village of Eskikaraağaç are revitalised by use of extensive grazing with Grey Anatolian Cattle. This cattle is a natural breed in the Marmara Region. It was chosen because of its fitness and ability to live under pure natural circumstances and use food with low feeding value. By support of the German Euronatur Foundation and the cooperation with the Municipality of Karacabey, 3 international projects were performed since 2016. 14 heifers and 2 bulls had been released on the pastures of the European Stork Village Eskikaraağaç. During the projects the changes on the pasture, the behaviour and reproductivity of the cattle and the species and numbers of waterbirds, especially white storks, are observed.

Keywords: White stork feding, Grey Anatolian Cattle, pasture revitalization

The effect of forage: concentrated (f:c) feed ratio and straw litter on normal and abnormal behavior in sheep-lambs and goat-kids

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The effects of different F:C feed ratio and the use of straw litter on the frequency of normal and abnormal behavior in sheep-lambs and goat-kids were investigated. The study was carried out with 18 lambs of between 135 days of age and 18 goat-kids of between 130 days of age. Lambs and kids were divided into 3 groups in which the ratio of F:C feed was determined as 20:80, 60:40 and 80:20. The animals were designed with slatted wooden floor (1.25x1.10 m, 5 cm wide, 2 cm apart) placed on the concrete floor in individual paddocks side by side, and straw litter on the slatted wooden floor. Straw litter was used in 18 paddocks, with three animals from each species and each group housed in a total of 36 paddock. Each group was given alfalfa hay and lamb concentrated feed at 07:30 in the morning and 16:30 in the evening. Water was supplied as ad libitum in plastic buckets of 30 cm in diameter and 15 liters. The study was completed in 5 weeks. Direct observations were made for between 8:30-16:30. The frequency of equipment manipulation, floor manipulation, wool-biting, scratching, bleating, lying and rumination was recorded by continuous observation method with 8 hours of behavior observation per day on a weekly basis. The frequency of scratching, lying and rumination behavior in lambs was similar in the 60:40 and 80:20 groups, while the 20:80 group differed from the two groups with a higher frequency of scratching and lying, a lower frequency of rumination behavior ($P \leq 0.05$). While the frequency of equipment manipulation behavior was similar in the 60:40 and 80:20 groups in the kids, equipment manipulation behavior frequency of the 20:80 group was found to be approximately 4 times higher than the two groups ($P \leq 0.05$). The frequency of rumination behavior in kids was the lowest in the 20:80 group and the highest in the 80:20 group, and the difference among the three groups was statistically significant ($P \leq 0.05$). The frequency of scratching behavior in lambs significantly differed according to the presence of straw floor and higher frequency of scratching behavior was observed in the straw litter group ($P \leq 0.05$). In kids, floor manipulation was higher in the straw litter group, while the frequency of wool-biting and bleating behavior was higher in the group without straw litter ($P \leq 0.05$). The higher frequency of lying and scratching in lambs suggests that the behaviors may be related. However, the fact that scratching behavior is significantly higher in the presence of straw litter although the lying frequencies are similar, it is thought that scratching behavior in lambs may be an abnormal stereotypical behavior. It can be said that the goat-kids are more severely affected at the low forage rate. In fact, the frequency of equipment manipulation behavior in the 20:80 group of goat-kids was significantly higher than the other groups. In addition, the presence of straw litter in goat-kids increased litter manipulation behavior.

Keywords: Roughage, concentrate, equipment manipulation, floor manipulation scratching

The usage of artificial intelligence technologies (deep learning - artificial neural networks) in determining some physiological and morphological properties in farm animals

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With the spread of artificial intelligence, deep learning, artificial neural networks, and automation technologies, the application of these modern technologies in traditional animal husbandry has started to come to the fore in recent years. The use of these technologies will greatly reduce labor force as well as human error, increase modern production efficiency and greatly help in improving product quality. The applicability of artificial intelligence is increasing day by day in many areas of animal husbandry., especially the emotional states of animals, feeding habits, milk yields, and face recognition. Moreover, it eliminates human error. These technologies not only reduce the workload and cost but also contribute to animal comfort by eliminating external factors such as earrings, signs, tags, etc., to identify animals. It is also used in biosecurity, disease monitoring, and control, animal monitoring, farm management, farm animal growth control, etc. emerges as an element that facilitates the work of breeders in such matters. Artificial intelligence provides huge benefits to livestock farms in collecting and analyzing customer behavior, optimizing processes, reducing huge costs, and improving meat and milk quality. The aim of this study is to give information about the use of artificial intelligence technologies in the determination of some physiological and morphological characteristics of farm animals with sample applications.

Keywords: Artificial intelligence, deep learning, livestock

Systems biology approach in animal science

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Systems biology is one of the rapidly growing research approach in the scientific arena. This approach is used in many applied biological disciplines including medical, bacterial, and eukaryotic genetics. The systems biology is holistic as opposed to reductionist approach. Systems biology studies became possible owing to rapidly developing omic technologies after the genomic revolution, modern computational biology and data science which requires high processing power of computers. Today, omic technologies can rapidly characterize the molecular components of life. Thus, big data on life are produced at the end of these analytical processes. The systems biology approach integrates bioinformatics and mathematical modelling tools into biology disciplines to make sense of the big data yielded from different omic technologies. In this process, the data obtained through genomics, transcriptomics, proteomics, epigenomics, metabolomics, and other omic technologies at various levels from genes to cells, organs, and the whole organism are evaluated to make sense of animal characteristics and biological functions. Thus, systems biology aims to unravel phenomena in biological complexity at system level. However, this approach is not yet frequently used in the field of animal science. This presentation aims to explain systems biology, and the possibilities of its use in several areas of animal science.

Keywords: Systems biology, omics, omic technologies, computational biology, modelling

Chronic problems of agricultural production in Turkey (1923-present): the need to take a historical perspective

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Based on the approach that the ongoing problems of Turkey's agricultural production have become chronic and this has a historical basis, it seems inevitable that the current situation and problems/solutions should be reconsidered and put into a historical framework. This study aims to reconsider and evaluate the chronic problems of agricultural production in Turkey with a historical approach. The first basic approach is the need for historical justification of the attempts and dilemmas to transform the agricultural production structure, that the new Turkish Republic established in 1923, inherited from the Ottoman Empire. The second is to turn to foreign-dependent and directed agricultural production branches instead of integrating with its unique product characteristics and activating its internal dynamics to adapt to the political, social, and economic changes experienced periodically in the world. A healthy social, cultural, and economic transformation supported by scientific approaches, where a sustainable model of agricultural production in Turkey could never be established, an effective bureaucratic transformation could not be operated, possible organizational initiatives were shaped without an adequate database, and it was convicted and managed by international social and economic changes. Additionally, planned and consistent proposals that will lead to solving the problems cannot be put forward, the specific production structure and styles are ignored, agriculture and production elements are not handled in integrity, the segment operating in this field is left alone in uncertainty, and the production ground is destroyed, and it has been understood that this field of activity is deal with as a problem area. It is thought that it is very important to historically establish the social, cultural, and economic dimensions of the chronic problems of agricultural production in Turkey. It is argued that possible initiatives cannot be successful without revealing the general characteristics and principles of a production structure and style that needs to be transformed. Again, it does not seem possible to achieve a sustainable structure in agriculture without holistic processes that will force the basic components of agricultural production to collaborate. Therefore, there is a need to explain the agricultural production of Turkey with both internal and external dynamics that have accumulated and become chronic within the specified date range. Such an explanation is needed to put Turkey's agricultural production in a framework.

Keywords: Agriculture, agricultural economics, Turkey

Changes in the livestock sector in Turkey

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The livestock sector plays an important role in the balanced nutrition of the rapidly increasing population by meeting the needs of high biological value foods such as meat, milk and eggs. In addition, it creates employment areas for many sectors such as production of animal feed, meat-milk products, veterinary drugs, livestock equipment, leather and textile industries and provides income to the country's economy. Considering the natural resources and ecological conditions that Turkey has, the livestock sector has an important place in agricultural production. In recent years, there has been a significant increase in the number of large and small ruminants. The number of cattle, which was 10.7 million heads in 2000, have increased over the years and reached 17.9 million heads in 2020. The number of water buffalo, which was 84.7 thousand in 2010, increased 2.3-fold in 2020 and reached 192.8 thousand heads. In small ruminants, the presence of sheep has increased by 82% in the last 10 years, reaching 42.1 million heads, and the presence of goats has reached approximately 12 million heads with an increase of 90%. In the poultry sector, the number of modern coop and integrated facilities has increased, and there has been an increase in egg and poultry meat production. Over the past decade, chicken meat production has increased 1.5-fold, turkey meat production has increased 1.9-fold and egg production has increased 1.7-fold. Despite the increase in the animal presence in Turkey, animal based protein consumption is significantly low (37.9 g/capita/day). With the solution of existing problems in the livestock sector, both the amount of animal production and the per capita consumption of animal based protein will increase.

Keywords: Turkey, livestock, animal based product, production, consumption

Organic and conventional eggs

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Chicken eggs are a food product with a rich nutritional content such as proteins, vitamins, lipids and minerals with high bioavailability. In addition, eggs are easy to prepare and relatively inexpensive compared to other foods. It is known that egg quality is of great importance in all eggs as it is related to food safety, consumer preferences and product value. There is an increase in demand for organic eggs. Consumers generally perceive organic eggs as healthy, nutritious and delicious food. However, the extent to which egg quality and ingredient content are affected by different production systems remains a controversial issue. There is still no consensus among researchers. Studies have shown that eggs obtained from organic farming are of better quality compared to eggs from cages. It was observed that the sodium and potassium content of organic eggs were higher than those of cage-raised chickens. In addition, organic eggs showed stable white, yolk and shell characteristics. But barn and cage eggs showed a certain variability in these terms. Organic egg yolks have the highest levels of protein, potassium and copper. In addition, organic egg whites contain high levels of protein. Eggs have a very important place in human nutrition. Quality food consumption is also very important. In this presentation, it is aimed to compare the quality and component properties of organic eggs and conventional eggs.

Key words: Organic eggs, conventional egss, egg production, egg components

Health benefits of honey due to its phenolic compounds

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Honey is a natural food and remedy produced by honey bees (Apis mellifera) as collecting nectar from flowers, other living parts of plants and insects living on the plants than storing them in the honeycomb cells and maturing. Phenolic compounds are the source of the therapeutic and functional properties of honey. They also have antioxidant, anti-inflammatory, anti-carcinogenic, antimutagenic, antitumor, antimicrobial properties known as therapeutic effects of Honey. The phenolic profile and amount of phenolic compounds depends on floral source, geographical origin and applied processes (harvesting, storage, etc.). The major phenolics of honey can be list as phenolic acids (caffeic, ellagic, chlorogenic, vanillic, gallic, etc.), flavonoids (kaempferol, hesperetin, myricetin, apigenin, etc.), and their derivatives. In this study, phenolic compounds of honey will be reviewed according to orgin of honey in terms of conducted studies in recent years.

Keywords: Honey, phenolic compounds, phenolic acids, flavonoids

Sericulture in World, Turkey and Bursa

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The stages from growing mulberry saplings that provide the mulberry leaf, which is the only food source of the silkworm, to obtaining raw silk (mulberry rearing, silkworm egg production, hatching, care and feeding, cocoon production, silk brushing from the cocoon) are defined as sericulture. The homeland of sericulture is China. With the demand for silk fabric, sericulture first spread to Anatolia around 500 AD, and then to Europe. Despite the fact that sericulture is carried out in about 20 countries in the world, especially in the Far East countries, the numbers of countries engaged in economic sericulture do not exceed 10. According to 2019 data, world wet cocoon production is 1,088,830 tons. 75% of the world's wet cocoon production was realized in China. According to the amount of wet cocoon production, China ranks first with 819,030 tons (2019), followed by India and Thailand. In parallel with this production, China ranks first in raw silk production. Due to the fact that China has a monopolistic position in the world's wet cocoons and raw silk production, it interferes and directs the prices of wet cocoons and raw silk and causes price instability. In addition, the political crises in the world, the increase in industrialization and environmental pollution, the increase in polyculture agricultural areas, the intensive use of pesticides, etc., affect the wet cocoon production negatively. In our country, sericulture, which has a history of approximately 1500 years, is an auxiliary agricultural activity. It is an important advantage that it provides income in a short time like 35-40 days. However, our wet cocoon production has decreased in recent years due to both internal and external effects. In Bursa, which was one of the important centers of the silk road in the production of both wet cocoon and silk fabric in the past, the production of wet cocoon shows a significant decrease in recent years in parallel with the production of wet cocoon in Turkey. With the support given per produced fresh cocoon (kg) and egg (box) by the Ministry of Agriculture and Forestry along with the projects carried out for developing sericulture the efforts to restore sericulture continue intensively. Sericulture, which has been kept alive in our country for 1500 years, symbolizes the historical silk road, has national, historical, touristic, cultural and economic values for our country. Even one of these features is a sufficient reason to keep our sericulture alive.

Keywords: Sericulture, wet cocoon, raw silk

Experience of animal breeding and pastoralism in Boğatepe, Kars

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This presentation will discuss family farming conditions of animal breeding and pastoralism in Boğatepe, Kars. Together with ecological and cultural significance of pastoralism, farmers' economic calculations will be presented. Through comparisons with industrial/intensive techniques of animal breeding, this presentation will aim to unravel economic and ecological dimensions of pasture-fed local animal breeds. It will identify both current problems of family farmers and possible solutions that can be developed in collaboration with animal scientists. Lastly, given the ongoing climate crisis, the presentation will also point to the significant contribution of pastoralism and family farming to the sustainability, biodiversity and national income.

Key words: Family farming, Pastoralism, Sustainable farming, Biodiversity

Automation and Digitalization in Farming

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Farms need a different kind of management than before. There's less room for mistakes. To reduce risk and optimise farm management operations, the farmer needs to be continually informed and have a lot of information to hand. The information comes from farm machines and third parties (such as milk buyers, feed suppliers or financial advisers). This information will help the farmer to make the right decisions at the right time. Imagine how much data a modern dairy farm generates. For example, the Lely Astronaut milking robot. With all its sensors, it generates a tremendous amount of data about milk quality, cow health, rumination, feed efficiency and much more. All at herd, individual cow and even milk-quarter level. It is time to make maximum use of data. To analyse all available relevant data in an intelligent way. It is time to connect all the Lely equipment and suppliers on your farm. Smart algorithms, connectivity and the cloud. Processed into user-friendly information. And eventually information that leads to practical advice.

Keywords: Automation, Digitalization, Farming, Sensors, Dairy farms

Farm Tourism: An Example of a Stork Village Lake House

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Leylek Köy Göl Evi (Lake House @ Stork Village) is a bed & breakfast at 'European Stork Village Eskikaraağaç' in Turkey, with an emphasis on sustainable rural experiences and farm to table restaurant service. Our B&B is located within a 25-years-old family farm, which started out as a hobby garden and amateur farm. It now hosts a small family of Jersey cows, Cameroon sheep, over ten different varieties of free ranging chickens, and a gaggle of geese, offering visitors experiences to interact with farm animals. Our visitors also comment that our garden is the closest to a botanical park that they have ever visited and it is true that we have not-so-commonly-ncountered species, some of which are medicinal and therapeutic. The garden also attracts many migratory birds including the white stork. Our ambitions for this private enterprise is beyond mere financial stability of the farm and include a desire to promote a more sustainable rural living and rural engagement for urban dwellers. This aspiration includes attempts to improve our own production and consumption habits at the farm, while also promoting prosumption via eco-tourism and rural tourism activities for urban visitors and participating as a stakeholder in the sustainable development of our larger village community. Trained in the disciplines of social anthropology and sociology, I situate our own experience within the global context of a remarkable rise in the interest in rural life and subsequent lifestyle migration for the purposes of self-critical analysis and learning from similar experiences worldwide. This presentation aims to share this analysis based on a self-ethnography of Leylek Köy Göl Evi (Lake House @ Stork Village).

Keywords: Farm tourism, Sustainable farming, Rural tourism

SECTION V

POULTRY PRODUCTION

(ORAL PRESENTATIONS)

Effects of different diets on performance and egg quality parameters in two-laying hen genotypes

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The current research was conducted to determine the effects of corn-soybean meal and wheat-sunflower meal based diets on performance and egg quality of two different layer hen genotypes. The experiment was carried out to randomized design consisting of two hen genotypes (ATAK-S and Tinted) and two different diets (corn-soybean meal and wheat-sunflower meal) in a 2 x 2 factorial arrangement with 3 replicates. At the end of the experiment, it was observed that the feed intake of the Tinted hen genotype was significantly lower than the ATAK-S genotype and the egg production, egg mass, feed efficiency and, egg quality was significantly better. Egg weight and yolk color decreased but feed intake, feed conversion ratio, albumen index and Haugh unit increased significantly with the use of wheat-sunflower meal instead of corn-soybean meal in the diet. As a result, it was determined that the performance and egg quality parameters of Tinted laying hen genotype were better than ATAK-S genotype, the use of wheat-sunflower meal instead of corn-soybean meal in the diet negatively affected the feed conversion ratio, eggshell rate and, yolk color but positively affected the Haugh unit.

Keywords: Corn, egg quality, laying hen, performance, soybean meal, sunflower meal, wheat

Plumage color, hatching day and hatching weight influence the survivability up to sexual maturity in japanese quails

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Farm animal losses due to genetic and environmental factors are important for economics of family and commercial farming and animal welfare. The factors that influence survivability are relatively well understood. However, some influencing factors in different species still need to be explained. On the other hand, the difficult quantifiability of survivability as a complex characteristic has a negative impact on their research. In this study the effects of plumage color, hatching day and hatching weight on survivability were investigated. A population was formed from birds obtained from several commercial quail breeders. Growth records of 2,280 birds from hatching to 6 weeks of age were used. Mortality records were kept daily. A threshold model included plumage color (wild-type, yellow, brown, and white), hatching day (17 or >17) and hatching weight as fixed effects was analyzed with a binomial distribution based generalized estimating equation method. Odds ratios (Ψ=eb) were calculated from the estimation values (b) and Euler's number (e). Overall survivability rate was found 93.4 % from hatching to an age of 42 days. Wild-type, yellow, brown, and white plumage colors were evaluated; survivability rates were found 92.8%, 94.3%, 94.87% and 86.99%, respectively. While white birds lived significantly lower than other color varieties ($P<0.05$), the survivability of other color varieties did not differ significantly ($P>0.05$). The survival probability to an age of 6 weeks of birds that hatched in the 17th day was 56% higher than the birds that exceeded 17 days (P=0,07). Furthermore, one gram increase in hatching weight increased the probability of survival 23% (P=0,03). There are examples in the literature of the relations between color and diseases as well as performance. For example, an article from South Africa reported higher eye cancer risk in Simmentals without pigmentation around eyes. Another report mentioned that Sardinian sheep with homozygous dark color genes are larger. It can be argued that chicks with a longer incubation period under the same conditions do not develop healthy during incubation and this situation negatively affects their survivability. The hatching weight also depends on healthy development during incubation. Light chicks may not have developed well during incubation. These factors that affect survivability need to be carefully analyzed to determine the "how" question.

Keywords: Mortality, juvenile, lifespan

Modelling of egg weight and size in Blue-breasted quails *(excalfactoria chinensis)*

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Blue-breasted quail (*Excalfactoria chinensis*) is a good laboratory and pet animal due to its small body size, easy breeding and endurance. In addition to these, more importantly, it has high egg-laying performance, and short generation interval. This study was conducted to investigate the variation of egg weight (EGGWT), egg length (EGGLT), egg width (EGGWD) and egg shape index (SHPINDX) from the first laying day age (49) to 409 days old age during the 360 day laying period in blue-breasted quail. Phenotypic correlations between egg weight and other egg traits were also determined. A total of 1168 eggs obtained from blue- breasted quails with different plumage color types such as golden pearl, red-breasted, blue-faced, pinto, white, cinnamon and tuxedo in twelve different age groups were sampled. Considering the change in age groups, it was observed that while egg weight, egg length and egg width increased continuously between G1 (49-78) and G4 (139-168) age groups, the shape index decreased. It was observed that the values of all egg traits decreased in G5 (169-198), then egg weight and egg length increased similarly at G6 (199-228) and G7 (229-258), while the shape index decreased. However, it was observed that the maximum egg weight and egg length was in G10 (319-348), the egg width were in G11 (349-378), and all values decreased except for the shape index in G12 (379-408). Egg weight was highly positively and significantly correlated with egg width and egg length and coefficients were 0.779 and 0.810 respectively, while the negatifve correlation between shape index was -0.283 ($P<0.01$). Egg width was positively correlated with egg length and shape index and coefficients were 0.508 and 0.169, respectively ($P<0.01$). However, egg length was negatively correlated with shape index and coefficiant was -0.752 ($P<0.01$). The fitted model of the study was (EGGWT) = -9.526 + 0.21511 (EGGLT) + 0.4807 (EGGWD). The significant factor affecting egg weight in this study were egg length and egg width ($P<0.01$). Analysis of variance evaluating all factors (age group, egg length, egg width, shape index and egg length x egg width interaction) revealed that the age group was highly significant ($P<0.01$) on egg weight and egg length and width were significant ($P<0.05$). As a result of the study, it was found that egg length and egg width were good estimators of egg weight in blue-breasted quail.

Keywords: Egg length, egg width, shape index, breeder age, king quail

Relationships between flock age and egg age on hatchery parameters in grandparent stock of broiler breeders

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The flock age and egg age are important factors to be taken into account by the commercial hatcheries. The term of egg age is defined as time from lay until incubation of egg. The objective of this field study was to determine the effects of flock age and egg age on egg weight, egg moisture loss, hatchability, chick weight, chick yield of grandparent stock broiler breeders. And, the coefficients of variations and regression equations were determined for egg weight, transfer weight, egg moisture loss, hatchability, chick weight and chick yield depending on flock age and egg age. A total of 1261 hatchery tray (189.150 eggs) data (between January 2019 to March 2021) obtained from a private grandparent stock hatchery in Marmara Region of Turkey, were used. The flock age groups classified as: 27-34 wks, 35-45 wks and 46-58 wks. The egg age groups classified as ≤ 8 day egg age for group I, and 9 ≥day egg age for group II, were used. The standard hatchery procedure of commercial hatchery was applied to all eggs during egg storage and incubation. In this study, egg weight, transfer weight, egg moisture loss, hatchability and chick weight were highly effected by flock age ($P<0.001$). The effect of egg age on transfer weight ($P<0.05$), egg moisture loss ($P<0.001$) and chick yield were found significant ($P<0.01$). The interactions between the flock age and egg age were found significant for the egg weight ($P<0.001$), transfer weight ($P<0.05$), hatchability ($P<0.001$) and chick weight ($P<0.05$). The independent variables (flock age and egg age) had a significant effect on transfer weight ($P<0.001$ and $P<0.05$), chick yield ($P<0.01$ and $P<0.01$), egg moisture loss and hatchability ($P<0.001$). The flock age and egg age had a greater percent of determination (those with highest R2 values) to transfer weight and hatchability (R2 = 74.18% and 27.44%, respectively). The flock age and egg age had a lower percent of determination to egg moisture loss and chick yield (R2 = 8.23% and 1.29%, respectively). The results showed highly significant relationship between flock age and egg weight, chick weight ($P<0.001$). It has been concluded that flock age and egg age were two major factors affecting some of the hatchery parameters. During the routine hatchery management one should take into account of flock age and egg age to improve their daily management and thus their business performance.

Keywords: Flock age, egg age, hatchery parameters, regression

Changes in eggshell temperature by egg position and hatchability of eggs obtained from two different broiler breeder genotypes

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The objective of this study was to evaluate the changes in eggshell temperature in different egg position and hatchability of eggs obtained from two different broiler breeder genotypes. A total of 7200 hatching eggs (3600 hatching eggs per genotype) were collected from commercial flocks of Cobb 500 and Ross 308 broiler breeder parent stocks at 45-50 weeks of age. Each genotype was randomly coded as A genotype and B genotype. This study was carried out in a commercial hatchery. To measure eggshell, eggs were randomly sampled from fan and wall side of each top, middle and bottom trays at 17 days of incubation. The eggshell temperature of eggs was found higher in Genotype B eggs placed in wall side of top trays (100.59 ºF vs. 99.92 ºF, $P<0.01$). In fan side of middle trays and wall side of bottom trays, Genotype A eggs had a higher eggshell temperature with values of 101.86 ºF and 100.55 ºF respectively. The hatching chick weight was found to be similar for each genotype (44.26 g in A genotype and 44.97 g in B genotype). The hatchability was higher in B genotype eggs than A genotype (83.78% vs. 80.70%, $P<0.05$). These findings could be beneficial for large scale hatcheries to comprise optimum temperature requirements of eggs and contribute the optimization of eggs' management and processing.

Keywords: Broiler chicks, hatchability, eggshell temperature, chick quality

Effects of dietary grape pomace supplementation on performance of Japanese quail with red mite infested (*dermanyssus gallinae*)

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The poultry red mite (*Dermanyssus gallinae*) is an ectoparasite that is commonly found in poultry. *Dermanyssus gallinae* causes stress, anemia, reduced growth rate, decreased egg and meat quality. The Stress factors can negatively affect feed intake, create metabolic and hormonal imbalance and depress the immune system. Grape pomace is rich in polyphenols and known to reduce oxidative stress, improve immunity and animal performance. This study was carried out to determine the effects of grape pomace supplementation on the performance of Japanese quail under *D. gallinae* infestation. One week old 240 Japanese quail were allocated four groups. (Infested and consumed grape pomace= I+/GP+ ; Non-infested and consumed grape pomace= I-/GP+; Infested and did not consume grape pomace= I+/GP-; Non-infested and did not consume grape pomace= I-/GP-) The quails were fed with pelleted feed (GP-) and pelleted feed including 4% grape pomace (GP+) for three weeks. The feed consumption and live weight of the animals were recorded at weekly intervals. To monitoring red mite density, traps weights and red mite infestation was monitored weekly. For determining anemia condition the hematocrit concentration was measured weekly. At the end of the study carcass and organ, weights were measured and recorded during the slaughtered process. The statistical evaluation of the data obtained from the study was performed using repeated measurements analysis of variance which includes feed, group, sex and infestation as a fixed factor. The supplementation of the grape pomace to quail feed under red mite infestation conditions was increased feed intake (P=0.0241) of quails while decreased live weight (P=0.0052). The red mite infestation cause anemia in the infested groups (P<.0001) but grape pomace addition did not affect anemia condition in I-/GP+and I+/GP+groups (P=0.6528). Grape pomace supplementation was decreased hot and cold carcass and lung weight in the I-/GP+group according to I-/GP-. while parasite infestation and grape pomace supplementation did not affect these parameters. Grape pomace supplementation under red mite infestation was decreased feed efficiency in quails under this study condition. Effects of grape pomace supplementation to quail feed under red mite infestation on immune system and metabolism would be evaluated in further studies.

Keywords: Ectoparasite, phenolic compound, performance

The effects of organic pomegranate seed oil addition ınto laying hen diet on performance, egg quality and shelf life

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In this study, the effects of the addition of organic pomegranate seed oil (NCY) at different levels (0, 0.5, 1 and 1.5 ml/kg) to laying hen rations on performance values, egg quality criteria, egg shelf life and some enzymes activity were investigated. 96 Lohman LSL laying hens at 64 weeks of age were used in the study. The trial consisted of 4 groups, each containing 24 animals. Animals were given feed and water ad-libitum during the 8-week experiment. The first group was the control group and was fed with basal feed, while the other groups were fed with feeds with 0.5, 1.0 and 1.5 ml/kg pomegranate seed oil added to the basal feed, respectively. The lowest feed consumption and the highest egg weight were determined in the 1 ml/kg NÇY group. The highest feed convertion ratio, the lowest eggshell weight and shell breaking strength were determined in 0.5 ml/kg NÇY group. It was observed that there was no significant difference between the groups in terms of shape index, shell thickness, white ratio, yellow ratio and Haugh unit. It was determined that the egg yolk malondialdehyde (MDA) value in the groups to which pomegranate seed oil was added was significantly lower than the control group on the 28th day of storage. The lowest glutation (GSH) and catalase values were found in the control group, and the highest total antioxidant capacity (TAC) was found in the 1 ml/kg NCY group. As a result, it was determined that the addition of 1 ml/kg pomegranate seed oil to the feeds decreased the feed consumption, increased the egg weight and positively affected the shelf life of the egg.

Keywords: Laying hen, antioxidant, pomegranate, MDA

Effect of olive paste flour on the performance and α-tocopherol plasma levels in broiler chicks

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Olives and olive oil are an essential part of the Mediterranean diet and are associated with having many beneficial effects on health. Olive-based products have been used in poultry diets in order to improve, performance, health and immunity. [1] However, the effect of such products on chicken antioxidant status and performance varies among studies. Specifically, results differ depending on the feed product, as well as the experimental conditions. [2, 3] The objective of the study was to investigate the effect of an olive-paste based product on plasma and muscle tissue total antioxidant capacity (TAC), plasma α-tocopherol, sensory characteristics, and growth performance in chickens fed with 5% olive paste flour (OPF) on top of the commercial diet in large-scale production on a poultry farm unit. [4] Two different groups of chickens were reared under the same conditions in two poultry houses of a commercial poultry farm. Group A was fed with a conventional commercial ration, while group B was fed the same ration supplemented on top with 5% OPF. TAC was assessed in plasma and muscle tissue following the DPPH method. Plasma α-tocopherol was determined according to fluorescence measurements. Bodyweight (BW) and mortality were recorded daily, and feed conversion ratio (FCR) and European production efficiency factor (EPEF) were calculated at the end of the experiment. Sensory characteristics were evaluated in roasted chicken breasts by many tasters. Data were analyzed by the independent samples t-test or the nonparametric Mann-Whitney U test. α-tocopherol was significantly higher in group B ($p \leq 0.05$), while TAC was not significantly affected ($p > 0.05$). FCR was significantly higher but EPEF lower for group B ($p \leq 0.05$). Also, group B chickens smelled more intensely and were more flavour than the group A ones, however other organoleptic characteristics did not differ. The present study shows that the supplementation of 5% OPF in the chicken diet suppressed the performance of broiler chicks. However, it increased plasma α-tocopherol levels, implying that it may be transferred from olive into chicken plasma through diet. These data could be exploited in large-scale poultry production.

Keywords: Olive paste flour, TAC, TBARS, α-tocopherol, large-scale roduction, lipid peroxidation, growth performance, FCR, organoleptics

Comparison of the antioxidant status of conventional and free-range poultry production systems in ındustrial-scale production

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The world poultry meat production increased from 9 to 132 million tonnes between 1961 and 2019 to meet growing demand. This demand consequently requires a large-scale production of fast-growing chickens. [1] However, the intensive production meets the serious oxidative stress-induced pathologies. Oxidative stress impacts animal immune response and increases lipid peroxidation, resulting in many pathologies and increased mortality. Hence oxidative stress affects animal performance, health and welfare, lowers meat quality, and results in heavy economic losses. Factors that induce oxidative stress are associated with rearing conditions, such as stocking density, temperature, ventilation, the health of broilers, slaughter-age, transport, and distance to the slaughterhouse. [2] A free- range poultry production system is less stressful and improves the health and welfare of poultry. Also, in recent years, free-range products have been a consumer's preference due to the better meat quality and animal welfare. Although conventional and free-range poultry have been studied for their antioxidant status, research has been done under experimental conditions. Nevertheless, the massive industrial production of poultry could present differences in antioxidant status from the experimental-scale systems. [3, 4] For this purpose, we studied and compared the antioxidants status of conventional and free-range chickens raised under industrial production, as defined by the industry. Two different poultry rearing systems were compared for the plasma and muscle antioxidant status and plasma α-tocopherol and isoprostane levels. Conventional broilers (Ross 508 genotype, fast-growing) were fed according to the nutrition specifications for the specific race and raised indoor (15 birds/m2) for 47 days. Free-range broilers (Sasso genotype, slow-growing) were fed a standard diet according to the nutrition specifications and raised indoor and outdoor (13 birds/m2 indoor, and 15 bird/m2 of forage paddock) for 67 days. Diet for both groups was wheat and maize-based formulated. The birds were raised under the same conditions (offered feed, drinking water, vaccination, lighting). Slow-growing chickens were also left outdoor for grazing. After the end of the experiment, blood and muscle tissue samples were collected, processed, and stored at -80 oC. Antioxidant status was determined by TAC and TBARS assays in the plasma and muscle tissue; α-tocopherol and isoprostanes were measured on plasma. Data were analyzed by the independent samples t-test or the nonparametric Mann-Whitney U test. TAC, α-tocopherol and isoprostane levels in broilers plasma did not show significant differences between the two systems ($p>0.05$). However, TBARS in plasma was significantly lower for the fast-growing broilers ($p\leq0.05$). Also, results in muscle tissue revealed significantly increased TAC in slow-growing broilers ($p\leq0.05$) and significantly increased TBARS in the fast-growing group ($p\leq0.05$). In conclusion, this study shows that the type of the rearing system on the industrial scale affects the antioxidant capacity of the chicken muscle tissues. More specific, the muscle tissue of the free-range chickens (slow-growing, Sasso genotype) presented overall improved antioxidant status, implying a better meat quality. This research could be exploited for industrial large-scale broiler production to improve meat quality.

Keywords: Fast-growing chickens, slow-growing chickens, industrial production, oxidative stress, meat quality

Investigation of the effect of a commercial water acidifier in broiler chicks experimentally challenged by *campylobacter jejuni*

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Acidification of the drinking water has been proved effective to maintain water quality and improve the health and performance of birds. In addition, studies indicate that water acidification could act as a hygiene barrier, hindering the spread of zoonotic bacteria in the flock. The aim of the study was to investigate the effect of a commercial water acidifier, blend of formic, lactic, acetic, propionic, sorbic acid, cooper-sulfates and oligofructosesirup, on the *C.jejuni* colonization, and physico-chemical properties of the digestive content in broiler chicks. One hundred and forty-four 1-day old broiler chicks were randomly allocated to 4 treatment groups according to the following experimental design: group A, which served as a negative control, group B, to which birds were challenged with *C.jejuni*, group C, to which birds were challenged and received 0.1% of a commercial antibiotic based on enrofloxacin, and group D, to which birds were challenged and received 0.1% of the commercial water acidifier. From each bird, fresh content from crop and caeca were collected for *C.jejuni* counting, while the gastrointestinal content was also collected for pH and viscosity determination. The statistical analysis and evaluation of the experimental data revealed that water acidifier reduced significantly (P≤0.05) the BW of the birds the first 25 days and increased significantly (P≤0.05) the FCR for the last part of the study. At 25th day, *C.jejuni* counts in the crop were significantly (P≤0.05) lower in group D and C compared to group B, while C.jejuni counts in ceca, were significantly (P≤0.05) lower in group C compared to other groups. At 38th day, *C.jejuni* counts in crop were significantly (P≤0.05) lower in group B and C compared to group D, whereas *C.jejuni* counts in ceca, were significantly (P≤0.05) lower in group C and D compared to group B. At 25th day the pH in crop was significantly (P≤0.05) increased in group B compared to group A and C. The pH in duodenum and ileum was significantly (P≤0.05) increased in challenged groups compared to negative control group, whereas the pH in jejunum was significantly increased (P≤0.05) in group B and C compared with group A and D. In addition, the pH of caecal content, was significantly(P≤0.05) decreased in group D compared to group A and C. Finally, at 38th day, the pH in caeca was significantly (P≤0.05) increased in group B compared to other groups, while the viscosity of jejunal digesta in group D was significantly(P≤0.05) increased compared to other groups. The study provides evidence that continuous water acidification can significantly reduce *C.jejuni* counts in the ceca of birds and could be useful in a *Campylobacteriosis* control program. However, its continuous use could suppress the performance in broiler chicks, and therefore more research is required to propose an optimum dosage scheme, for both, growth promotion and pathogen control.

Keywords: *Campylobacter jejuni*, broilers, water acidifiers, pH, viscosity, feed additives

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The effect of a blend of acidifiers and essential oils on the *campylobacter jejuni* counts and physico-chemical properties of ıntestinal digesta in broiler chicks

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Antibiotic use in poultry feeds is under scrutiny due to development of antimicrobial resistance bacteria and a potential threat to human health as well as a result of increasing consumer awareness and the demand for livestock products from antibiotic-free production systems. Many feed/water additives have been developed as alternatives to AGPs due to a focus on maintaining the gut homeostasis. Acidifiers and essential oils (EOs) are promising alternatives since they have beneficial results on animal health and performance. The objective of the study was the investigation of a commercial phytogenic product, that contained lactic, citric, formic, acetic, phosphoric, malic acid and oregano oil, against *Campylobacter jejuni* and its interaction with the pH of intestinal digesta in broiler chicks. One hundred and forty-four (144) one-day old chicks were randomly allocated to 4 treatment groups, with 4 replicates, according to the following experimental design: group A, which served as the negative control, group B, birds of which were challenged with *C. jejuni*, group C, birds of which were challenged and received 0.1 % a commercial antibiotic of enrofloxacin, and group D, birds of which were challenged and received the commercial phytogenic product by drinking water in concentration of 0.05%. The body weight (BW) of birds was measured weekly and the feed conversion rate (FCR) was calculated. From each bird, fresh content from crop and caeca were collected for *C. jejuni* counting, while the gastrointestinal content was also collected for pH and viscosity determination. The statistical analysis and evaluation of the experimental data revealed that group C and D had significantly lower *C. jejuni* counts in the crop ($P \leq 0.05$) and caeca ($P \leq 0.05$) compared to group B at the 25th day of age. In addition, group B had significantly higher *C. jejuni* counts in the caeca ($P \leq 0.05$) compared to group C. The pH of the duodenum was significantly higher ($P \leq 0.05$) in group B compared to group C at the 25th day of age. Furthermore, the pH of jejunum digesta in group D was significantly lower ($P \leq 0.05$) compared to the other challenged groups. The pH in the caeca was significantly lower ($P \leq 0.05$) in the group D compared to group C. At the 38th day of age the pH of caeca in group C was significantly lower ($P \leq 0.05$) compared to group B. The commercial product evinces, to be effective against *C. jejuni*. Moreover, it reduced the pH in jejunum and caeca at day 25 and 38 of age respectively. Further studies are necessary to investigate the effect of the commercial product on gut health.

Keywords: Broilers, acidifiers, essential oils, pH, *campylobacter jejuni*

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Effects of feeding with balanced digestible essential amino acids and low protein feeds on performance

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In poultry nutrition, most attention is given to protein products, due to the importance of protein as a major constituent of the biologically active compounds in the body. It also assists in the synthesis of body tissue, for that renovation and growth of the body. Furthermore, protein exists in form of enzymes and hormones which play important roles in the physiology of any living organism. Broilers have high dietary protein requirements, so identification of the optimum protein concentration in broiler diets, for either maximizing broiler performance or profit, requires more knowledge about birds' requirements for protein and amino acids and their effects on the birds' growth performance and development. It also requires knowledge about the protein sources available that can be used in poultry diets. The broad aim of this review is to highlight the importance of some of the available high-quality specialized protein products of both animal and plant origins which can be explored for feeding broiler chickens. Minimization of the concentration of anti-nutritional factors (ANFs) and supplementation with immunologically active compounds are the main focus of gut health-promoting broiler diets. Worldwide poultry production has increased significantly over the past fifty years to accommodate rising demand.Broiler chicks grow rapidly and typically receive diets high in protein or amino acids. It is common practice in the poultry industry to provide varying diets during the growing period. Protein is an essential constituent of all tissues of animal body and has major effect on growth performance of the bird. The raised number of animals required for meat production in turn increases the need for protein-rich feedstuffs, such as soybean meal, to meet the nutrient requirements of the animals. Concurrently, the arable land per capita is decreasing which can result in increased prices for crops used for feed purposes because agricultural land for feed production is limited. Lowering the crude protein (CP) concentration in diets for broiler chickens is an effective tool to reduce N excretion of birds thereby decreasing the negative effects of animal husbandry on the environment. Moreover, decreasing the dietary CP concentration reduces the proportion of protein-rich feedstuffs in feed that can result in decreased feed costs. It has often been reported that the reduction of dietary CP concentration results in decreased growth even though essential amino acids (AA) were sufficiently supplied. A better understanding of the nutritional requirements of amino acids allows a more precise nutrition, offering the possibility for the formulator to optimize the requirement of at least minimum levels of crude protein by essential amino acids requirements, generating better result and lower costs for the producer.

Keywords: Essential amino acid, broiler performance, feeding

SECTION VI

SMALL RUMINANT PRODUCTION

(ORAL PRESENTATIONS)

Karacabey Merino sheep breeding study in Edirne province sheep farms

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The aim of this project was to aim to determine the performances of Karacabey merino sheep (KBS) and their lambs in different years within the scope of the "The national ovine breeding project in the flocks of the breeders" carried out in the province of Edirne. In the project was determined the lamb yield at birth, the survival percent, the litter size, and on day 60 and on day 120 (weaning weight) growth performance of lambs in base sheep flocks. This project was conducted between 2015 and 2020 on the Karacabey Merino sheep in the base flocks of Edirne provinces and 36 base flocks in the Edirne breeding region a total of 263 head of rams and, 5290 head of ewes, and their lambs 20081 lambs.

The average live weights were measured for males 20.48 ± 2.3 and for females 19.90 ± 2.29 kg on day 60 and, olsa for males 40.87 ± 3.02 kg and for females 40.86 ± 3.03 kg on day 120. Average daily live weight gain (DLWG) in all herds was found to be 307.24 ± 26.81 g on day 120. The lamb loss rate is 5.27% on day 60. The selection superiority for the live weights (LW) were 2.26 kg and 0.36 kg on day 120, respectively. As a result of the five-years of the selection study in project herds, the coefficient variation (CV) of all herds was reduced from 10.05 to 8.64 on day 120. This 5-year project result showed that the growth performance of the lambs of Karacabey Merino sheep increased in the following years compared to 2016.

Keywords: Sheep, weaning weight, live weight, daily live weight gain

Acknowledgements: In the presentation, the animal materials data of Karacabey Merino Sheep breeding - I project (Project No: 22KBM2015-01) carried out in Edirne Province within the scope of the "National Breeding Project in The Sheep Herds Owned by Breeders" was used. With the permission of the General Directorate of Agricultural Research and Policies (TAGEM) in the Ministry of Agriculture and Forestry of Turkey.

The effects of some environmental factors on the growth traits in Karacabey Merino lambs raised for community based sheep ımprovement project in Tekirdağ

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This study was carried out to determine the influence of enviromental factors on Karacabey Merino lambs for birth weight, 45 day's and 90 day's weight (weaning weight) and and average daily gain from 2016 to 2020, years. The least square means of birth weight (BW), 45 day's weight(FFW) and weaning weight at 90th day (WW) for male and female lambs were 3823.9 ± 14.0 g and 3794,9 ± 13,8kg; 17357.3 ± 55.7 and 17389.7 ± 55.0 and 31187.5 ± 91.9 g, and 32366.9 ± 90.6 g, respectively. The effect of age of dam, year, birth type and gender were significant on birth weights and weaning weights of lambs (P<0.01). The effect of age of dam, year and birth type were significant on 45 day's weight (FFW) of lambs (P<0.01). The overall average daily weight gain of male and female lambs were found from birth to 45 day's as 299.8 ±0.7 and 302.9 ± 0.6 and from 45 day's to weaning as 338.7 ± 0.9 and 338.8±0.8 g, respectively. All population were managed under community based sheep improvement programs in Tekirdağ province. The data were analyzed to determine the effect of age of the dam, birth type, gender, year, on the birth weight, 45 day's weight,and 90 day's weight (weaning weight) of Karacabey merino lambs. Statistical analysis was performed by Least Square Analysis Methods.

Keywords: Karacabey Merino, growth traits, community based sheep improvement program

Effect of weaning age on social ısolation behavior of lambs

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In this study, the effect of different weaning age on the behavior of Tahirova lambs during short-term social isolation was investigated. The study used 60 twin lambs weaned at an average age of 4, 8, and 12 weeks. Three random groups were formed with 10 females and 10 males in each group. The lambs stayed with their mothers for the first week after birth and then separated from their mothers between 8:00-17:00. Creep feeding system the lambs meeting with their mothers after milking at 17:00 were allowed to pass to the paddock in with their own group mates. The lambs were placed in a 2.5 x 3.5 m2 social isolation chamber, and each group was individually isolated for five minutes, 2 days before the weaning date. The bleating behavior frequency and starting to bleat were taken from a point where the animal did not see the observer. The camera system placed in the isolation chamber was determined from the camera recording by taking sniffing, climbing, bipedal stance, walking to back, turning around, jumping, running, looking up and elimination behaviors. In the social isolation test, according to the groups the behaviors of starting to bleat, bleating, walking back, turning, jumping and running were found to be statistically significant ($P \leq 0.05$). While the averages of starting to bleat, bleating, walking to back, turning around, jumping, running were similar in the groups weaned at the age of 8 and 12 weeks, the average behavior of the group weaned at the age of 4 weeks was higher and statistically different from the other two groups ($P < 0.05$). There was no statistically significant difference in the social isolation behaviors of female and male lambs ($P > 0.05$). It can be said that the group weaned at the age of 4 weeks experienced more social isolation stress than the groups weaned at the age of 8 and 12 weeks, due to the higher frequency of behavior and earlier onset of bleating.

Keywords: Tahirova, weaning age, bleating, walking to back, turning around

Sexual behavior and reproductive hormone profile in melatonin treatment for Turkish saanen goat buck

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In this study, the effects of melatonin implant treatment before the breeding season on melatonin (M) and testosterone (T) hormone levels, and the sexual behavior and performance, were determined in Turkish Saanen goat bucks. Four head of Turkish Saanen goat bucks were used. The bucks were randomly divided into two groups and they were treated with 3 implants with 18 mg melatonin. The mating of 50 Turkish Saanen female goats was also observed, half of which were implanted with melatonin (18 mg/goat). All bucks and goats were fed with barley grain feed (flushing) for 60 days. A total of 13 blood serums were collected before the melatonin implant (Day 0) and on the 21st, 42nd, 63rd, 94th, 129th, 157th, 185th, 213rd, 251st, 275th, 307th, and 335th days after the implant. The M and T hormone were determined using the ELISA method in the blood serum. Mating was carried out for 10 minutes, and the sexual behaviors of the bucks and does were recorded. While the treatment (MI) group had an average melatonin hormone level of 526.3 ng/L, the control (C) group had a melatonin hormone level of 199.0 ng/L (P=0.0224). The testosterone hormone level in the MI group was 12.7 nmol/L on average, and it was 6.13 nmol/L in the C group (P=0.2137). The MI group had significantly higher melatonin hormone levels in the summer, autumn, and winter than the C group, and significantly higher testosterone hormone levels in all seasons (P≤0.05). The highest levels of melatonin and testosterone hormone levels were determined in the MI and C groups in April-May. Sexual behaviors and the duration of mating were similar in the groups of bucks (P>0.05). A high statistically significant positive correlation coefficient was determined between melatonin hormone and testosterone hormone (P≤0.05). In addition, there was a significant and positive correlation coefficient between hormone levels and the frequency of tongue-lapping, sexual vocalization behavior in the MI group. Pearson correlation coefficients r=0.487 and r=0.462 were determined between hormone level and frequency of tongue-lapping and frequency of sexual vocalization, respectively. In conclusion, the melatonin implant, which was determined to increase hormone levels significantly, can be used to increase the libido in Turkish Saanen goat bucks.

Key words: Turkish Saanen, melatonin implants, melatonin, testosterone, mating behavior

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Effect of early weaning on behavior of weaned lambs

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This study was carried out to determine the effects of different weaning age on the behavioral characteristics of Tahirova sheep lambs at weaning. A total of 60 twin lambs, 30 females and 30 males, were used in the study. The lambs were randomly divided into 3 groups of 20 each. Lambs born within 5 days were suddenly weaned at 4 weeks (Group 1), 8 weeks (Group 2) and 12 weeks (Group 3). The mothers and their lambs, which were separated during the daytime hours (08:00-17:00) were brought together in the evening, then milking took place after 1 week of age. The creep feeding system was applied at night to the mother and their lambs were housed in side-by-side paddocks. Behavior observations were made by two observers between 17:00 and 18:00 from the day of weaning the lambs in each group. Observations were made by the continuous observation method for one hour on the day of weaning and the following 7 days. Significant differences were observed in the behavior of lambs during the weaning period, according to the groups (P≤0.05). The frequency of bleating, resting, playing, interest in the side compartment, stereotype, scratching and drinking behavior were found to be statistically significant between groups (P≤0.05). The frequency of bleating, abnormal stereotypes and sexual interaction behavior were found to be statistically significant compared to the lambs' gender (P≤0.05). While bleating and stereotype behaviors were higher in female lambs, sexual interaction was higher in male lambs (P≤0.05). As a result, it can be said that Group 1, weaned earlier than the other groups, experienced more stress than the other groups. In addition, female lambs seem to have experienced more stress than male lambs during the weaning period.

Keywords: Tahirova, bleating, resting, stereotype, drinking

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Some yield and structural characteristics of the sheep enterprises included in akkaraman breeding subprojects in Çankırı province

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In Turkey, with the "National Sheep and Goat Breeding Project", which was initiated in 2005 with 2 breeds in order to increase the productivity of domestic sheep and goats and to meet the demand for quality breeding animals in ovine breeding by encouraging the establishment of breeding stocks, breeding studies are carried out in 23 sheep and 7 goat breeds today. In this study, it is aimed to investigate some of the yield, herd management, breeding and structural characteristics of Akkaraman sheep enterprises, which were included in the Akkaraman Breed Sheep Breeding Sub-projects carried out in Çankırı since 2011. Within the scope of the research, a face-to-face survey was conducted with a total of 57 Akkaraman breeders included in the "Çankırı Province Akkaraman Sheep Breeding Sub-Projects" according to the full count method. The obtained data were analyzed using the SPSS package program. Descriptive statistics and frequencies were determined in the analyzes. In the study, the average age of breeders was determined as 50,3. Average number of ewes in farms was 260. Extensive grazing system was practiced in all of the enterprises, and the animals were kept in the pasture for 8 months and in the barn for 4 months of the year. 79% of breeders did not find pasture areas sufficient. The average breeding age of ewes was determined as 18 months, and the average productive longevity was 57 months. Single and twin birth rates in enterprises were determined as 74% and 25.5%, respectively. The average weaning age of lambs was 130 days. The number of sheep per ram during the breeding period was determined as 35. 47% of the breeders reported that they started to feed the lambs with starter in the first 2 weeks after birth, and 53% in the 3rd and 4th weeks. In addition, it was determined that 90% of the enterprises produced forage crops. The current situation was determined regarding some yield and herd management characteristics of sheep enterprises within the scope of Çankırı Province Akkaraman Sheep Breeding Subproject. As a result, it was determined that the enterprises within the scope of the breeding project examined in this study were generally similar to the sheep enterprises in Turkey in terms of structural characteristics.

Keywords: Akkaraman, sheep breeding, herd management, Çankırı

The effect of aging time and breed on some meat quality traits in Morkaraman and Awassi ram lambs

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The aim of this study was to examine the effects of aging time and breed on some meat quality parameters in Morkaraman and Awassi male rams. The study was carried out in Sheep Breeding Branch, Food and Livestock Application and Research Center, Atatürk University, Erzurum. Meat quality characteristics were determined from *m. longissimus dorsi (MLD*) muscles taken from ten Morkaraman and Awassi lambs sent to slaughter at an average age of 7.5 months. Meat quality such as color (L*, a*, b*, C, and H), pH, drip loss and TBA was determined on the MLD muscle. The MLD muscles were maintained at 4 °C for up to 12 days. While there was no effect of breed on meat quality parameters except L, pH and drip loss, it was observed that there were changes in all meat quality parameters examined depending on the aging time. Due to the structural deterioration of the muscle by proteolytic enzymes during aging, significant improvements have occurred in the properties of meat such as color, pH, juiciness and TBA. However, it was observed that a* value decreased, drip loss and TBA value increased depending on the progress of aging time.

Keywords: Morkaraman, awassi, aging time, meat quality

Evaluations on birth period practices in hair goat

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Hair goats and their crosses are farmed in almost every region of our country, it is observed that there are regional differences in the purposes of production. The aim of this study was to make evaluations about the parturition period practices in hair goat breeding in the enterprises. The study material of the study consisted of the data obtained by survey studies in 25 enterprises within the scope of «The Hair Goat Breeding Sub-Project under Field Conditions in Çanakkale». The survey study of the birth period aimed at presenting the current situation of the enterprises. In short, 70% of the births occur in January (47.94%)-February (22.69%). 41.6% of the breeders stated that they did Vitamin E-Selenium injection within the first 7 days and 33% on the 30th day after birth. It has been observed that the breeders are mostly aware of the importance of colostrum. The body weight of kids was reported as 15.48 kg at an average age of 123 days. It was determined that 53.3% of the breeders took the operation time of dairies, as the weaning criterion, 37.8% as kid development status and 8.9% as the cheese making situation of the goats when the dairy was opened. The breeders indicated that 47.6 % of kids sucked their mother for 90 days and for 120 days and stated that they start giving concentrate feed after weaning. It is observed that milk prices, the start of milk selling from dairy farms, labor force for milking and kid meat prices are important in this regard. It was stated that they mostly encountered white muscle disease and diarrehea during the delivery period. The average separate time of kids from their mothers during the day after birth was 8.48 ± 1.44 hours, and the average starting age for roughage consumption was 87.75 ± 57.95 days. It is stated that giving hay to the kids after birth is 49.32±34.72 days on average, while it is stated that hay is provided continually to the kids right after birth. They also state that kids start concentrate feed consumption after an average of 87.75±54.93 days. Although 20% of the breeders state that the births take place in a separate section, it is observed that goats give also birth in the pasture. In the enterprises participating in the survey, 56% of the births occur in separate sections, 28% in the herd, and 16% in the pasture. Multiple births are not preferred in the enterprises (multiple kids are given to another goat, another enterprise or person). It was determined that 61.1% of the kids who were not accepted by their mothers in the enterprises were given to another goat, and 38.9% were given to someone else. In conclusion, multiple births are not preferred in hair goats' herd, it is observed that the opening date of dairies has an effect on the weaning date of the kids, the multiple kids are given to another goat whose kid has died (milk mother).

Keywords: Birth season, breeder practices, weaning criteria, hair goat

SECTION VII

FEEDS AND ANIMAL NUTRITION

(ORAL PRESENTATIONS)

The importance of animal nutrition in animal production

Prof. Dr. Nizamettin Şenköylü

President of Animal Nutrition Science Association

The world population is growing dramatically and is expected to reach 9.7 billion by 2050. Thus, nourishing the fast-growing population and improving health are essential. The human body consists of 17% protein and depends on animal-based products, such as meat, milk, egg, and fish. An adult man of 80 kg requires at least 70 g dietary protein per day and 28 g of this should be derived from these animal products. According to FAO, the global annual meat consumption could reach 373 Mt by 2030 and 465 Mt by 2050. Similar amount of increase is expected in milk, eggs and fish production to nourish the world. This huge amount of production should aim healthy food without any compromise to the environment. Inequality in animal products consumption among developed and other countries is unfair and the existing huge gap should be decreased. Animal feeding and nutrition is becoming top priority to manage the enormous amount of animal production provided no health risk for environment and no risk for humans and animals health have been left. Inadequate/erroneous feeding and nutrition might result in growth retardation, reproductive failure, impaired defence system, metabolic disorders, unproductivity and even death. Therefore, the chemical composition and the methods of processing of the feedstuffs significantly affect nutrient availability and overall animal performance. Feed is the most prominent input in animal husbandry. Generally, feed cost accounted for 60 to 70% of the total cost in animal production and therefore substantially affect farm economy by increasing or decreasing profit margin. A study conducted with broilers in Scotland demonstrated that the increase in feed raw material prices particularly in wheat, soybean and feed fat resulted in a reduced profit margin from 112% to 104% point in relation to the recommended balanced protein. Since the profitability of broiler production is the value of the end product minus the input costs to produce that product, profit margin is decreased as the feed price is increased in order to reach the same performance. Feed conversion ratio (FCR) which means as kg amount of feed consumed per kg of live weight gain is a distinct indicator of animal productivity. FCR for fish, poultry, pig, rabbit, sheep and cattle is respectively about 1.5, 2.0, 3.0, 4.0, 6.0, 7.0 and determine the preference of basic animal husbandry depending on the local conditions of a given region. Vitamin mineral and energy deficiency or erroneous nutrition can easily cause several symptoms such as ketosis, perosis, osteoporosis, muscular dystrophy, encephalomalacia, obesity and other diseases, which affect animal health and significantly decrease farm profitability. Another important point to be considered is the likelihood of feed contamination by pathogens, heavy metals, dioxin or pesticides that can affect the quality and safety of animal foods and cause potential risk to human health. Feed quality inspection has to be carefully monitored in order to avoid these types of health hazards in human and animals. New concepts in animal nutrition and metabolism require interdisciplinary collaboration, and some challenges have been reported that need to be addressed: comparative nutrition, relationship between endocrinology, immunology and nutritional diseases and nutrigenomic treatments for metabolic diseases. Such scientific areas in animal nutrition can be attractive particularly for young nutritionists since they require perseverance study and meticulous approach.

Keywords: Animal nutrition, animal production, protein recoilment

A research on the microbiological status of the dairy cattle feeds produced in compound feed factories of İzmir province

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As known, both raw materials and compound feeds should have stored under certain circumstances during compound feed production. It is utmost important to not have any changes in the compound feed and raw materials due to microorganismal activity during this storage period by manufacturers and the businesses. Microbiological status of the dairy cattle feeds in different crude protein levels produced by compound feed factories of Izmir province was intended to be researched in this study. For this study, a total of 81 dairy cattle feed samples containing 19 %, 20 % and 21 % crude protein at different times from 10 feed factories operating in İzmir province were collected. In dairy cattle feed samples, the total amount of mesophilic aerobic bacteria and total aflatoxin levels stipulated in the feed regulation were determined. TS EN ISO 4833-1 analysis method was used for the counting (CFU/g) of total mesophilic aerobic bacteria(TMAB). Entire of B1, B2, G1 ve G2 toxins were detected in feeds with total aflatoxin (TA) analyis. Elisa Test System was implemented in this analysis. According to the findings obtained from the research, the total mesophilic aerobic bacteria count (TMAB) of dairy cattle feeds (n=81) ranged from 2.54 x 10 2 to 3.86 x 10 5 CFU/g, and the total aflatoxin (TA) levels varied between 1.61 and 5.38 ppb. No values exceeding the standards were found in terms of feed microbiology norm in dairy cattle feeds produced in the feed factories examined (n=10). According to results of this study, when the microbiological status of dairy cattle feeds with different protein levels produced in compound feed factories in Izmir province are examined, it is possible to say that the average total mesophilic aerobic bacteria and total aflatoxin amounts are compatible with the norm values and it will be beneficial to maintain the current situation in both of raw materials and finished products in terms of feed hygiene.

Keywords: Dairy cattle feed, microbiological status, Izmir province

Determination of urea via liquid chromatography with refractive index detector in animal feeds

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Urea, one of the non-protein nitrogen compounds, has been used as a source of protein in the feeding of ruminant animals. The protein ingredient of feeds is increased via adding urea to compound feeds, hays or silages. However, there is a legal restriction on the use of urea in animal feeding and the legal regulations on the addition of urea to feeds read that "it can be used at the rate of at most 2% in ruminant rations, which have completed their rumen development, on condition that it is specified in the tag label". In laboratories, if feeds contain urea is determined qualitatively via present-absent tests and also amount of urea is determined quantitatively. In studies on quantitative urea determination, standards published by national and international organizations are complied with. In our country, the amount of urea is determined via spectrophotometric method, but sometimes incorrect/positive results are obtained when the feed contains free amino acids. In fact, in the EU countries, it was reported that some incorrect/positive results were obtained via spectrophotometric method in animal feeds and also some inconsistent results were reached in comparisons between laboratories. In our country, too, some similar problems have been encountered and they have caused some judicial problems between feed control laboratories and feed sector. In this study, it was aimed to describe the analysis procedure of determining the urea in animal feeds via the Liquid Chromatography with Refractive Index Detector as an alternative to the determination of urea in animal feeds quantitatively via the spectrophotometric method. In the method optimization study, the dairy cattle feed, which has been on the market for sale, was used. For the optimization of the extraction of the urea, 3 different sample amounts (1.0, 2.5 and 5.0 g) were used and 3 different shaking times (10, 20 and 30 minutes) were applied. As a result of the study, it was determined that the interactions between sample amounts and shaking times were not statistically significant ($p>0.01$) on the amount of urea and the recycle results determined via the method of Liquid Chromatography with the Refractive Index Detector. In conclusion, it was revealed that the method of determination of urea amount via Liquid Chromatography with the Refractive Index Detector has a potential of being an appropriate method for the analysis of urea in animal feeds.

Key Words: Urea, compound feed, liquid chromatography, refractive index detector

Relationship between chemical composition and fibre degradation kinetics of cottonseed meal

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Cottonseed meal, a byproduct of the cotton industry obtained after the oil-extraction step. After removal of oil, lint and hulls, approximately 45% of initial cottonseed meal remains and is used as a feed supplement for livestock. Cottonseed meal is uniquely high in fiber and fibre degradable characteristic relates to feed intake and performance of high producing ruminants. Rumen fibre digestion also impacts feed energy value available for ruminants. The objective of this study was to evaluate relationship between chemical composition and fibre degradation kinetics using nylon bag method and to develop the model to predict fibre degradability in cottonseed meal. A total of 40 cottonseed meal obtained by extraction method were used in the study. The cottonseed meal samples were obtained from cottonseeds grown in the Aegean, Mediterranean and Southeastern Anatolia regions where cotton production is common in Turkey. All chemical analyses were carried out in triplicate. Dry matter was determined by drying the samples at 105°C overnight and crude fat content was analyzed using the ether-extraction method. Crude protein content was measured by the Leco Combustion method which is based on the Dumas dry combustion technique (AOAC 2007). Neutral detergent fibre, acid detergent fibre and acid detergent lignin were determined by the methods of Van Soest et al., 1991. The degradation kinetics were evaluated by the nylon bag technique through the in situ procedure described by Mehrez and Ørskov (1977). Three Holstein cows (575±19 kg body weight) fitted with permanent ruminal cannulas were used to measure the degradation kinetics of DM, NDF and ADF of cottonseed meals in this experiment. Cows were fed total mixed ration twice a day and had 24 h/d access to fresh water. Nylon bags were ruminally incubated for 2, 4, 8, 16, 24, 36, 48 and 72 h. The relationships between chemical composition and fiber degradation kinetics of cottonseed meal were determined by linear regression. Crude protein content of cottonseed males ranged from 23.40% to 40.23% of dry matter. Effective degradability of dry matter, neutral detergent fibre, and acid detergent fibre ranged from 39.60% to 52.20%, 23.10% to 35.60% and 17.40% to 23.50%, respectively. Effective degradability of dry matter, neutral detergent fibre, and acid detergent fibre were positively correlated with crude protein content ($P < 0.05$) but negatively with the content of neutral detergent fibre, acid detergent fibre and acid detergent lignin ($P < 0.05$). Fiber content was the best feed composition for predicting effective degradability of dry matter, neutral detergent fibre, and acid detergent fibre of cottonseed meals. These results suggested that chemical analysis could give a satisfactory prediction towards degradable characteristics of cottonseed meal in ruminants.

Key words: Fibre degradation, chemical composition, cottonseed meal

Bacillus subtilis improves the nutritional composition of wheat bran through solid-state fermentation

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The effects of *Bacillus subtilis* on the nutritional composition of wheat bran were investigated in this study. Wheat bran was fermented using *B. subtilis* (ATCC 21556) at 1010 cfu per kg wheat bran. Raw and fermented wheat bran were analyzed to determine the crude protein (CP), ether extract (EE), ash, crude fiber (CF), neutral detergent fiber (NDF), and acid detergent fiber (ADF). Fermentation increased ($P<0.001$) the CP and ash content but decreased ($P<0.001$) the CF, NDF, ADF, EE ($P<0.05$), and nitrogen-free extract of the wheat bran. Solid-state fermentation using *B. subtilis* can be suggested to improve the nutritional quality of wheat bran according to the results of the present study.

Keywords: Wheat bran, nutritional composition, *bacillus subtilis,* solid-state

POSTER PRESENTATIONS

Effects of kinship matings on hatchability of fertile Japanese quail eggs

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It is known that inbreeding increases the homozygosity ratio, whereby the probability of homozygosity of semi-lethal or lethal genes also increases. Furthermore, it leads also to an impoverishment of the genoms. The probability of inbreeding depression is higher for traits with low heritability, such as reproductive traits, than for traits with relatively higher heritability. In this study, the effects of different kinship matings on fertile egg hatchability were investigated. 2310 quail eggs were obtained from mother-son (MS), father-daughter (FD), full-sibling (FS), half-sibling (HS), and not related (CONT) matings. Four incubations were performed and eggs in each incubation were obtained from different birds. The female-male ratio was 1:1 for related matings and 2:1 for CONT mating. Fertilized eggs and embryo losses were determined after hatching. Hatchability was recorded as a binomial trait. A threshold model with incubation parties and mating groups as fixed factors was analyzed using the generalized estimating equation method. Odds ratios (Ψ=eb) were calculated from the estimation values (b) and Euler's number (e). The effect of mating type was significant ($P<0.0001$). The probability of hatching of eggs from matings that has F=0.25 inbreeding coefficients (MS, FD, FS) were 27% to 54% lower than from matings produce no inbreed (CONT) ($P<0.05$). Interestingly, the probability of HS eggs to hatch were light higher than the CONT eggs, but not significant ($P>0.05$). Eggs hatching probability from MS mating were significant lower than FD and FS ($P<0.05$). On the other hand, no significant difference was observed for the hatching probabilities between FD and FS eggs ($P> 0.05$). The results reflects the difference in the genetic relationship between parents and offspring versus between siblings. While the relationship between parents and offsprings are absolute, the relationship between siblings are relative averages.

Keywords: Quail, hatchability, heritability

Analysis of one way repeated measure anova using spss: application to egg shelll thickness of quails

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Experiments that are obtaining data from the same experimental unit at different time points or different circumstances are called repeated measure experiments. There is a relation between data groups due to their origin of same experimental unit; therefore, the assumption of independency is violated and classic one-way analysis of variance cannot be applied. Instead, its nonparametric alternative Kruskal-Wallis or repeated measure analysis of variance is preferred. In this study, shell thickness data of three different parts (at the equator, pointy and blunt end) from the eggs of White Japanese Quails (*Coturnix japonica*) are analyzed with one-way repeated measure analysis of variance on the commonly used statistical software SPSS and results are interpreted. Analyses revealed that shell thickness at the pointy end and equator in the average are statistically same (0.217 mm and 0.220 mm; $p>0.05$); whereas the average blunt end thickness (0.240 mm) was found statistically different from the others ($p<0.001$)

Key words: Repeated measures, SPSS, quails*, coturnix japonica*, egg shell thickness

Investigation by orthogonal comparison of the effects of vitamin E and selenium added to the diet at different levels on fertility and hatchability of partridges

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In this study, the effects of vitamin E and selenium (Se) on fertility and hatchability in partridges (Alectoris chukar) were analyzed by orthogonal comparison. According to the analysis, the fertility and the hatchability in partridges showed statistically significant differences compared to vitamin E and selenium (P<0.01). As a result of orthogonal comparison, quadratic (square) effect was found to be significant for both fertility rate and hatchability (P<0.05 and P<0.01). 8.961% of variation in fertility can be estimated by linear regression, 90.562% by quadratic regression and 0.053% by cubic regression equation. The correlation coefficient of quadratic regression with the greatest effect was found to be r=0.952 and the coefficient of determination as R2=0.907. 58.676% of the variation in hatchability ratio can be explained by linear, 32.064% quadratic and 9.260% cubic regression models. Linear and quadratic effects were significant (P<0.01 and P<0.05), while cubic effects were insignificant. Correlation coefficients related to linear and quadratic relationships in hatchability ratio were calculated as 0.654 and 0.813, respectively, and determination coefficients were calculated as 0.428 and 0.661, respectively. Quadratic regression model with higher R2 value could better explain the hatchability ratio. As a result, studied with orthogonal comparison, it was revealed that vitamin E and selenium had a quadratic effect on the fertility and hatchability of partridges.

Keywords: Partridge, orthogonal comparison, vit E, selenium, fertility, hatchability

The importance and morphology of the uropygial gland in birds

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Skin is an auxiliary material for the formation of body functions in both vertebrates and invertebrates. It includes a number of anatomical formations in order to perform its own specific tasks. Some of these anatomical formations are sweat and sebaceous glands. While mammals have skin glands, birds have only uropygial glands as skin glands, and turkeys also have a specific oil gland in the ear hole region A uropygal gland is a sebaceous gland consisting of two lobes that have a feather non-feather structure over them, depending on the species that settle under the skin at the dorsal of the tail in poultry. The secretion of the uropygial gland is a sebaceous gland with a complex composition that includes waxes consisting of fatty acid esters, long and short chain fatty acids, triglycerides, enzymes involved in fat synthesis and cell debris. Shape and size vary greatly between species. The functions of the uropigial gland include the care of feathers, decontamination, pheromone production, body temperature control, intra- and interspecific communication, protection against predators and/or parasites, their functions. The secretion of the gland also provides, directly or indirectly, the regeneration of cells, the development and differentiation of cells. It acts as a defense mechanism for pathogenic microorganisms to establish colonization on feathers and prevent their protection, thereby protecting birds from infections and feather spoilage. The composition of the gland secretion can also be a guide dec assessing interspecific inbreeding in birds. It is known that it is the source of social olfactory cues that determine mate choice, and its size and secretion increase during the breeding season. In this study, the morphological features and different aspects of the uropygal glands of poultry were discussed, and the evaluability of the effect of this on poultry animals from the point of view of zootechnical science should be investigated.

Keywords: Skin, uropygal gland, sebaceous gland, tail gland

Crop's milk

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Crop is a character of poultry an enlargement of the cervical esophagus that forms towards the ventral at the entrance to the chest cavity. It is the organ from which physical digestion is carried out in poultry, and in many bird species the proventriculus is used to store food when it is completely full. It is strongly attached under the skin, differs in volume by species, sex and nutrition. The most interesting feature of pigeons, doves and other cage birds that are not found in other birds is that they secrete a milky secretion to feed their young. This secretion, which is called. Crop milk, is popularly known as bird's milk. This secretion is secreted from the intestinal wall by means of the hormone prolactin secreted from the pituitary gland of adult birds and is as nutritious a liquid as mammalian milk. A baby bird inserts its beak into its parents ' mouth and receives this secretion by making its parents vomit. It is a highly nutritious substance consisting of protein (55-60%), fat (32-36%), carbohydrates (1-3%) and minerals. It is an important source of nutrients that allow young offspring to survive, grow and develop. The young are fed with this secretion for 8-11 days after hatching, then with ground, semi-digested food in the parental course. The word "bird's milk", which is very rare, has therefore passed into idioms. With these aspects, it has been focused on the rare bird's milk in the species and its importance has been tried to be explained.

Keywords: Bird's milk, crop milk, pigeon milk

Characteristics of blackbirds and its importance in biodiversity

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The Blackbird (*Turdus merula*) is one of the most common songbird species in Europe and Turkey. Blackbird, which is present in almost every region in Turkey, has the status of native, passerine bird, winter and summer migrant. The Blackbird makes its nest among fences and shrubs, tree branches and wall cavities. In forested areas, they choose juniper species as a nesting place. It lives in urban parks and gardens, as well as in wooded areas. It is involved in ecological balance and can be used in biological struggle. The Blackbird is a rare predator of the early larval periods and eggs of pests up to the third larval period of the pine pouch Beetle in autumn and winter. They promote seed germination by eating olive fruits. In parks in urban areas, the breeding period is prolonged under the influence of artificial lights. Due to artificial night light, it has been revealed that foraging activities continue into the night. Exposure to artificial light at night may explain the importance of diversity in the timing of reproductive physiology in European blackbirds. With all these characteristics, blackbirds should be evaluated as an alternative poultry with an emphasis on animal science.

Key Words: Blackbirds, *turdus merula*, biodiversity, biological control, foraging habits.

The effects of feeding conditions on the fatty acids composition in lamb meat

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The sheep are the first herbivores that has been domesticated around 8900 B.C. and resistant to environmental factors with low costs and safe breeding profile. Meat production is the most important yield of sheep, mostly produced as lamb meat. According to the 2019 data of Turkish Statistical Institute of sheep breeding in Turkey, the number of slaughtered animals is 5 million heads and the total meat production is 109.382 tons. Animal proteins are vital in human nutrition in terms of fatty acids and essential amino acids they contain. It is recommended that half of the 70-80 g/day protein that an adult person needs should be of animal origin. Fatty acids are divided into two groups as saturated and unsaturated (monounsaturated and polyunsaturated) fatty acids. Some fatty acids found in foods are palmitic, stearic and myristic acids as saturated fatty acids; oleic acid as monounsaturated and linoleic acid as polyunsaturated fatty acids. It has been shown that ω-3 and ω-6 fatty acids, which have to be taken with food because they are not synthesized in the human body, decrease the risk of heart attack, ω-3 fatty acids (especially triglycerides) reduce total cholesterol and low density lipoprotein levels and increase high density lipoprotein levels when they are taken in sufficient levels. The ratio of ω-6 and ω-3 fatty acids in the body (ω-6/ω-3) is very important. World Health Organization suggests that this ratio should ideally be 1:1-4:1 and should be kept at 5:1-10:1. According to the studies on the effects of feeding conditions on the fatty acids composition, saturated fatty acids rate was found the highest, while ω-6/ω-3 was found the lowest in pasture fed lambs. The rate of polyunsaturated fatty acids was detected higher in milk-fed lambs only and the rate of monounsaturated fatty acids was higher in intensively fed lambs only. This study was prepared to present information about the effects of feeding conditions on the fatty acids composition in lamb meat.

Keywords: Fatty acids, feeding conditions, lamb meat

Relationship between body weight and milk yield in Holstein cows

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This study was conducted to investigate the relationships between body weight (BW) and milk yield, and post-partum BW and their changes during parity and lactation in Holstein cows. This study was conducted on a private dairy cattle farm in Kastamonu province in the Mid-Black Sea Region of Turkey. The study material included 2133 records from 273 Holstein cows calved between 2016 and 2017 years. Parity (from 1 to 5) and stage of lactations (from 1 to 10) were used to be environmental factors affecting traits. The effect of parity and stage of lactation on BW and milk yield were significant ($P<0.05$). BW and milk yield increased with advancing lactation until the fourth parity, then declined in fifth parity. The lowest BW was observed in the first two months of lactation, and it increased linearly with following lactation periods. Milk yield was low in the first month of lactation and then decreased linearly until the end of lactation. Correlations between BW and milk yield were all positive and ranged from 0.201 to 0.588. BW change in early to mid-lactation were phenotypically correlated with milk yield. Finally, based on the findings, it is suggested that monitoring BW change in early and mid-lactation can be used as a management tool to improve the milk yield in dairy herds.

Key words: Holstein, body weight, milk yield, parity

Use of hemp by products in ruminant nutrition

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Hemp (*Cannabis sativa* L.) is a plant cultivated with the aim of producing fiber in most of the regions of the World. However, some by products (seed, oil, cake, seed shell and leaves) of hemp production can also be used in rations of different animal species. Each of these by products provides basic nutrients (crude protein, ether extract, crude fiber etc) to the animals in varying amounts. Use of hemp by products in ruminant rations also enriches the ruminant products (milk and meat) with bioactive compounds.Indeed, previous studies showed that the milk and meat products obtained from ruminants fed on rations containing hemp by products are rich in bioactive compounds such as n-3 fatty acid and conjuged linoleic acid (c9 t11) etc. which are beneficial to human health. In this study, the nutrient contents and nutritive values of the hemp byproducts and their effects on animal performance and product (meat and milk) quality will be reviewed.

Keywords: Hemp, ruminant, nutrition, hemp meal

Effect of nano zinc supplementation on yield performance in sheep

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The lack of metals, minerals and nutrients can cause serious problems in animals. Minerals in the form of inorganic salts are the main food sources for animals. For this reason, mineral supplements are added to animal feeds in inorganic forms to increase physiological functions such as vitamin synthesis, enzyme activity, regulation of cell osmotic pressure, collagen formation, tissue synthesis, milk and fertility. It is important to increase the reproductive performance of animals, especially in order to increase animal production and make it efficient. Therefore, proper nutrition affects efficient production. Zinc; It is one of the minerals consumed daily and is an indispensable element for the healthy development of humans, animals and plants. It is known that the most common mineral deficiency in the world is zinc deficiency, which causes significant economic losses to growers by causing decreases in grain production and animal yield. In regions where animal husbandry is intense, zinc is added to their feed by breeders in order to protect the health of animals and increase their productivity. Recent studies have shown that adding 6 times or more zinc to the ration of sheep and cattle increases the yield. The difference of Zn from other minerals is that it is the second most abundant trace element in the animal body, but since it cannot be stored in the body, it must be taken with a regular diet. Zinc oxide nanoparticles are specially prepared mineral salts with a particle size between 1 and 100 nm. It promotes growth, can act as an antibacterial agent, modulate the immunity and reproduction of animals. It exhibited varying effects on animal performances in the specifications at both lower and higher doses. Besides the high bioavailability of nano-zinc (nZn), reports have pointed to many other effects such as growth promoting, antibacterial, immunomodulatory. These can be used in lower doses, better results can be obtained than traditional Zn sources and indirectly environmental pollution can be prevented. Toxicological studies have produced mixed results in animal models. Studies have been conducted in diversified animal species and promoting effects have been reported with nZn supplementation. However, there is a need to optimize the dose and duration of ZnO NP supplementation for humans and livestock based on its biological effects. The use of nanotechnological trace elements in animal production is a fairly new subject in the literature, and the use of zinc, one of these elements, as nano zinc in lamb fattening has not been studied yet. It also contains zinc; An increase in fertility is expected with nano-structured nZn, and it is desired to focus on further economic studies in this regard. Therefore, in this paper, the effect of nano ZnO addition on fertility in lambs will be discussed by examining the literature data. It is thought that this study will form a preliminary and infrastructure for future studies.

Keywords: Zinc, trace elements, animal production, nanotechnology, sheep

Growth performance, antioxidant status, and organoleptic characteristics in conventional vs slow-growing broiler chicks

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Poultry meat is of high nutritional value because of its high protein and low-fat content, as well as low cost of production and low price for consumers. [1,2] Nevertheless, there is an intended interest to improve chicken welfare, meat quality and productivity. In this study, we examined the growth performance and meat quality in conventional and free-range chickens. Specifically, we recorded growth performance, assessed the antioxidant status, and performed a chemical analysis of the meat. Also, we tested and compared organoleptic characteristics for both conventional and free-range chickens in the roasted thigh. Forty-six thousand fast-growing conventional chickens (Ross 508, group 1) and six thousand slow-growing chickens (Sasso, group 2) were allocated in different houses and raised under the same conditions (equipment, ventilation, lighting, drinking water, etc.). Slow-growing chickens were also left for outdoor grazing. Special diets were designed for each group, age period and genotype. Growth performance was estimated by recording the mortality daily, while the body weight (BW), Feed Conversion Ratio (FCR) and European Production Efficiency Factor (EPEF) were measured and calculated at the end of the breeding. Antioxidant status was evaluated by performing the TBARS assay in plasma and muscle tissue samples. Chemical analysis of the meat was achieved by measuring the protein, lipid, moisture, and ash content, pH 24h after the slaughter, and water holding capacity. Evaluation of organoleptic characteristics was done by roasting chicken thighs at 200oC for 30 min. Eight testers recorded the odour, flavour, tenderness, colour, and texture of the meat. TBARS statistical analysis was performed according to the independent samples t-test. Growth performance showed that slow-growing broiler chicks had lower mortality and body weight, higher FCR and lower EPEF. However, slow-growing broiler chicks showed significantly better antioxidant status ($p \leq 0.05$). Moreover, chemical analysis showed that slow-growing broiler chicks had higher protein, lower lipid, moisture, and ash content, lower pH value and water holding capacity. Furthermore, slow- growing broiler chicks presented better odour, flavour, colour and texture, but lower tenderness. In conclusion, slow-growing broiler chicks exhibited overall better growth performance and antioxidant status than conventional fast- growing broiler chicks. Also, the protein content was slightly higher in the slow-growing broiler chicks, while all the other chemical analytes were somewhat lower. Moreover, organoleptics were better in the slow-growing broiler chicks except for tenderness, which was expected because they exerted more physical activity and were more mature.

Keywords: Fast-growing chickens, slow-growing chickens, growth performance, antioxidant status, organoleptic characteristics

Efects of feeding with different roughage ratios on fattening performance in the post-weaning period in lambs

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Excessively increasing feed costs in recent years make the sustainability of intensive lamb production based on concentrate feed difficult and negatively affect profitability. On the other hand, the search for methods to increase profitability in intensive fattening continues. Considering that the aim of intensive lamb fattening is to achieve maximum live weight gain in the shortest time with low feed intake, various fattening combinations can have an effect on profitability in the intensive system. In this study, ad-libitum concentrate feed and 3 different roughage levels (Group 1: ad-libitum concentrate feed added to ad-libitum ryegrass; Group 2: 200 g/day ryegrass added to ad-libitum concentrate feed; Group 3: ad-libitum concentrate feed-no ryegrass) were used in lambs for 28 days of fattening. It was aimed to determine the effects on performance traits such as body weight, daily body weight gain, feed consumption (g) and feed conversion ratio (kg feed intake/kg body weight). Concentrated feed consists of 73% barley, 25% sunflower meal, 1.4% marble powder, 0.1% vitamin and mineral premix and 0.5% salt composition. Italian ryegrass was given as roughage. A total of 30 weaned lambs, 10 male Merino x Kıvırcık crosses, at 55-65 days of age, were used in each group. Fattening initial body weights were equal in all groups with 23.7 kg. Although there was no statistical difference between groups regarding daily body weight gain (BWG) in the first 28 days of fattening period (P = 0.129). Group 2 lambs had 220.3 g daily BWG, and numerically 53.6 and 27.1 g more daily BWG than Group 1 and Group 3, respectively. The highest daily concentrate feed intake determined in Group 3 (1095.0 g) lambs in the first 28-day period, followed by Group 2 (1034.3 g) and Group 1 (920.0 g), respectively. Group 1 lambs intaking ad-libitum ryegrass consumed daily 26.5 g more ryegrass than Group 2 lambs fed limited ryegrass. Concentrate feed conversion ratio in the first 28 days of fattening period was found the best in Group 2 (4.693), and followed by Group 1 (5.516) and Group 3 (5.667), respectively. During the study, higher environmental temperatures were effective due to the hot summer season, and temperatures between 27-38 °C during the day and were between 13-21 °C in the evenings. The study is still ongoing and a total fattening period of 56 days will be applied. However, when the first 28-day period is evaluated, it is concluded that the lambs that consume 200 g/day ryegrass with ad-libitum concentrate feed, consume less concentrated feed (4.7 kg) for 1 kg body weight gain and provide higher daily BWG.

Keywords: Body weight, concentrate feed, feed conversion ratio, feed intake, intensive fattening, ryegrass

In vitro and *In vivo* ınvestigation of hydrogen peroxide complexed with silver as alternative solution for the control of *campylobacter jejuni* in broiler chicks

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Acidification of poultry water is recognized as an important tool for controlling important zoonotic agents in poultry farms. Currently, many products are available in the market, however, their antimicrobial activity, as well as their effect on the gut health of birds is still underreported. The objective of the present study was to investigate the effect of a commercial poultry water disinfectant, based on hydrogen peroxide, blended with complexed silver against *Campylobacter jejuni*, firstly *in vitro* and secondly *in vivo*, in experimentally challenged broiler chicks. The *in vitro* activity of the product was estimated by the determination of its Minimal Inhibitory Concentration (MIC). For the *in vivo* experiment, one hundred and forty-four 1-day old chicks were randomly allocated to 4 treatment groups, with 4 replicates, according to the following experimental design: group A, (negative control), group B (birds were challenged with *C. jejuni*), group C (birds were challenged and received 0.1% of a commercial antibiotic based on enrofloxacin), and group D (birds were challenged and received 0.04% of a commercial water disinfectant). The bodyweight (BW) of birds was measured weekly to assess the feed conversion rate (FCR). The *C. jejuni* counts in the crop and caeca of birds were evaluated by plate counting in mCCDA agar, with presumptive colonies confirmed by PCR. Results from the *in vitro* assay showed that the product exhibited inhibitory effect against *C. jejuni* under remarkable low concentrations varying from 0.002-0.071%v/v among the tested strains. *In vivo* experimental data revealed that commercial water disinfectant reduced significantly (P≤0.05) the BW of the birds the first 30 days of their life and increased significantly (P≤0.05) the FCR for the first 15 days, as well as for the total experimental period (1-36 days). *C. jejuni* was not detected in crop and caeca in broiler chicks of experimental group A, indicating the absence of cross contamination between experimental groups and the efficacy of strict biosecurity measures applied. However, the *C. jejuni* counts in the crop and caeca at the 25th day of age were significantly (P≤0.05) lower in group C compared to other groups, while the *C. jejuni* counts in the crop at the 39th day of age were significantly (P≤0.05) higher in group D compared to other groups. The study provides evidence that the commercial water disinfectant has strong *in vitro* antibacterial activity against *C. jejuni*. However, it has no effect on the *C. jejuni* counts *in vivo*, while its continuous use could suppress the performance in broiler chicks.

Keywords: *Campylobacter jejuni*, broiler chicks, hydrogen peroxide, water disinfectant, sanitation, MIC

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The effect of drinking water acidification against *campylobacter jejuni* colonization in broiler chicks

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The development and spread of antibiotic resistance has become a major threat for public health. Therefore, there is an urgent demand for alternate solutions, such as the development of nutritional strategies, or bioactive compounds that may partially or completely replace antibiotic growth promoters in livestock. The aim of the present study was to investigate the effect of a commercial water acidifier, blend of propionic acid, formic acid, ammonium propionate, and ammonium formate, on the *Campylobacter jejuni* colonization and physico-chemical properties of the intestinal digesta in experimentally challenged broiler chicks. One hundred and forty four 1-day old broiler chicks (Ross 308) were randomly allocated to 4 treatment groups according to the following experimental design: group A, which served as a negative control, group B, to which birds were challenged with *C. jejuni*, group C, to which birds were challenged and received 0.1% of a commercial antibiotic based on enrofloxacin, and group D, to which birds were challenged and received 0.1% of the commercial water acidifier. The body weight (BW) of birds was measured weekly and the feed conversion rate (FCR) was calculated. From each bird, fresh content from crop and intestine were collected for *C. jejuni* counting as well as for pH and viscosity determination. The statistical analysis and evaluation of the experimental data revealed that neither the challenge nor the product significantly ($P>0.05$) affected the BW of birds. However, the FCR for the last part of the study was significantly ($P\leq0.05$) improved in group B when compared with that of group A. *C. jejuni* counts at 25 days of age were lower in the crop and significantly lower ($P\leq0.05$) in the caeca in group D compared to group B, whereas in group C were significantly lower ($P\leq0.05$) in both sites compared to other groups. In addition, the pH in duodenal, jejunal, and ileal content at 25 days of age was significantly ($P\leq0.05$) increased in group B and D, whereas jejunal viscosity at 38 days of age was significantly ($P\leq0.05$) increased in group D compared to other groups. The study provides evidence that continuous water acidification can significantly reduce C. jejuni counts in the ceca of birds at the early stage of life and could be a useful tool in a *Campylobacter* spp. control program.

Keywords: *Campylobacter jejuni*, broilers, water acidifiers, water disinfectant, sanitation, MIC

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The effect of a commercial phytogenic product on the *campylobacter jejuni* counts and physico-chemical properties of intestinal digesta in broiler chicks

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The essential oils or phytogenic products have been traditionally used for treatment of pain or diseases in humans and animals. The last decades they are also used as feed additives in animals, due to the antimicrobial, antioxidant and anti-inflammatory effects they have. The aim of the study was the investigation of a commercial phytogenic product, blend of that contained rosemary, cinnamon and thyme oil against *Campylobacter jejuni* and its interaction with the pH and viscosity of intestinal digesta in the broiler chicks. One hundred and forty-four (144) one-day old chicks were randomly allocated to 4 treatment groups, with 4 replicates, according to the following experimental design: group A, which served as the negative control, group B, birds of which were challenged with *C. jejuni*, group C, birds of which were challenged and received 0.1 % a commercial antibiotic of enrofloxacin, and group D, birds of which were challenged and received a commercial phytogenic product by drinking water in concentration 0.1%. The body weight (BW) of birds was measured weekly and the feed conversion rate (FCR) was calculated. From each bird, fresh content from crop and caeca were collected for *C. jejuni* counting, while the gastrointestinal content was also collected for pH and viscosity determination. The statistical analysis and evaluation of the experimental data revealed that group C had significantly lower *C. jejuni* counts in the crop ($P \leq 0.05$) compared to group B and also in the caeca ($P \leq 0.05$) compared to group B and D, at the 25th day of age. In addition, group D had significantly higher *C. jejuni* counts in the crop ($P \leq 0.05$) compared to group B and C at 38th day of age. The pH of the crop's content was significantly higher ($P \leq 0.05$) in group B compared to the other groups at the 25th day of age. Furthermore, the pH of duodenum and ileum was significantly ($P \leq 0.05$) increased on challenged groups when compared to the negative control, while the pH in the jejunum digesta was significantly lower ($P \leq 0.05$) in the group D compared to group B. At the 38th day of age the pH of caeca in group C was significantly lower ($P \leq 0.05$) compared to group B. Finally, the viscosity of the jejunum digesta was significant higher ($P \leq 0.05$) in group D compared to group B at the 38th day of age. The commercial phytogenic product reduced the pH and elevated the viscosity of the jejunum digesta, although it has no effect against *C. jejuni*. Further studies are needed to investigate the effect of the commercial phytogenic product on gut immunity and microbiota.

Keywords: Broilers, phytogenic product, antibacterial activity, pH, viscosity, *campylobacter jejuni*

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The *In vitro* and *In vivo* effect of a commercial phytogenic product against *campylobacter jejuni* in broiler chicks

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Campylobacteriosis is the most frequently reported zoonotic disease in humans. Since chicken meat is the main source of contamination, the control of *Campylobacter* spp. in poultry farms is the cornerstone for the safety of consumers. Phytogenic products have been used widely in animal nutrition the last decades, mainly for their antimicrobial, anti-inflammatory, and antioxidant properties. The objective of this study was to investigate *in vitro* and *in vivo* the activity of a commercial phytogenic product, blend of oregano, cinnamon and aniseed oil, against *C. jejuni*. The *in vitro* activity of the commercial phytogenic product against *C. jejuni* was estimated by the determination of its Minimal Inhibitory Concentration (MIC). For the *in vivo* investigation, one hundred and forty-four 1-day old chicks were randomly allocated to 4 treatment groups, with 4 replicates, according to the following experimental design: group A, which served as the negative control, group B, birds of which challenged with *C. jejuni*, group C, birds of which challenged and received 0.1% a commercial antibiotic of enrofloxacin, and group D, birds of which challenged and received the commercial phytogenic product by drinking water in concentration of 0.1%. The *in vitro* study revealed that the commercial product exhibited bacteriostatic effect against *C. jejuni* strains under low concentration of 0.118% v/v. The statistical analysis and evaluation of the *in vivo* data revealed that the *C. jejuni* counts in the crop were significantly lower ($P \leq 0.01$) in group C compared to group B and D at the 25th day of age, whereas the *C. jejuni* counts in caeca were significantly lower ($P \leq 0.01$) in group C and D compared to group B. The study provides evidence, that the tested commercial phytogenic product has a promising *in vitro* and *in vivo* antibacterial activity against *Campylobacter jejuni.* Further research is necessary to investigate the effect of the commercial phytogenic product on gut immunity and microbiota.

Keywords: Poultry, phytogenic, antimicrobial activity, MIC, *campylobacter jejuni*

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Homeopathy and Apis mellifica

Sema Çetinkaya

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One of the most common additional and alternative medical treatments is homeopathy. AIM:The theory behind homeopathy is that when the right stimulus is given to the body, it has the potential to heal itself. Plant, animal or mineral components are often mixed with alcoholic water and diluted many times to make homeopathic remedies. Because homeopathic remedies have therapeutic properties, these nanoparticles, coupled with the interfacial water on their surface, might transport this information to the target, which biological systems can recognize. Homeopathy might be a nanomedicine system since various types of silica have been shown to interact with immune system proteins and cells. In this review, we examine the literature studies of Apis mellifica (obtained from the whole bee) dilutions that homeopathy traditionally uses for inflammatory symptoms.

Keywords: Apis mellifica, homeopathy, homeopatic medicine, nanoparticles, therapeutic properties.

Apitherapy and Covıd -19

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Bee products have immune-boosting effects, understanding their chemical makeup and metabolic processes is critical. AIM:New apitherapy findings in this direction are of interest to researchers and pharmaceutical companies. The way for new drug designs should be opened. Apitherapy appears to be a promising source of pharmacological and nutraceutical substances for the treatment and/or prevention of COVID-19 in this setting. Honey, pollen, propolis, royal jelly, beeswax, and bee venom, for example, have been found to have strong antiviral, antimicrobial, anti-inflammatory, antioxidant action against infections that cause severe respiratory syndromes, including those produced by human coronaviruses. These studies conducted suggests that apiteraphy products might be a suitable therapeutic option for COVID-19. 27 October 2014, some standards for the manufacture and presentation of bee products to the pharmaceutical industry, which are also included in complementary medicine legislation and are also utilized as reinforcing food, should be created and described. The relevance of apiterapine, a complementary medicine technique, and its present place in the COVID-19 pan are discussed in this review article.

Keywords: Anti-inflammatory, antimicrobial, antioxidant, antiviral, apiterapthy, COVID-19.

The honey bee queen's ınsemination

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In order to dec the desired products from a beehive colony, the queen must have a large egg capacity. The colony should also be resistant to disease, have a low tendency to swarm, be resistant to theft and be able to adapt to the climatic conditions of the region. AIM: In this environment, it is very important to save pure bee breeds and improve them through breeding work. Improving honey bees needs parental control. In this approach, firstly, the creation of methods for regulating natural mating was carried out, and secondly, the development of artificial insemination technologies was carried out. To do this, you need to get sperm from the drone. The amount and consistency of the collected sperm vary, but on average, each drone can produce about 1 µl of semen, of 8 to 10 µl per queen is the usual dosage. The abdomen of adult drones narrows, revealing a pair of yellow-orange horns resembling horns (mature drone). The drone will not produce semen if it remains immature and the abdomen soft, or if the cornea is transparent and lacks pigment (immature drone). The quality and quantity of semen are very important for the future of the colony and the artificial insemination technique used. In this study, the development of artificial insemination technologies, which is one of the seeding techniques, is discussed.

Keyword: Insemınatıon techniques, immature drone, honey bee queen, mature drone.

The doolittle grafting method with queen bee

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Since beekeeping is both an art and a science, it uses technology that uses science to solve problems and improve our capacity. Our goal is to produce outstanding queens. The existence of a queen begins with an egg. At this point, it is almost difficult to remove the egg from a worker cell. When the egg is three days old, it begins to bend over and turns into a small larva near the bottom of the cage. The findings of published clinical studies were compared to the recommendations in the literature. There were several ways to raise a queen. Langstroth, swarm, supercedure and emergency cells are used to launch cores. Small pieces of scallops with quinby, eggs and larvae are given to colonies without small queens. The shafts are removed from the queen, and the comb is cut into a "V" shape. Doolittle transforms various larvae into queen cell cups and places them in a queen-free colony. Studies have shown that queen bees bred using the Doolittle method are superior to queen bees bred using natural queen cells. In this study the development of doolittle technologies, one of the queen bee breeding techniques, is discussed.

Keyword: Cell cups, grafting tools, larva transfer, queen bee, The Doolittle Grafting Method

Impact of storage temperature on embryonic development in broiler breeders

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The objective of this study was to determinate the effect of storage temperature in embryonic development, hatchability and post-hatching performance in broiler breeders. A total of 40 hatching eggs were obtained from a commercial Ross 308 broiler breeder flock at 28 wk and 40 wk-old age on the same day. All eggs were weighed and numbered individually with a precision ±0.01g electronic balance. The eggs were ranged from 52.48g to 59.41g in 28 wk-old flock age group and from 55.98g to 60.75g in 40 wk-old flock age group. Eggs were classified into two groups: 20 eggs were stored at normal temperature 16°C and %65 relative humidity for 3 days, while as 20 eggs were stored at 25°C temperature and %65 relative humidity for 3 days. Initial weight, egg weight loss, embryo weight, yolk sac weight, embryo length, eggshell weight were examinated at 16°C normal temperature and 250C storage temperature in this study. The embryonic development occurs earlier at 25°C temperature storage as compared to the 16°C storage temperature. These findings could be instructive for broiler breeders that normal growth temperature was found beneficial in terms of hatchability, embryo development and chick quality.

Key words: Storage temperature, humidity, embryonic development, hatchability, chick quality.

The effect of sumac juice given to broilers by drinking and ınhalation on performance and immunity response

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This study was carried out to determine the effects of different administration ways of Sumac juice on fattening period and immunity performance of Broiler chickens. 240 Ross 308 broiler chicks (days old) chicks were smoothly taken from a hatchery, then the chicks were randomly separated in to 6 different treatments of 4 replicates, each duplicate with 10 birds. Birds were supplemented with three different levels (0, 5, and 10 g/liter) of sumac both in drinking water and via inhalation. This duration of experiment was 42 days. In order to determine body weight, increased weight, the feed intake, and feed conversion ratio, during the experiments the weight of the chicks and leftover were weighted on days 10, 24, and 42. After slaughtering internal organs were weighed, the carcass characteristic were measured, haematological tests and lipid profile were done as well as measuring Newcastle Disease Virus (NDV) antibody titters and infectious bronchitis antibody titters (IBV). The main results of present paper that supplementation of sumac in the drinking water or as an inhalation didn't significantly Influence the performance of broiler chickens in terms of growth as a result of sumac supplementation. Sumac was effective in reducing the lipid profile particularly cholesterol in the serum of broiler chickens. The dressing percentage was slightly decreased by sumac supplementation without any effect on the carcass parts. In addition, the antibody production against NDV and IBV of broiler chickens was improved to some extent. Jejunum morphology was clearly improved thereby increasing the villi height however it was statistically not significant.

Keywords: Fattening performance, COVID-19, antibody, respiratory tract infectious diseases

Effects of honey bees (*apis mellifera* l.) on yield and quality in fruit growing

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Various applications for efficiency and quality in agricultural activities carried out to meet the food demand of the increasing world population constitute the largest inputs of plant production. Pollination in plant production is one of the most important factors on yield and quality. Pollination, which is the most important factor for plants to produce fruit and seeds to continue their generation, is the fertilization process by carrying the pollen from the male organs of the flower to the female organs. Although pollination varies according to plant species, it generally takes place through wind, water and animals. The most important assistant of plants, most of which need pollination by animals, is honey bees. Pollination with bees is needed for the continuation of around 200 economically important plant species. Especially countries that play an active role in agricultural production regard honeybees as an important element of modern agriculture. The fact that honeybees can be easily controlled by humans and can live in different climatic conditions has made honeybees one of the most important elements of plant production and agriculture. Scientific research has revealed that even in self-pollinated plant species, the amount and quality of the product increase thanks to pollination by honeybees. The fact that the yield in some plant species is 100% dependent on honeybees and other insects shows how important pollination is in plant production. In this study, the importance of honey bees in pollination and their effects on yield and quality were determined in various fruit trees. After the study carried out on fruit trees isolated from the environment, the differences between the isolated fruit trees and the other trees in terms of fruit yield and quality were determined.

Keywords: Polination, honey bee, furit tree.

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