# MUŞ OVASI
## ULUSLARARASI
# TARIM KONGRESİ
## 24-27 EYLÜL 2019

## BİLDİRİ ÖZETLERİ KİTABI

INTERNATIONAL AGRICULTURAL CONGRESS OF MUŞ PLAIN
ABSTRACT BOOK

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# ÖN SÖZ

İnsan medeniyeti ve hatta dünya üzerindeki canlılık topraksız düşünülemez. Canlılığın en temel varoluşsal nedeni olan toprak; aynı zamanda insanın kültür, din ve medeniyetinin ana parçasıdır. İnsanın toprakla olan üretim ve mülkiyet ilişkisi, tarih boyunca yeniden şekillenmiştir. Toprağı, bitkiyi ve hayvanı yerinde kontrol edip üretime yönelik işleyebilen insan, yerleşik hayata geçmenin bir sonucu olarak köyler, şehirler ve hatta imparatorluklar kurmuştur. Tarım adı verilen bu yeni etkileşim biçimi "medeniyetlerin" doğmasına neden olmuş ve böylece insanlık, kendi varlık serüveninin sürekli olan işaretlerini zamana karşı koyacak şekilde mekâna nakşetmiştir.

Ülkemizde insanın doğayla olan etkileşiminin ara yüzü olan tarımın değişim seyri, dünya ile yarışır düzeye henüz ulaşmamış ise de özellikle son yıllarda gelişen kitle iletişim araçları ve teknoloji sayesinde ülkemiz, "küçük bir kasaba" haline gelen dünyadaki tarımın mevcut durumundan ve uygulamalardan etkilenmektedir. Bu bağlamda tarım ile ilgili aktiviteler ve tarımsal bilgi üretimi devlet hiyerarşisi içerisinde iki ana kanal üzerinden gelişmektedir; Üniversiteler ve Tarım ve Orman Bakanlığı...

Ülkemizde 40'ın üzerinde farklı adlar altında Ziraat Fakültesi bulunmakla birlikte, 2017 yılında Muş Alparslan Üniversitesinde (MŞÜ) kurulan Uygulamalı Bilimler Fakültesi (UBF) ile Türkiye'de tarımsal potansiyel açısından en önemli illerinden birisi olan Muş'un tarımda teknolojik gelişmelerden ve değişimlerden faydalanması amaçlanmıştır.

Muş, tarım potansiyeli açısından Türkiye'nin en önemli illerinden birisi olmasına karşın bu alt yapıya uygun bir teknolojik gelişim ve değişimi sağlayacak kurumsal desteklerin yetersiz olması sebebiyle ekonomik gelişmişlik sıralamalarında ülke çapında hak ettiği konuma erişememiştir. İlin bu makûs talihinin, sahip olduğu ekonomik alt yapıya uygun bir ekonomik ve sosyolojik üst yapı inşa edilmesi ile mümkün olabileceğini düşünmekteyiz.

İlimizin ekonomik yapısı tarıma endekslidir. Tarım içerisinde öne çıkan alt sektör ise hayvancılıktır. Bu ekonomik yapı tamamen ilin sahip olduğu üretim faktörleri olan toprak

(arazi), ucuz ve bol işgücü ile ilgilidir. Ülkemizin yekpare olarak en büyük üçüncü ova arazilerinden birine sahip olan Muş, Muş Ovası (165 000 ha) başta olmak üzere Bulanık Ovası (52 520 ha), Malazgirt Ovası (45 000 ha) ve Liz Ovası (16 000 ha) ile birlikte toplam 278 520 ha arazi varlığına sahiptir. Bu arazinin etkin bir şekilde kullanılmasını sağlayacak olan Murat ve Karasu nehirlerinin yanı sıra, Büyük ve Küçük Hamurpet ile Kaz Gölleri ve Alparslan I ve II barajları ilimizin en önemli su kaynaklarını oluşturmaktadır. Buna karşın arazi ve su varlığındaki bu zenginliğin üretime dönüştürülmesinde 2 temel engel bulunmaktadır. İlk olarak ilin tarımsal arazi sınıfları tam olarak bilinmemektedir ve ovanın çeşitli yerlerinde ciddi bir taban suyu problemi bulunmaktadır. İl topraklarının üretime kazandırılabilmesi için ivedi bir biçimde toprak haritalama çalışmalarının yapılması ve yer altı suyu hidrolojisinin belirlenmesi gerekmektedir.

İlimizde iklim faktörleri tarımsal ürün deseninin üzerindeki en önemli kısıtlayıcı etkiye sahiptir. Uzun süren kış dönemini takip eden yağışlı ve donlu geçen bahar ayları özellikle tarla ve bahçe ürünleri açısından önemli sıkıntılara neden olmaktadır. Bölgeye uygun geççi bahçe bitkileri ve vejetasyon süresi kısa tarla ürünlerinin belirlenmesi bu nedenle önem arz etmektedir. Bitkisel üretimdeki bu olumsuz durum organik tarım ve çayır-mera arazisi bakımından umut vericidir. 2016 yılı Tarım ve Orman Bakanlığı verilerine göre Muş organik tarım ürünleri üretiminde 1. sıradadır. İl arazilerinde gübre kullanımı çok düşük düzeydedir ve pestisit kullanımı neredeyse yoktur. Sahip olduğu hayvan varlığını sürdürülebilir kılacak mera arazisine (718 204 ha) sahip olan Muş, ülkemizde Konya'dan sonraki en önemli ildir.

İlimizin Bulanık ve Malazgirt ilçelerinde yoğunlaşmış Tarım-Alet Makine üretim sanayi tesisleri bulunmasına rağmen; burada üretilen alet ve makineler; römork, tek ve çift bıçaklı çayır biçme makinaları, ot toplama makinaları gibi basit alet ve ekipmanlardan oluşmaktadır. İlde bir döküm atölyesinin bulunmayışı, üretimin galvanizleme ve döküm gibi çeşitli aşamalarının Konya, Elazığ veya Gaziantep gibi sanayinin daha gelişmiş olduğu illerde yapılmasını zorunlu kılmaktadır. Gerek yarı mamul ve gerekse de tam mamul haline gelip pazara sunulacak ürünlerde bu durum nakliye masraflarını arttırmakta ve üreticilerin daha teknolojik alet ve makine üretiminin önüne geçmektedir. Bunun yanı

sıra, tarımsal sanayinin lokomotifi olacak bu işletmelerin yetersiz yatırımcı profesyonelliğine ve öz sermayeye sahip olmaları ve kurumsallaşmalarını sağlayacak yerel denetim, kontrol ve teşvik mekanizmalarından yoksun oluşları sektörün gelişememesindeki diğer engeller olarak karşımıza çıkmaktadır.

TÜİK verilerine göre toplam hayvan varlığı bakımından Türkiye'de 4. sırada bulunan ilimizde özellikle son yıllarda Tarım ve Kırsal kalkınmayı Destekleme Kurulu (TKDK), Doğu Anadolu Kalkınma Ajansı (DAKA) ve diğer devlet destekli tarımsal finansman sağlayan kuruluşlar tarafından çok sayıda modern ahır yapımı gerçekleştirilmiştir. Ancak, işletme sermayelerindeki yetersizliklerden dolayı bu ahırların önemli bir bölümü kullanılamamaktadır. Ayrıca gerek mevcut gerekse de yeni yapılmış modern ahırların biyogaz enerjisi gibi son derece kıymetli olan bir alternatif enerji üretebilmelerini sağlayacak donanımları bulunmamaktadır.

İl genelinde hayvancılığın geleneksel metotlarla yapılması özellikle ahır hijyeni, hayvan hastalıkları ve süt kalitesi sorununu önemli derecede etkilemektedir. Bingöl ilinde açılması planlanan ve önümüzdeki yıllarda üretime başlaması beklenen SÜTAŞ süt işleme tesisinin ihtiyaç duyduğu kalitedeki sütün teminini gerçekleştirmek üzere DAKA tarafından süt üreticilerinin eğitime alınması bu durumun olumlu şekilde değişmesine katkı sağlayacaktır. Ayrıca, Muş Alparslan Üniversitesi Uygulamalı Bilimler Fakültesinin Bölgesel Kalkınma Odaklı Misyon Farklılaşması ve İhtisaslaşması Programı kapsamında "Hayvancılık" alanında ihtisas üniversitesi olması; il ve hatta bölge hayvancılığının profesyonel bir şekilde uygulanmasına ilimizdeki bütün kurum ve kuruluştan çok daha fazla katkı sağlayacaktır. Bu uğraşı ve gayretin ilk kıvılcımları olarak Türkiye'nin hayvan sayısı bakımından en önemli illerinden biri olan Muş'un hayvancılık yapısının incelenmesi ve yapısal özelliklerinin tanımlanmasına yönelik çalışmalar Uygulamalı Bilimler Fakültesi tarafından başlatılmıştır. Son olarak kaz yetiştiriciliği açısından önemli bir üs olan ilimizde kaz yetiştiriciliğinin daha profesyonel ve verimli bir şekilde yapılabilmesi için konuya dikkat çekmek adına yine UBF bünyesinde iki farklı "Kaz Çalıştayı ve Kaz günü" etkinlikleri yapılmıştır.

İlimiz endemik fauna ve florası zengin bir ildir. Türkiye Bitkileri Veri Servisi (TÜBİVES)'in yaptığı çalışmalara göre ilimiz 66 farklı endemik bitki türüne sahiptir. Muş lalesi son yıllarda yapılan çalışmalarla ülke genelinde ilimizle özdeşleşmiştir. Henüz kültüre alınmamış olan Muş Lalesi ile ilgili olarak MŞÜ Muş Lalesi Uygulama ve Araştırma Merkezi tarafından "Muş İli Endemik Bitkileri Projesi" ve "Muş Lalesinde Seleksiyon Islahı İle Çeşit Geliştirilmesi Projesi" adı altında iki farklı proje hazırlanmıştır. Bunun dışında ilimiz, Dünya Doğayı Koruma Birliği IUCN (International Union of Conservation of Nature) listesine göre nesli tükenmek üzere olan ve koruma altına alınan Telli turna ve Toy kuşlarının yaşam merkezi durumundadır. Ancak her iki kuş türü için bugüne kadar bir çalışma yürütülmemiştir.

Herhangi bir ilin veya ülkenin gelişmişliği, ekonomik alt ve üst yapılarının uyuşmasına bağlıdır. İl düzeyinde bu uyuşmanın sağlanması noktasında MŞÜ UBF'de görev yapmakta olan bizler, yukarıda sathi olarak bahsettiğimiz konular hakkındaki "giriş" niteliğindeki çalışmalarımızı sunmak, senelerce bakir kalmış bu güzide ilin sorunlarına eğilmek isteyen akademisyen meslektaşlarımızla temas kurabilmek, onların yaptıkları çalışmalardan esinlenmek ve yarar sağlamak adına 24-27 Eylül 2019 tarihleri arasında "Muş Ovası Uluslararası Tarım Kongresi'ni düzenlenmesine karar vermiş bulunmaktayız.

Tarıma gönül veren tüm bilim insanlarımızı kongremize davet etmekten onur duyarız.

**Prof. Dr. Yaşar KARADAĞ**

**KONGRE DÜZENLEME KURULU BAŞKANI**

# PREFACE

Human civilization and even life on earth are unimaginable without soil. The soil, most fundamental existential reason of life, is also the main part of the human culture, religion and civilization. The relationship between mankind's relationship with ownership and production has been reshaped throughout history. The human-being, controlling the soil, the plant and the animal for production, founded villages, cities, and empires as result of adopting sedentary life. This new interaction form, called agriculture, led to the emergence of the civilizations; thus, humanity has gilded the permanent signs of its own adventure of existence to space in a way that resisting time.

Although the course of change in agriculture, the interface of the human interaction with nature, has not yet reached the level of competing with the world, our country has been affected by the current situation of the agricultural practices in the world, which has become a small village, thanks to the mass media and technology developed in recent years. In this context, agriculture-related activities and agricultural information production are developed through two main channels within the state hierarchy: Universities and Ministry of Agriculture.

There are more than 40 agricultural faculties under different names in our country and Muş, one of the most important provinces in terms of agricultural potential in Turkey, is aimed to benefit from technological developments and changes with the Faculty of Applied Sciences (FAS), opened at Muş Alparslan University (MAU) in 2017.

Despite its high potential in agricultural production, Muş has not reached to place it deserves in the country-wide economic development rankings of cites due to poor institutional supports, not providing a suitable infrastructure for technological changes and improvements. We think that the city’s misfortune will be changed by the construction of an economic and sociological superstructure in accordance with its economic infrastructure it possesses.

The economic infrastructure of our province is based on the agriculture. The prominent sub-sector in agriculture is animal husbandry. This economic structure is completely related to the production factors of the land, and cheap and abundant workforce. With having 3rd largest single piece plain of the Turkey, Muş has 278 250 ha land area with primarily Muş plain (165 000 ha), Bulanık plain (52 520 ha), Malazgirt plain (45 000 ha) and Liz plain (16 000 ha). In addition to the Murat and Karasu rivers that will ensure the effective use of this land, the Big and Small Hamurpet and Kaz Lakes and Alparslan I and II dams constitute the most important water resources of our province. On the other hand, there are two main obstacles to the transformation of this wealth in the presence of land and water into production. First of all, the agricultural land classes of the province are not fully known and there is a serious groundwater problem in various parts of the plain. Therefore, soil survey and groundwater hydrology should urgently be determined in order to be able to bring the provincial lands into production.

Climate factors in the province have the most important restrictive effect on the agricultural production. The rainy and frosty spring months after the long winter periods cause substantial problems especially in terms of field crops and horticulture. Therefore, it is important to determine the crops that are suitable for the region's climate and to improve current crop varieties with its shorter vegetation period. This negative situation in crop production is reversed when Muş's organic agriculture and pasture-meadow land has taken into consideration. According to Ministry of Agriculture and Forestry's the data in 2016, Muş ranks 1st in the production of organic agricultural products. The use of fertilizers is very low on the provincial lands and there is almost no use of pesticides. Moreover, with having 718 204 ha pasture land; Muş is the most important province in our country after Konya in terms of pasture and meadow land.

Although there are Agricultural-Instrumentation Machinery production industry facilities concentrated in Bulanık and Malazgirt districts of the city; the tools and the machines produced are simple tools and equipment such as trailers, single and double blade sickle bars, hay rakes. The absence of a casting factory in the province necessitates the various stages of the production including galvanizing and casting to be carried out in other provinces where the industry is more developed, such as Konya, Elazığ or Gaziantep. This

situation increases transportation costs and prevents the production of more technological tools and machinery in the production of both semi-finished products and finished products. In addition, the fact that these enterprises, which will be the pioneer of the agricultural industry, have inadequate investor professionalism, equity capital, or lack of local control, and of control and incentive mechanisms to ensure their institutionalization are the other obstacles in the inability of the sector to develop.

Many modern barns and stables have been constructed in recent years by Eastern Anatolia Development Agency (DAKA), Agriculture and Rural Development Support Institution (TKDK) and other state institutes, providing financial supports in Muş, ranked 4th in terms of livestock statistics according to Turkish Statistical Institute (TUIK). However, a significant number of these barns and stables cannot be used due to the inadequacy of working capital. In addition, both existing and new modern stables do not have the equipment to produce an alternative energy that is highly valuable, such as biogas energy.

The traditional methods of animal husbandry in the province have a significant effect on stables, animal diseases and milk quality. The training of milk producers by DAKA to ensure the supply of milk required by the SÜTAŞ, a milk processing plant which is planned to be opened in Bingöl and is expected to start production in the coming years, will contribute to the positive change of this situation. Furthermore, the fact that the FAS has chosen to become a “specialized university” in the field of livestock farming in the scope of Regional Development Oriented Mission Diversification and Specialization Program will contribute to professionally implementation of livestock methods in the city- even in the region- more than any other state institutes and organizations. As the first sparks of this endeavor, the studies on the identification and structural characteristics of Muş’s livestock structure were initiated by the FAS. In this respect, two different events, Goose Workshop and Goose Day, were organized by the FAS to draw public attention to the subject.

The province is a province rich in endemic fauna and flora. According to Turkey's Plants Data Service (TUBIVES) there are more than 66 endemic plant species in the city. Muş tulip has been consubstantiated with the province throughout the country in recent years.

Also, two different projects, Muş Province Endemic plants and Variety Development in Muş Tulip using Selection Breeding, about wild tulip has been prepared by Muş Tulip Application and Research Centre at Muş Alparslan University. Other than this, Muş is the center of life of demoiselle crane (Grus virgo) and great bastard (Otis tarda) birds which are endangered species which should be taken under the protection according to IUCN (International Union of Conservation of Nature). However, no study has been conducted for both species so far.

The development of any provinces or countries depends on the compatibility of its economic infrastructure and superstructure. In order to achieve this agreement at the provincial level, we, as stuff of FAS at MAU, have decided to organize International Agriculture Congress of Muş Plain, held on 24-27 September 2019, to present our introductory studies about the concisely-aforementioned topics, to contact with our academician friends who would like to conduct their researches on the problems of this pristine and distinguished province, to be inspired by and to benefit from their works.

We are honored to invite all our scientists who are enthusiastic and have a strong passion to agriculture to our congress.

**Prof. Dr. Yaşar KARADAĞ**

**CHAIRMAN OF THE CONGRESS ORGANIZATION COMMITTEE**

# İÇİNDEKİLER

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# STRUCTURAL COMPARISONS OF UNIVERSAL STRESS PROTEINS IN SOYBEAN (GLYCINE *MAX*)

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## ABSTRACT

Universal Stress Proteins (USPs) are transcribed by severeal organisms. USPs act as chaperone proteins by reversibly changing their structures particularly under heat shock and oxidative stresses. In this paper, we try to identify the structural differences among USPs in soybean (hereafter GmUSPs) and find out the most diverged GmUSPs. To do that, GmUSPs were modeled, their model qualities were validated, and superimposed. The quality of superimposition was also tested. The results showed that Glyma.02G220000 and Glyma.14G187800, and Glyma.04G224000 and Glyma.06G140900 seemed to have almost the same structures whereas Glyma.18G050600 particularly is very structurally diverged protein among GmUSPs. This protein may be participating in very different metabolic pathways and biological processes. To identify its function clearly, biotic and abiotic stress experiments should be carried out.

**Key words**: Soybean, Universal Stress Proteins, Tertiary Structures

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# RAIN WATER HARVESTING TECHNIQUES IN TUNISIA

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## ABSTRACT

Generally the low rainfall in arid and semi-arid areas is distributed with a high variability in space and time, which hinders profitable agriculture and creates instability in production. In order to increase the availability of water for crop production and cattle grazing, inhabitants of dry areas have constructed and developed several types of Rain Water Harvesting techniques (RWH). RWH is a method for inducing, collecting, storing and conserving local surface runoff for agriculture in arid and semi-arid regions (Kahinda et al., 2008). RWH is a likely viable option to increase water productivity at the production system level (Kahinda et al., 2007). RWH and management techniques have a significant potential for improving and sustaining the rainfed agriculture in the region (Lasage and Verburg., 2015). In fact, a wide variety of micro-catchment, macro-catchment and in situ RWH techniques are available in arid and semi-arid regions. The indigenous techniques, or those modified by the indigenous RWH practices, are more common and widely accepted by smallholder farmers than the others (Bianzin et al 2012). Throughout history, archaeological evidence has revealed RWH sites that were implemented in Jordan, the Al-Negev desert, Syria, Tunisia and Iraq. The earliest signs of RWH are believed to have been constructed over 9000 years ago in the Edom Mountains in southern Jordan Al Adamat., 2008; Ammar et al., 2016). The most common RWH techniques in arid and semi-arid regions are dams, terracing, ponds and pans, percolation tanks and Nala bunds. Tunisia is an example of the Mediterranean countries that are facing scarcity of water which will be worsened due to climate change, growing demand for water in agricultural and urban development and an expanding tourism industry (Ouessar et al., 2004). To adapt to this development, Tunisians have developed and implemented several types of water harvesting techniques of which the most common are jessour, tabias, terraces, cisterns, recharge wells, gabion check dams and mescats.

**Key words**: Irrigation, Jessour, Tabias, Cisterns, Recharge wells

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# CHARACTERIZATION OF THE UNIVERSAL STRESS PROTEINS IN SOYBEAN (*GLYCINE MAX)*

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## ABSTRACT

Universal Stress Proteins (USPs) are important biomolecules for plant defense system against stressors. Despite their important roles in plant defense and pathogen invasion system, there are a very few studies about characterization and functional annotation of USPs. Therefore, in this study, we aimed at characterize the USPs in soybean (GmUSP). According to the sequential and expressional results, Glyma.18G050600 has the most distictive expressional and sequential properties from the rest of GmUSPs. Synteny and *Ka*/*Ks* calculations showed that USPs are highly conserved in soybean and stabilized by purifying selection. These results imply that GmUSPs play key role in organism's adaptation to its environment.

**Key words**: Soybean, Universal Stress Protein, Synteny, Mutation

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# MUŞ PROVINCE ONA CROSS SECTION OF THE BEEKEEPING ACTIVITIES

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## ABSTRACT

Muş in the survey conducted for the purpose of determining the level of provincial beekeeping, beekeepers have evaluated the results of the data obtained from interviews with 200 businesses registered in the union. In the study, has tried to put forward the province's beekeeping structure and beekeeping activities, the effect of honey yield of beekeepers years the situation with the number of colonies, determining the number of colonies for economic gain in beekeeping, the contribution to the beekeeping of the province's economy, problems in breeding material and material supply, the problems encountered in the marketing of products that have been examined. The profitability and sustainability of beekeeping proposals have been made regarding the use of information and technology to be provided.

**Keywords:** Beekeeping issues, sustainability, Muş

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# THE SURVIVAL OF GENERIC ESCHERICHIA *COLI* IN PEAT AND PERLITE USED AS PLANT GROWTH ENVIRONMENTS

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## ABSTRACT

A wide variety of plant growth media can be used as alone or in different combinations. Peat is the most widely used organic material in this field. Perlite, an inorganic material, can be used as an alternative plant growth medium by supporting with plant nutrient solution in hydroponic system applications. Different growing environments used in plant growth can promote the transfer of pathogens to produce. The aim of this study was to investigate the survival of generic *Escherichia coli* in peat and perlite used for plant growth.

Peat and perlite (200 ml) were placed into clamshells. Each plant growth media in clamshells was inoculated with naladixic acid resistant generic *E. coli* to achieve an initial concentration of $10^5$-$10^6$ CFU/g. Inoculated plant growth media were exposed to approximately 400 µmmol/$m^2$ of white fluorescent light for 12 hours day and night timeset and watered periodically with spray and bottom irrigation. Samples were taken on days 0, 1, 3, 5, 7, 14 and 28 for microbiological analysis. Appropriate dilutions of samples were spread plated on tryptic soy agar supplemented with naladixic acid. Colonies were enumerated after incubation for 24 at 35 ± 2 °C. The change in generic *E. coli* population in all samples was evaluated at the end of storage period, statistically. Three replicates (n = 3) were performed in the study.

The population of generic *E. coli* showed similar survival trends in all bottom or spray irrigated peat and perlite samples. The generic *E. coli* populations in the peat decreased starting from day 1 and showed similar survival trends with a total decrease of 4.3-5.1 log CFU/g in both irrigation type over the course of storage. In Perlite, a 1 log increase after the first day of storage followed by a slow decrease was observed until 5.5 ± 0.1 log CFU/g. According to these results, plant growing environments may support the survival of generic *E. coli* until contamination of produce.

**Key Words:** Peat, Perlite, Generic *E. coli*, Survival, Irrigation

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# ENVIRONMENTAL EFFECTS ON LACTATION MILK YIELD, LACTATION LENGTH AND FIRST CALVING AGE OF ANATOLIAN WATER BUFFALOES REARED IN ISTANBUL

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## ABSTRACT

In this study, 551 lactation milk yield (LMY), lactation length (LL) and first calving age (FCA; year and month) records of Anatolian Buffaloes within "Anatolian Water Buffalo Breeding Project" and reared in Istanbul province and district were used. In this research effects of region (R), farm size (FS), calving season (CS) and calving year (CY) on LMY, LL and FCA were researched. The average of LMY and LL were calculated as 1149.8 kg and 243.9 days, respectively. Average of FCA were calculated for month 38.8 and for year 3.2. The least mean square analysis showed that the effects of CY on FCA were statistically significant ($P \leq 0.05$). The effect of R, CS and CY on LL and R and CS on LMY were significant ($P \leq 0.05$). The effect of FS on all components were not statistically significant ($P > 0.05$). To conclude, it can be believed that milk yield traits or first calving age calculated for Anatolian Water Buffalo raised in Istanbul were important for selection studies in future.

**Keywords:** Anatolian Water Buffalo, environmental factors, lactation milk yield, lactation length and first calving age

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# OPPORTUNITIES FOR USE OF STALKS FROM DIFFERENT VARIETIES OF TOBACCO AS A BIOENERGY MATERIAL

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## ABSTRACT

Tobacco (*Nicotiana tabaccum* L.) is an annual industrial crop whose height varies greatly depending on the variety. It is a crop grown for the use of tobacco leaf in the tobacco industry in the production of cigarettes, cigars and other tobacco products. At the end of the vegetation when the tobacco leaf has been already harvested, the stem and flower bud leaves are mostly left unused and plowed back to the soil (rarely used for production of paper, cork, biofuel or in the energy production industries). The purpose of this paper is to investigate the different varieties of tobacco, and to see how quantitative their waste material is, and to be used as an alternative bio-energy material. The trial was performed at the experimental field at the Scientific Institute for Tobacco – Prilep. As the material ten dry stalks from nine varieties were used from different varieties of tobacco such as: oriental type (P-12-2/1 Ø, Jebbel – 38, Jebel $N^0$1, JK-23, Izmir) semi-oriental type (O-9-18/2 and Maya-96), and largeleaf type (B-21 and V-90/13). At the end of the vegetation period, after harvesting, the stalks were cut and weighed and left to dry in the biological laboratory. The next step was measuring the stalks after drying, in order to get a real picture for their weight. The obtained data were statistically processed: ($\bar{x}$) mean (δ) standard deviation (Sδ) average error standard deviation (CV) coefficient of variability. From the obtained values of the tested variants, we distinguish the semi-oriental variety Maya-96 and the virgin V-90/13 which have the highest percentage of waste material. The participation of other varieties should not be neglected and there are opportunities for use of tobacco stalks as bio energy material.

**Key words:** Tobacco stalks, variety, bioenergy material

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# DEVELOPMENT OF A SOFTWARE THAT CAN BE USED TO DETERMINE THE AMOUNT OF DAILY REFERENCE EVAPOTRANSPIRATION ($ET_O$) IN CODESYS-ST PROGRAMMING LANGUAGE

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## ABSTRACT

In this study; It is aimed to develop a software in CODESYS-ST programming language which calculates daily Reference evapotranspiration ($ET_o$) amount according to FAO 56 Penman Monteith method, calculating daily crop water consumption ($ET_c$) of maize (Zea mays L.) using this software and comparing with the available data. The study was carried out with daily climate data of Kahramanmaraş Province in 2018 obtained from the General Directorate of Meteorology. The software is composed of ET0_account (PRG), entegral (PRG) and climate_data (PRG) subprograms in addition to the PLC_PRG (PRG) main program.

Daily $ET_o$ values were calculated using software. Daily $ET_c$ values were obtained by multiplying $ET_o$ values with maize crop coefficients ($k_c$) and compared with values of "Water Consumption Guide of the Irrigated Crops in Turkey". The values of MAPE and RMSE between $ET_c$ values calculated with the software and $ET_c$ values given in Guide were calculated as 8.17 % and 0.55 mm $day^{-1}$. It was concluded that the results of software was generally compatible with Guide and can be used for daily $ET_o$ and $ET_c$ calculations.

**Key words:** CODESYS-ST, $ET_o$, $ET_c$, Penman Monteith

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# COMPARISON OF SOME EMPIRICAL METHODS USED IN ESTIMATION OF REFERENCE EVAPOTRANSPIRATION IN KAHRAMANMARAS CONDITIONS

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## ABSTRACT

In this study; it is aimed to compare some of the empirical methods used in the estimation of daily reference evapotranspiration ($ET_o$) depending on air temperature and radiation parameters in Kahramanmaras climatic conditions and to test their usability levels. For this purpose, firstly estimated daily reference evapotranspiration ($ET_{o\_predict}$) values were determined by Abtew (1996), Caprio (1974), Irmak et al. (2003), Tabari et al._1 (2013) and Tabari et al._2 (2013) methods. Then, these $ET_{o\_predict}$ values were compared with the daily reference evapotranspiration ($ET_{o\_PM}$) values calculated by the FAO 56 Penman Monteith method. The study was conducted with 2018 daily climate data obtained from the General Directorate of Meteorology. $ET_{o\_PM}$ values were accepted as actual $ET_o$ values within the scope of the study and taked into account as comparison criteria. Mean absolute percentage error rate (MAPE) and root mean square error (RMSE) values were taked into account as an expression of the deviation amounts of $ET_{o\_predict}$ values from $ET_{o\_PM}$ values. The statistical relationships between $ET_{o\_predict}$ and $ET_{o\_PM}$ values were determined by using linear regression analysis method.

It was determined that MAPE values obtained for empirical methods ranged between 12.40 - 23.95 % and RMSE values ranged between 0.304 - 1.109 mm $day^{-1}$. The method with the highest usability level was determined to be Abtew (1996) with 12.40 % MAPE and 0.304 mm $day^{-1}$ RMSE values. The statistical relationship between the $ET_{o\_predict}$ values calculated using this method and the $ET_{o\_PM}$ values considered as a comparison criteria was revealed by the $ET_{o\_PM} = 0.9991\ ET_{o\_predict} + 0.1954$ equation. The regression coefficient $R^2 = 0.988$ was obtained as an expression of the relationship level. It is concluded that the estimation methods are compatible with Kahramanmaras climate conditions in general and can be used in daily $ET_o$ estimation.

**Keywords:** Penman Monteith, Radiation, Reference evapotranspiration, Temperature

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# DIAGNOSIS, TREATMENT AND APPLICABLE BEEKEEPING METHODS OF VARROA (*VARROA DESTRUCTOR*) PESTS

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## ABSTRACT

Varroa is one of the most important factors that slow down the development of the colony and limit the production efficiency in the world beekeeping. In order to minimize the effectiveness of the pest, intensive studies are carried out in the world. Various chemicals used against pests threaten human health due to bee and residue. The chemicals used against the pest lose their effectiveness by gaining resistance over time and the desired success in the control of the pest is not achieved. In addition to the use of chemicals against pests in recent years, a significant proportion of biological and cultural studies are taking shape. This study was prepared to give information about pest diagnosis, treatment, chemical control and applicable beekeeping techniques.

**Key words:** varroa, diagnosis, treatment

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# ASSESSING THE ADEQUACY OF PASSIVE TRANSFER IN GOAT KIDS FROM DERA GHAZI KHAN, PUNJAB-PAKISTAN

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## ABSTRACT

The present study was aimed at assessment of adequacy of passive transfer in goat kids from Dera Ghazi Khan district of Pakistan by analyzing serum through an indirect method i.e. Zinc Sulfate Turbidity Test (ZSTT). The goat kids (n=26) were grouped as per age (Group 1: 1-4 days; Group 2: 5 days; Group 3: Above 5 days), gender (male and female), breed (Crossbred and Teddy) and parity of does (P1: 1st Parity; P2: 2nd Parity; P3: 3rd Parity and P4: 4th Parity and above. Significance level was ascertained at $P \leq 0.05$. Results regarding age revealed significantly higher values for ZSTT in Group 2 (93.39±26.16). Male kids had significantly higher ZSTT value (74.5±19.3) as compared to females. Similarly, breed-wise results revealed significantly higher values for Teddy being 81.4±19.8 as compared to crossbred. ZSTT values were not significant for parity of does in the present study. In conclusion, males and Teddy goat kids had higher levels of immunoglobulins in their serum, as determined through ZSTT. The present study provides baseline information on detection of passive immunity through an indirect method in goat kids and appears to be first of its kind being reported for Dera Ghazi Khan district of Punjab-Pakistan. It envisages a broader study through detection of specificity, sensitivity and predictive values for this tests as predictive diagnostic field test.

**Keywords**: Passive transfer, zinc sulfate turbidity test (ZSTT), Teddy goat kids, Dera Ghazi Khan, Pakistan

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# ENVIRONMENTAL IMPACTS OF AGRICULTURE APPLICATIONS

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## ABSTRACT

The rapid increase experienced in the world population, the industrial development, and the efforts for the growth observed in the economy have had an effect on the agriculture as well as on many other areas. The increase in the demand for the agricultural food because of the increasing population and the contraction in agricultural land caused by industrialization have led to the need to harvest more agricultural products in a unit area. The intensive chemical inputs and the use of non-ecological agricultural techniques in agricultural areas so as to meet this demand have brought about the regional and global environmental pollution. It is purposed in this study to reveal the effects of such agricultural practices as pesticide, fertilizer, and heavy machinery/equipment on water, air, soil pollution, and living life.

**Keywords:** Environment, agriculture, pollution, fertilizer, pesticide

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# BAZI EKMEKLİK BUĞDAY (*TRITICUM AESTIVUM* L.) GENOTİPLERİNİN KALİTE PARAMETRELERİ BAKIMINDAN DEĞERLENDİRİLMESİ

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## ÖZET

Çalışma, 2011-2012 yetiştirme sezonunda GAP Uluslararası Tarımsal Araştırma ve Eğitim Merkezi (GAP UTAEM) deneme alanında yürütülmüştür. Çalışmada, 80 ekmeklik buğday hattı ve 5 standart çeşit kullanılmıştır. Araştırma, Augmented Deneme Deseninde her birinde 25 parsel bulunan dört blokta yürütülmüştür. Standart çeşitler her blokta tekrar edilmiştir. Çalışmada amaç kalite bakımından standartlardan daha üstün olan hatları belirlemektir. Varyans analiz sonuçlarına göre; genotipler arasında başaklanma süresi, bitki boyu, hektolitre ağırlığı bakımından %1, bin tane ağırlığı ve protein oranı yönünden %5 düzeyinde önemli farklılıklar olduğu belirlenmiştir. Çalışmada, hektolitre ağırlığında; G6, G21, G42, G43, G44 ve G52, bin tane ağırlığında; G9 ve G46, protein oranında; G35, G36, G38 ve G46'nın üstün ve ümitvar hatlar olduğu görülmüştür. Standartlardan üstün olan hatlar farklı çevrelerde tekrar denenmek üzere ıslah programına alınmıştır.

**Anahtar Kelimeler:** Ekmeklik buğday, kalite, augmented

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# REACTIONS OF SOME BREAD WHEAT GENOTYPES (*TRITICUM AESTIVUM* L.) AGAINS TO YELLOW RUST (PUCCINIA *STRIIFORMIS F.SP. TRITICI)*

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## ABSTRACT

There was wide yellow rust epidemics in 2009-2010 season, causing about % 40-60 grain yield losses in South East Anatolia Region of Turkey. So, this study was carried out to assess reactions of some bread wheat genotypes againts Puccinia striiformis f.sp. tritici. Studies were conducted under the rainfall condition at 2009-2010 season with 20 advenced bread wheat lines and 5 cultivars. The experiment is conducted in randomized complete block design with three replications in GAP International Agriculture Research and Traning Center field. While average grain yield of sensitive genotypes was 2663 kg $ha^{-1}$ average of the resistant genotypes was 3918 kg $ha^{-1}$. Resistant genotypes had higher thousand grain weight (TKW) and test weight (TW) than sensitive genotypes. While four lines (G14, G16, G23 and G24) were very sensitive. Pehlivan, Cemre and seven lines (G7, G8, G11, G12, G13, G21 and G22) have been found tolerant to yellow rust in this study. These tolerant genotypes can be recommended for cultivation in South East Anatolia Region and further using in breeding, programs as yellow rust resistant source.

**Key words**: Bread wheat, grain yield, yellow rust

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# STABILITY ANALYSIS OF SUGAR BEET GENOTYPES IN TERMS OF YIELD AND SUGAR RATIOS (*BETA VULGARIS VAR. SACCHARIFERA* L.)

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## ABSTRACT

This study was carried out to investigation of ecological regions of Eskişehir, Konya, Kırşehir, and Çorum in terms of sugar beet root yield (kg da-1), polar sugar rate (%), refined sugar rate (%) and sugar yield (kg da-1) and to determination of stability analysis of genotypes, to assist in future studies. The experimental data of Variety Registration and Seed Certification Center conducted in the ecological regions of Eskişehir, Konya, Kırşehir, and Çorum between 2013 and 2017 were used in this research. 58 genotypes of foreign origin were used in the study. It was determined that Çorum location in terms of sugar beet root yield feature, Çorum and Eskişehir locations in terms of polar sugar beet and refined sugar rate feature, and Eskişehir locations in terms of polar sugar rate feature could be considered as bad environment. In terms of sugar beet root yield feature, Sandrina, Bernache, and Aigrette genotypes; Garrot and Beetle genotypes in terms of sugar yield feature; in terms of polar sugar rate feature, Delano and Portofina KWS (5K618) genotypes; in terms of refined sugar rate feature, it was concluded that Ametist (SV1634), Masai and Eldorado genotypes showed good adaptation under good environmental conditions and were stable genotypes.

**Keywords:** Sugar beet, stability analysis, root yield, polar sugar rate, refined sugar rate.

# HIDDEN TREASURE "GRAPE SEED"

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## ABSTRACT

Grapes, one of the first cultivated crops in the world and existed in the culture of many civilizations that have lived from the past to the present day, is one of the most produced fruits due to its taste properties and nutritional value as well as being able to convert into valuable products such as wine. The main nutrients of grapes contain the seed. Studies have shown that grape seed contains much more phenolic and antioxidant substances than fruit flesh and skin. As the value of the grape seed was understood, the potential of using the grape must products, especially the grape pulp produced as a result of wine production, increased. It is known that grape seed oil is rich in unsaturated fatty acids such as linoleic and oleic acid and proanthocyanidins which have high antioxidant properties. The essential oil content of grape seed oil, which has a high degree of unsaturation, is higher than other high-consumption vegetable oils. In addition to this, grape seeds have high antioxidant properties and they can be used in pharmacy and cosmetics sector as a food additive.

**Keywords:** Grape seed, content, usage areas

# TRANSGENİK BİTKİLER VE SÜRDÜRÜLEBİLİR GIDA ÜRETİMİ

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## ÖZET

Bu Literatüre dayalı derleme bildiride transgenik tarımının dünyadaki mevcut durumu günümüzdeki durumu gözden geçirilmiş, transgenik bitki tarımının avantajları açıklanmıştır. Ayrıca, transgenik bitki tarımı ve bu bitkilerden elde edilen gıdaların olası riskleri ile bu bitkilerin sürdürülebilir gıda üretimindeki rolleri tartışılmıştır.

**Anahtar Kelimeler:** Transgenik, Bitki, Sürdürülebilir, Gıda

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# DISTRIBUTION AREA, PROPERTIES ANDPROBLEMS OF MUŞ TULIP (*TULIPA SINTENISII* Baker)

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## ABSTRACT

Muş Tulip (*Tulipa sintenisii* Baker), an endemic species of the Liliaceae family, is generally grown in continental climate with an altitude of 1100-2500 m in the Eastern Anatolia in Muş, including Ağrı, Elazığ, Erzurum, Gaziantep, Hakkari, Şırnak, Kahramanmaraş and Kayseri provinces. According to Davis' Grids squares system, Mus tulip is distributed in A8, B5, B7, B8, B9, C6, C9, C10 squares. Mus Tulip has a short flowering period of 15-20 days in late April and early May. The plant has 6 bright red crown petals, 23-45 cm tall, usually 3-5 leaves with a main stem. Each tulip tuber gives one main stem and one flower. There has been no comprehensive and sufficient scientific study on Mus Tulip which is generally grown in the natural fields and flat meadows. Mus tulip population density decreases every year due to the newly cultivated lands and the plowing of existing meadows and pastures.

**Key words:** Distribution area, herbal properties, Muş Tulip, *Tulipa sintenisii* Baker

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# ENDEMIC PLANTS OF MUŞ AND USAGE AREAS

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## ABSTRACT

In this article, family classifications of endemic plants of Muş, Turkish names used, endangered categories according to red book, distribution areas, plant parts used, chemical composition, effect and their usage were examined. Sixty six of 392 taxa found in the flora of Muş province are endemic and the rate of endemism is 17%. There are 18 families and 42 genera, including endemic species. Number of taxon according to family in the flora are; Asteraceae (14) Fabaceae (10), Caryophyllaceae (8), Lamiaceae (7) and Scrophulariaceae (6), Brassicaceae (4), Boraginaceae (2), Dipsaceae (2), Liliaceae (2), Apiaceae (1), Convolvulaceae (1), Linaceae (1), Malvaceae (1), Poaceae (1), Plumbaginaceae (1), Ranunculaceae (1), Rosaceae (1), Rubiaceae (1), Violaceae (1). The genera with the highest species were Astragalus (7), Centaurea (6), Dianthus (5) and Verbascum (5). At the same time, the distribution of endangered categories of these endemics by species are VU (10), LC (31), NT (3), CD (4), EN (3), DD (7), O (1). *Achiella, Asperula, Delphinium, Linum, Quercus, Tanacetum* and *Verbascum* species are important medicinal plants.

**Key words:** Endemic Plants, Flora, Muş Province.

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# DETERMINATION OF FILTER EFFICIENCY OF HYDROCYCLONE AT DIFFERENT WATER SPEEDS

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## ABSTRACT

The aim of the study was to determine filter efficiency of hydrocyclone used at 4 different water velocity such as 0.5, 1.0, 1.5 and 2.0 $ms^{-1}$. For this purpose, a hydrocyclone test system was constituted in laboratory conditions. In the test system, there were a tank, a motopump of 5.5 Kw, inverter, flowmeter, valve, hydrocyclone, disk filter and polythene pipe of ∅63 mm. In the test system, hydrocyclone filter with the input-output diameters of 2" and 78 cm height was used. Filtration performance of hydrocyclone was conducted three replications by using 0.5, 1.0, 1.5 and 2.0 $ms^{-1}$ water speeds for oven dried sand of 2 mm diameter and 500 g, respectively. Water speed was determined using both flow rate of flowmeter and cross section area of input pipe of hydrocyclone. Duration of each test was 10 minutes. Efficiency of hydrocyclone filter were calculated by dividing amount of sand collected in hydrocyclone by input amount of sand (500 g). Efficiency of hydrocyclone filter resulted as 59.6%, 76.0% and 84.5% for water speed, respectively. However, at 0.5 $ms^{-1}$ water speed, there was no sand in the hydrocyclone collection box since water with a speed of 0.5 $ms^{-1}$ could not drag the sand in the pipe. The efficiency tests of hydrocyclone showed that the efficiency of hydrocyclone filter increased as water velocity was raised from 0.5 $ms^{-1}$ to 2.0 $ms^{-1}$ and vice versa.

**Key words**: Drip irrigation, hydrocyclone filter, sand diameter, water velocity, efficiency.

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# EFFECTS OF VARIOUS SOWING DATES AND DIFFERENT DISTANCE BETWEEN ROWS ON YIELD AND YIELD COMPONENTS OF CHICKPEA (*CICER ARIETINUM* L.)

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## ABSTRACT

This study was carried out to determine the effects of various sowing dates and different distance between rows on yield and yield components of chickpea in Van conditions in 2016-2017. Trial was laid out in a split plot design with three replications In this study were used three different sowing dates (25 March, 8 April, 22 April) and three different distance between rows (15 cm, 30 cm, 45 cm). In the study were investigated components as the plant height, first pod height, number of branche, number of pod per plant, seed yield per unit area, harvest index, biological yield and 100 seed weight. In 2016, the highest (141.77 kg/da) and lowest (61.22 kg/da) unit area yield were determined 25 March planting time and 15 cm row spacing, 22 April planting time and 15 cm row spacing, respectively. The highest yield per unit area in 2017 was determined as 25 March planting time and 15 cm row (129.41 kg/da). The lowest yield (42.65 kg/da) was determined April 22 and 15 cm row spacing.

**Key Words:** Chickpea, sowing date, distance between rows, yield, yield components.

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# CONTRIBUTIONS TO AN INSECT FAUNA OF THE DIYARBAKIR: HEMIPTERA (HETEROPTERA: COREIDAE, CYDNIDAE, PENTATOMIDAE)

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## ABSTRACT

The present study was carried out in Diyarbakır (Sur district) province in Southeastern Anatolia Region of Turkey in 2018. Nymphs of Heteroptera were collected from on rose (*Rosa spp*.) garden in Diyarbakır province of Turkey during February-May 2018 and brought to the laboratory for rearing. The nymphs were reared at the temperature of 26±1°C, relative humidity of 65±5, and illumination of 3500 lux for 16 hours per day. In this study 4 Heteropters species were determined in rose garden in Diyarbakır. These species were *Tritomegas sexmaculatus* (Rambur, 1839) (Hemiptera: Heteroptera: Cydnidae), *Phyllomorpha laciniata* (Villers, 1789), *Syromastus rhombeus* (Linnaeus, 1767), (Hemiptera: Heteroptera: Coreidae), *Ancyrosoma leucogrammes* (Gmelin, 1789) (Hemiptera: Heteroptera: Pentatomidae). *T. sexmaculatus*, *P. laciniata*, *S. rhombeus* and *A. leucogrammes* were determined as new records for the rose insect fauna in Diyarbakır. In additional to: *T. sexmaculatus, P. laciniata* and *S. rhombeus* were determined as new records for the insect fauna in Diyarbakır.

**Keywords:** Heteroptera, Rose Garden, New Record, Diyarbakır

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# NYCHIODES DIVERGARIA STAUDINGER 1892 (LEPIDOPTERA: GEOMETRIDAE) A NEW PEST ON PEACH (*PRUNUS PERSICA* L.) IN SOUTHEASTERN ANATOLIA REGION OF TURKEY

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## ABSTRACT

The present study was carried out in Diyarbakır (Sur district) province in Southeastern Anatolia Region of Turkey in 2018. Recently, larvae of a geometrid were collected from the leaf and shoots of peach (*Prunus persica* L.) (Rosaceae) in Diyarbakır province of Turkey during March April in 2018 and were brought to the laboratory for rearing. The larvae were reared at a temperature of 26±1°C, relative humidity of 65±5, and illumination of 3500 lux for 16 hours per day. *Nychiodes divergaria* Staudinger 1892, a new pest on peach for Southern Anatolia Turkey is reported.

**Keywords:** *Nychiodes divergaria*, Peach, First Record, Geometridae, Diyarbakır

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# THE IMPORTANCE OF MORKARAMAN SHEEP AT THE HIGHLAND SMALL RUMINANT HUSBANDRY AND THE RECOMMENDED BREEDING MODEL IN MUŞ PROVINCE

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## ABSTRACT

Animal husbandry is one of the most important economic sectors of Turkey. Sheep production systems in Turkey depend on factors such as the natural and socio-economic conditions of the regions, the availability of feed resources, the connection to plant production and, the consumption habits of the population. These are systems of the stock breeding, the highland sheep husbandry, and the nomadic livestock breeding. In the highland sheep husbandry, sheep flocks are removed to the highlands with cool and plenty of grassy plains by pressing hot and dry towards the end of spring. For a period of 3-5 months, sheep remain in control by shepherds in the highland. After the weather cools down, sheep go back to the villages or the farms in the plain. Sheep herds usually consist of 300 to 500 heads. Each sheep is composed of lots of different people with a lot of expenses, depending on the number of animals contributes. Sheep herds are taken away the summer ranges by grazing or by road transport. One of the most important examples of livestock farming is highland small ruminant husbandry in Muş province. The pastoralism in Muş is one of the most beautiful ring. The pastoralism is refer to the exit the high plateaus for small ruminant production and semi nomadic life. In order to get more abundant the products such as milk, cheese, wool and so on, the people of the region have to go to the highlands with the arrival of spring animals to find better grazing and water areas. With the arrival of spring to the first zone in the region is exited. With the start of the cold days of autumn again return to the settlements. In this province, it is recommended to keep records in order to obtain a sustainable income source from small ruminant husbandry. In this paper, the importance of Morkaraman sheep breed, a significant genetic resource in Muş province, has been emphasized.

**Keywords:** Pastoralism, Sheep husbandry, Red Karaman, Muş

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# OCCUPATIONAL HEALTH AND SAFETY CULTURE FOR BERİVANS AND SHEPHERDS IN SMALL RUMINANT HUSBANDRY

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## ABSTRACT

In this article, information on the occupational health and safety for berivans and shepherds in small ruminant husbandry in Muş was compiled. The occupational health and safety has a vital importance in livestock production. Occupational safety and accident risk factors of revealing awareness of breeders are not yet fully come to avoid. For employees in the livestock farming and the practical fields, to do risk analysis in advance for taking necessary measures is very important for occupational health and safety. In practical work related to crop and livestock production to ensure safety and to prevent accidents at work is important to take necessary precautions. In Muş province located in the east of Turkey, the livestock activities are an important source of income for the indigenous people. The livestock activities and especially small ruminants husbandry are indispensable for indigenous people. The husbandry of sheep and goat in this region has been adapted to regional differences, and has been characterized by the prominence of different applications. In the highland sheep and goat husbandry, flocks are removed to the highlands with cool and plenty of grassy plains by pressing hot and dry towards the end of spring. For a period of 3-5 months, sheep remain in control by shepherds in the highland. In order to get more abundant the products such as milk, cheese, wool and so on, the people of the region have to go to the highlands with the arrival of spring animals to find better grazing and water areas. With the arrival of spring to the first zone in the region is exited. With the start of the cold days of autumn again return to the settlements. The most important factor in small ruminant husbandry is berivans and shepherds for both animals and family. *Berivan* is called as women milking the ewe and the nannie. As a result, the issue of berivans' and shepherds' occupational health and safety and the work related accidents in small ruminant husbandry should be considered in Muş province.

**Keywords:** Berivan, Shepherd, Occupational Accident, Occupational Health and Safety

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# FORWARD ESTIMATION OF THE NUMBERS OF GEESE, DUCKS AND TURKEYS USING ARTIFICIAL NEURAL NETWORKS BASED ON THE POPULATION IN THE PROVINCE OF MUŞ

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## ABSTRACT

The province of Muş comes the second in the number of geese and ducks and the 7$^{th}$ in the number of turkeys, according to Turkish Statistical Institute's (TSI) stats of 2018. The city's 2018 population is determined at 414.706 with 92.754 geese, 36.428 ducks, and 76.484 turkeys. In this study, data estimation was made for the 2019-2021 period using the numbers of geese, ducks and turkeys in Muş and its last 12-year population. For this purpose, the method of Artificial Neural Networks (ANN) was used. In the present study, three models were individually established based on the data of the years of 2007 to 2018. For each model, the population was independent variable while the numbers of geese, ducks and turkeys were dependent variables. Furthermore, the hidden layer neuron number was taken as eight in individual models, and 70% of the data was used for training and 30% for testing. The established models Utilized Tangent Sigmoid (tansig) function for a transfer function as well as network type Feed-forward Backprop. For performance evaluation of the models, coefficient of determination ($R^2$) and Mean Square Error (MSE) were used. With ANN method to estimate the number of geese, ducks and turkeys, $R^2$ values were found as 0.879, 0.935, and 0.765, respectively. Consequently, the estimated outcomes from the ANN models using 1-8-1 network architecture established were statistically compared, and they were determined to have much effectiveness for estimation. The populations for next three years (2019 to 2021) are projected as 110.545 to 96.979 in geese, 52.693 to 33.110 in ducks, and 95,513 to 61.343 in turkeys.

**Key words:** Artificial Neural Networks, Geese, Duck, Turkeys, Population

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# CHICKEN MEAT PRODUCTION ESTIMATION IN TURKEY: AN APPLICATION OF ARTIFICIAL NEURAL NETWORKS AND REGRESSION ANALYSIS

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## ABSTRACT

In this study, chicken meat production was modelled to forecast products, based on the number of chicken slaughtered in Turkey. The slaughtered chicken number was the independent variable, and the quantity of chicken meat products the dependent variable. For this purpose, Artificial Neural Networks and Regression analysis were used. The data used in the study were obtained from Turkish Statistical Institute (TUIK) for the period of 1995 to 2018. For Regression analysis, the Linear, Quadratic and Exponential regression models were applied. For Linear and Exponential models, the coefficients of determination ($R^2$) were computed as 0.995 and 0.921 respectively, and their parametric estimates were significant. For the other model, $R^2$ value was found to be 0.999. In the current study, 70% of the data was used for training and 30% for testing, estimation was made through different models. Artificial Neural Networks have one variable for input layer, one for hidden layer, and one for output layer. The number of neurons in the hidden layer was selectively identified as eight. We conclude that Artificial Neural Networks better estimation method than Regression analysis, and from a five-year projection made using this method, chicken meat production in Turkey will vary from 2.269.919 to 2.312.943 tons between the years of 2019 and 2023.

**Key words:** Chicken Meat, Production, Artificial Neural Networks, Regression, Estimation.

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# OPINIONS AND TENDENCIES ON LAND SELLING AND PURCHASING OF THE FARMERS IN BAYINDIR DISTRICT OF IZMIR PROVINCE

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## ABSTRACT

The purpose of this study is to examine opinions and tendencies for land selling and purchasing of the farmers in Bayındır district of Izmir province. The data of the study was collected from 80 farmers with a survey by using proportional sampling. Before analysing the research data the socio economic level of the farmers was examined and then their opinions and tendencies for land selling and purchasing. 5-point likert scale was used in opinion and tendency analyses.According to the research results the average age of the farmers is 50.05, average education period 6.71 years. The average land size is 104.56 decares, average parallel number is 6.44. The main points that the farmers take into consideration are economical conditions, reasonable land prices and the location of the land. They think if they sell the land they will get smaller. However they state that they can sell it in advance if they have to sell the land. The most important factors which are effective on the price of the agricultural land are land survey cadastral situation, size, irrigation, road transportation situation and productivity.

**Key words:** Agricultural Land, Land Market, Land Price, Determination of Opinion and Tendency.

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# DETERMINING THE PURCHASE PREFERENCES OF ORGANIC PRODUCTS IN SIIRT PROVINCE

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## ABSTRACT

Nowadays, the global demand for organic products is growing at a very rapid rate. Ever since increasing use of chemicals in farming, the consumers are getting conscious and selective about edible products. The main purpose of this study is to analyze level of knowledge on organic products, consumption of organic products and preferences of consumers related to the organic products in Siirt province. The sample volume was calculated as 90 % confidence interval and 7 % error margin according to the proportional sample volume formula. Sample size is calculated as 138. Data obtained from consumers face-to-face interviews using pre-arranged questionnaires constitute the primary material of the study.According to research results; average education period was calculated as 13.28 years. Average monthly income was 4803.44 TL and average food expenditure was 1362.32 TL.%97.83 of consumers who are aware of organic products. 46.38% of consumers mentioned that they have heard the name “organic product’ from TV. 81.16% of households stated that they consume organic products. It was determined that the reason behind them they do not consume organic products due to lack of organic products and high prices. When the frequency of consumption of organic products is examined, it is determined that more than half of the consumers do not buy organic products very often. Consumers mostly buy organic products directly from the farmer. 87.68% of consumers agree to pay more for organic products.

**Keywords:** Organic Products, Consumer Preferences, Consumer Profile, Siirt Province

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# OVERVIEW OF MUS PLAIN SOILS USING GIS ON THE PROPERTIES OF ALPARSLAN STATE FARM

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## ABSTRACT

Alparslan State Farm, which is geographically located in the Upper Euphrates basin in Mus Plain and on the highway Bingol-Erzurum, covers an area of approximately 66.310 decares. It was determined that there are 7 taxonomically different soil series in the land whose detailed soil survey and map was in 2003. In this study, series, slope, top soil texture, surface drainage and soil drainage maps were produced by using Geographical Information Systems (GIS) of the farm land where detailed soil surveys were pre-made. As an example of the data obtained, the most widespread series in the study area is Murat series with approximately 45420 decares of land. The least spread series is Göktepe with 210 decares. Farm land is generally flat area and 48% of the total land is located on flat slope and 25% is located on slightly undulating slope. In almost all of the land, the soil texture is clay-clay loam. On the other hand, physical and chemical properties of the series in the farm state were evaluated and general characteristics of the Muş Plain which has important agricultural potential for the region were tried to be revealed.

**Keywords:** Soil, Muş, Alparslan, State Farm, GIS

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# MAPPING OF SOIL QUALITY OF ALPARSLAN STATE FARM

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## ABSTRACT

Alparslan State Farm, located in 66310 decares of Muş Plain which is one of the most important plains in Turkey, is the lands with high agricultural potential. In this study, it is aimed to determine the quality indexes of soils distributed in the lands of Alparslan State Farm within the borders of Muş province with the help of standard scoring function (SSF) and analytical hierarchical process (AHP) and to be mapped in the Geographical Information Systems (GIS). For this purpose, some of the soil physical and chemical properties previously determined were evaluated. These properties were scored and weighted with the help of SSF and AHP, respectively and soil quality indices were calculated. Soil quality value corresponding to each corner point was entered into GIS environment in Alparslan Agricultural Management land divided into 500 m grid. With the help of geospatial modeling, point data were converted to spatial data and soil quality map of the whole area was created. As a result of the evaluation, it was found that Alparslan Agricultural Management lands had soil quality indexes ranging from 48.8% to 94.8%. While Alican series had the highest quality value in the Management, Göktepe series had the lowest quality value. Very low quality soils were not included in the farm lands. As a result, consideration of soil quality in agricultural production is important for ensuring agricultural sustainability.

**Key words:** Soil Quality, Muş, Alparslan, State Farm, GIS

# MARGINAL AREAS, SOIL REGULATORS AND THEIR EFFECTS ON PLANT PRODUCTION

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## ABSTRACT

The human-earth relationship is as old as human history. The existence of humanity and agricultural activities have emerged. Therefore, it is quite old in agricultural activities. The growing and rapidly growing world has also led to extreme exploitation of the lands. It has even made clear the fact that it is a scarce resource. Under these conditions, scientists have increased their work on soil conditioners, microorganisms and soilless farming techniques to develop land and to assess marginal areas. As an alternative to soilless farming and soil regulators (peat, perlite, pumice, leonardite, humate, etc.), it is an important area of research to ensure the reintegration of agricultural areas which are very bad for agricultural use as well as for protection. With the introduction of new modern technologies in our country, production in our country has increased in parallel with the increase in greenhouse areas. The most important of these technologies is the use of soilless agriculture and soil regulators. The use of this technique provides soil and optimum plant root development in traditional agriculture. In this review, soil regulators and their effects on plant development and their use in marginal areas were investigated.

**Key Words:** Soil Regulators, Soilless Agriculture, Marginal Area, Plant Development

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# THE EFFECT OF SOME PGPR'S ON ROOT DEVELOPMENT OF WHEAT (IN STATUS OF SOIL COMPACTION)

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## ABSTRACT

Soil compaction is caused by natural phenomena such as wetting and drying, or by intensive cultivation and machine farming. Inadequate physical conditions of soil root growth and soil microorganisms are adversely affected. The most important factor causing mechanical disruption in soil environment is soil compaction. Unconscious and excessive use of agricultural techniques; decreasing organic matter rate of soils, structural degradation of structural structure and aggregation, increases soil compaction. Therefore, in this study; The effects of rizobacteria that stimulate the development of plant growth on the root growth of the soil in case of compression of the soil and the relationship between the compression is intended to be investigated. Soil with a bulk density of 1,1, 1,3 and 1,6 g / $cm^3$ and *P. agglomerans*, *P. putida*, *B. suptilis* and *A. agilis* were used as cultivation medium. In the soil with three different bulk density dry and wet root weight of wheat, root length, rooting rate, root number and root quality the effects of rizobacteria on plant growth were investigated.

**Keywords:** Soil Compaction, PGPR, Soil, Wheat, Root

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# DETERMINATION of YIELD AND YIELD COMPONENTS OF SOME HORSE BEAN (VICIA FABA L.) GENOTYPES GROWN IN ERZURUM ECOLOGY

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## ABSTRACT

Fifteen broad bean populations collected from different provinces and six registered broad bean varieties (Lara, Seher, Filiz-99, Eresen-87, Kıtık and Salkım) were used as standard. Eastern Anatolia Agricultural Research Institute Pasinler trial area was carried out with randomized block design with three replications. The aim of the study; bean in accordance with Erzurum ecology and yield elements in terms of determining the value of feed. In the study, some agronomic characteristics of 21 different broad bean genotypes were used as feed, mean values of two years; the number of branches 4.5-3.8 pcs, the first pod height 25.9-27.0 cm, plant height 56.5-62.1 cm, the number of pods per plant 16.1-13.7, the number of beans per pod 3.7-2.8, 52.2-59.9 days of flowering onset and seed ripening period was determined as 117.1-121.8 days. The yield of green grass was determined as 1645.3-1671.3 kg da-1 and 204.2-127.2 kg da-1. In the analysis of variance of the two-year combined trial results, significant differences were found between genotypes and years. In the correlation analysis based on years, it was suggested that there was a negative but very important relationship between green grass yield and first pod height, and a positive and very important relationship between seed yield and number of pods and pods per plant and suggested that these criteria could be used as selection criteria in breeding studies. In the study area, there are not enough researches about the use of beans for feed purposes. As a result, it was concluded that these and similar studies should be based on a wider region survey.

**Key Words:** Horsebean, Legume, Forage, Yield, Bean Agriculture

# CHARACTERIZATION OF F6 GENERATION COTTON GENOTYPES DEVELOPED BY DOUBLE CROSS HYBRID METHOD

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## ABSTRACT

This study consisted of the characterization of 36 double cross $F_6$ generation populations obtained in 2016 by selection of 45 populations of one *Gossypium barbadense* L. and 5 *Gossypium hirsutum* L. cotton genotypes which were formed by double cross breeding method. The experiment was conducted as a 4 block according to Augmented design and cottonseed yield, ginning outturn, plant height, 100 seed weight and SPAD value were examined. This study was carried out area of GAP International Agricultural Research and Training Centre in 2016. In the study, it was found that 3 lines (11, 18F, 26A) were higher than the control variety having the highest value in terms of cottonseed yield ($kg.da^{-1}$) and the average cottonseed yield of our experiment was determined to be 342.5 $kg.da^{-1}$. Although the study overall average of our test in terms of ginning outturn was 41.48%, our 10 lines (44A, 39C, 31, 31A, 9, 16, 18A, 18B, 18C, 18E) were higher than the highest standard. The mean of our experiment in terms of plant height was found to be 83 cm. The tallest plant of our experiment was determined to be Carmen cotton variety with 95.75 cm. The standard error of our experiment in terms of chlorophyll content was calculated as 0.35 and sub-limit and upper limit values were determined by subtracting from the mean value of each property examined in our experiment. Accordingly, in terms of SPAD value, 3 lines are equal to mean, 19 lines are smaller than average value, 14 lines are higher than average value, and 13 lines are higher than the largest control variety. 100 seed weights were investigated in the experiment and the mean of the experiment was found to be 9.57 grams, 100 seed weights ranged from 9 g to 10.48 g. According to the results of the study, the prominent lines in terms of the parameters examined were transferred to $F_7$ generation to establish preliminary yield experiments.

**Key Words:** Cotton, Breeding, Double Cross, Augmented Design, Yield Trials

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# RELATIONSHIPS BETWEEN OIL, PROTEIN AND GOSSYPOL CONTENTS IN COTTONSEED MEALS

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## ABSTRACT

Cottonseed, a coproduct of cotton production, is either fed primarily to cattle as whole seed, or the oil is extracted to provide edible oil for human consumption and the meal is used as a feed supplement for livestock. Cottonseed contains 0.03% to 0.2% gossypol and the issue of gossypol has constituted the greatest problem to the use of cottonseed meal (CSM) in animal production.

The aim of this study was to determine the relationships between oil, protein, and gossypol contents of CSM obtained from cottonseeds grown in the Aegean, Mediterranean and Southeastern Anatolia regions where cotton production is common in Turkey.

A total of 40 CSM obtained by extraction method were used in the study. Crude fat (CF) content was analyzed using the ANKOM rapid determination of oil/fat utilizing high temperature solvent extraction method (AOCS 2009). Crude protein (CP) content was measured by the Leco Combustion method which is based on the Dumas dry combustion technique (AOAC 2007). The total gossypol content was determined by the High Performance Liquid Chromatography (HPLC) method developed by Hron et al. (1999). All chemical analyses were carried out in triplicate. The relationships between oil, protein, and gossypol contents of CSM were determined by linear regression.

The crude protein contents of CSM showed significant differences and CP values ranged from 11.71% to 40.23%. The protein content of CSM varies depending on the oil extraction process and it was determined that 28 of the CSM produced in Turkey had protein below standard value. The crude fat contents ranged from 1.80% to 11.18% and the total gossipol contents of CSM ranged from 72.37 mg/kg to 2285.38 mg/kg. There is no real correlation between oil and total gossypol in CSM, which means that any improvement in oil content of cottonseed will not result in a similar increase in gossypol content. Because the quantity of this toxic substance in the meal is largely dependent upon the quantity in the original seeds. These findings will be important to cotton breeders interested in increasing the oil content of cottonseeds. However protein and total gossypol were positively correlated.

Cottonseed meal plays an important role in supplying the protein needs of animals. However gossypol content, especially free gossypol content, is a restricted factor for the usage of this meal. A number of studies have been reported on chemical constituents of cottonseed meals but literature on the inter-relationship between important constituents like oil, protein, and gossypol in cottonseed meals belonging to different region in Turkey is insufficient.

**Key words:** Cottonseed meal, gossypol, oil, protein.

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# THE EFFECTS OF DIFFERENT PEG (POLYETHYLENEGLYCOL) CONCENTRATIONS ON GERMINATION CHARACTERISTICS OF SOME ALFALFA (*MEDICAGO SATIVA* L.) VARIETIES

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## ABSTRACT

This study was carried out under laboratory conditions to determine the response of some alfalfa varieties to the drought stress during germination period. The research was conducted in Sakarya University Food Engineering Department laboratory in 2019. Azurra, Delta, Emiliano coated, Emiliano uncoated, La Bella Campagnola, Neptune varieties were used as plant material. Six different drought stress levels (0, -2, -4, -6, -8, -10 bar) were handled in the study. Studies in different plant species have shown that under controlled conditions, polyethyleneglycol (PEG) can be used successfully in creating drought stress in plants. PEG controls the uptake of water in plants and thus leads to the formation of drought stress in plants. For this reason, polyethyleneglycol-6000 (PEG-6000) was used to create different levels of drought stress. The experiment was set up in a randomized plot design with two factors and three replicates. In this study, germination percentage, germination rate, the length of plumula, the length of radicula, plumula / radicula ratio, plumula fresh weight, radicula fresh weight, plumula dry weight, radicula dry weight, and vigor index were investigated. Research results showed that peg concentrations had a statistically significant effect on all properties evaluated. It was found that the values obtained in all properties decreased as PEG concentration increased. In terms of the characteristics examined among the varieties, it was found that Emiliano coated and Emiliano uncoated varieties were more tolerant than other varieties. PEG concentration negatively affected the properties examined after -8 bar and the lowest values were obtained at -10 bar dose. When Variety x PEG concentration interactions were examined, the highest values in all properties were found in Emiliano coated x -2 bar interaction. In this study, it is concluded that Emiliano variety may be more tolerant than other varieties in alfalfa cultivation in the soil faced with drought problem.

**Key Words:** Alfalfa, Drought Stress, PEG-6000, Germination, *Medicago Sativa*

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# FATTY ACID CONTENT AND SOME CHEMICAL PROPERTIES OF SELECTED ALMOND (*PRUNUS AMYGDALUS* BATSCH.) GENOTYPES IN NORTH OF IRAQ SULEYMANIA CHEMCHEMAL PROVINCE

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## ABSTRACT

This study was carried out to determine some chemical properties and fatty acid content of selected almond (*Prunus amygdalus* Batsch.) genotypes in Suleymaniye province. In the study, total oil content, protein content, ash content, humidity, palmitic acid content, palmitoleic acid content, stearic acid content, oleic acid content, and linoleic acid content of the selected genotypes were ranged from % 40.33 ile (SU-67) - 48.17 (SU-69); % 21.26 (SU-67) - 28.42 (SU-69); % 2.72 (SU-65) - 3.97 (SU-69); % 2.87 (SU-82) - 3.81 (SU-24); % 6.26 (SU-67) - 6.72 (SU-69); % 0.22 (SU-67) - 0.42 (SU-69); stearik asit oranı % 1.07 (SU-67) - 1.70 (SU-69); % 70.41 (SU-67) - 71.15 (SU-69); % 16.57 (SU-67) - 18.59 (SU-69) respectively.

**Key Words**: Almond (*Prunus amygdalus* Batsch.), Chemical Properties, Fatty Acid Composition

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# EVALUATION OF YIELD AND YIELD COMPONENTS TRAITS OF PROMISING LINES IN DIYARBAKIR ECOLOGICAL CONDITIONS

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## ABSTRACT

This study was carried out in 2016 in the experimental area of GAP International Agricultural Research and Training Center with 4 replications according to randomized complete block design by considering yield and yield components characteristics in Diyarbakır ecological conditions. Within the scope of the study, 7 hopeful lines and 2 standard varieties (Stonville 468, GW Teks) constituted the plant material of the experiment. In this experiment, cottonseed yield, cotton fiber yield, plant height, number of fruit branches, 100 seed weight and ginning outturn were investigated. In the study, except for plant height, statistically significant differences were found in terms of other properties examined. Plant height 76.91-90.42 (cm); number of fruit branches 10.33-13.58 (pcs/plant); 100 seed weight 8.9-11.43 (g); cottonseed yield 305,58- 398,91 (kg/da); cotton fiber yield 126,38-162,33 (kg/da); ginning outturn ranged from 37.99 to 44.22%. İn terms of cottonseed yield has been found Line-5, Line -6, Line -1 and Line -7 highest value. In terms of cotton fiber yield, Line -5 and Line -1 were found to have the highest value. In terms of ginning outturn, Line-5 was above the average with 41.89% and was in the second group. In the ecological conditions of Diyarbakır, the genotypes Line -5, Line -6, Line -1 and Line -7 were prominent. However, it has been concluded that it is necessary to be included in registration trials as a candidate varieties after yield and region yield trials.

**Key Words:** Cotton, Breeding, Yield and Yield Component Trait, *Gossypium hirsutum* L.

# USAGE OF GEOGRAPHICAL INFORMATION SYSTEMS FOR DETERMINATION OF SOIL AND LAND PROPERTIES IN VINERY

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## ABSTRACT

Vine is one of the plants that can grow without problems in different soil types where many other cultivated plants are not economically grown. Although Vitis vinifera L. varieties are not selective about soil, the same cannot be said for American vine rootstocks. Vine is a perennial plant and its economic life varies according to the maintenance conditions, although it is about 30-40 years. For this reason, before bonding in a place, the soil should be analyzed and lime content, structure, structure, depth, groundwater height and salinity should be examined and the appropriate variety and rootstock selection should be made accordingly. In such cases, it is very easy to benefit from the Geographical Information System (GIS). With the data transferred to the GIS environment as map layers (soil maps, land capability classes, suitability for irrigated agriculture, suitability for agricultural use classes and potential usage areas), ideal land uses can be determined on parcel basis. Therefore, the creation of quality soil maps, healthy evaluation and comments can be made. Land applications of GIS, which is an indispensable part of agriculture, mostly focused on land use situations. In this study, the possibilities of using GIS to determine soil and land characteristics in viticulture were compiled.

**Key words:** Grapevine, Viticulture, Soil, Land, Geographical Information System

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# THE IMPORTANCE OF SUSTAINABILITY POULTRY MEAT PRODUCTION IN TURKEY

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## ABSTRACT

In parallel with the increasing world population, poultry meat production has risen to the first place all over the world. Production is realized in a short time, low cost, adequate production and marketing organization and the fact that poultry products are not banned in any religion and belief system have been the most important factors in spreading. Turkey was among the leading countries in production growth and has become among the top 10 countries can produce. Today, 82 million of Turkey's population, which is expected to be passed to 100 million in 2040. Besides increasing global population levels of malnutrition, such as climate change, the decline in output due to problems requires taking serious measures for Turkey and the world. According to the data of 2018 in the world, per capita meat consumption is 43.9 kg while in Turkey it is 36.2 kg. Approximately 22 kg of meat consumed consists of poultry meat. This situation necessitates the increase in consumption below the world average today and in the future, significant increases in production in parallel with the population increase. The increases should be made from red meat (cattle, sheep, goat, buffalo) and poultry besides pork. While our country, which is experiencing serious problems in short-term increases in red meat production, tries to close the deficit by importation, larger problems may be encountered in the future due to the negative impact of production. 20-25% of the production which is over 2 million tons in poultry meat is exported. If this trend continues in the future, if there is no increase in the poultry meat per capita, a production increase of 4-5% is required every year. Breeders, feed raw materials, capacity building and renewal of infrastructure in existing enterprises and marketing channels should be arranged in line with technological developments. Resources should be used correctly while sustainability is prioritized in the production objectives. In the producer-consumer chain, it is important for future generations to consider production models that will balance consumer demands, environment, animal welfare, land and water use.

**Keywords:** Poultry Meat, Sustainability, Consumer Demands, Animal Welfare, Environment, Land And Water Use

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# PURCHASING HABITS OF MEDICAL AND AROMATIC PLANT CONSUMERS IN ERZURUM PROVINCE (CITY CENTER)

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## ABSTRACT

The increasingly changing environment and living conditions have begun to threaten human health. This led people to nature and natural life.It has tried to secure its health and future by moving away from the elements of synthetic life. In this context, natural plants and herbal treatment methods have gained momentum for a healthy life. Of nearly 500 plant species are known to be used for therapeutic purposes in Turkey. In addition, some plants are used as spices or in the perfume industry. The increase observed in some cities such as Erzurum in Turkey in recent years in the province is increasing the consumption and sale of medicinal and aromatic plants. The study was conducted to determine the habits and purchasing tendencies of medicinal and aromatic plant consumers. The main material of the study consisted of MAP consumers residing in Palandöken, Yakutiye and Aziziye settlements which constitute Erzurum city center. Sample volume was determined by proportional approach (95% confidence limit, 5% error margin) and 384 consumers were surveyed and MAP buying habits and factors affecting their purchases were examined. According to the results of the study, 49.7% of the consumers are “men” and 50.3% are “women. Approximately 46.1% of the consumers were registered as “31-46’ in the ’age range” and 75.5% as “married. It was determined that 23.4% of consumers purchased MAP with the recommendation of friends, 58.6% could pay more for the packaged product and 61.9% could pay more for the product collected from nature. MAP consumption of consumers varies seasonally. MAP'S is mostly were purchased to be form herbs and collected from nature in spring. The have been determinated that, the factors affecting the purchasing tendency of medicinal and aromatic plant consumers are hygiene, preservation, quality, packaging, origin, physical properties and brand, respectively. In addition price has not been an important factor.

**Key Words:** Medicinal And Aromatic Plants, Customer, Behaviour, Buying Trends.

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# PCR-RFLP ANALYSIS OF CALLIPYGE GENE IN DIFFERENT SHEEP BREEDS REARED AT THE SHEEP BREEDING RESEARCH INSTITUTE

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## ABSTRACT

The present study aimed to determine the genetic polymorphism of *Callipyge* (*CLPG*) of five different breeds reared in Bandirma Sheep Breeding Research Institute. A total of 202 heads of sheep, 41 heads of Kivircik, 44 heads of Karacabey Merino, 48 heads of Black Headed German Merino X Kivircik (Bandirma), 44 heads of Hampshire X Merino, 25 heads of Ramlic, were used in this study. Genomic DNAs from each animal material were obtained and amplified 214 bp telomeric region using gene specific primers. Amplifying locus genotyped by the PCR-RFLP method with restriction enzyme *Ava II*. Two different genotypes were observed according to the bands on the agarose gel after digestion. These bands were NN which had two bands (137 and 77 bp), MN which had three bands (214, 137 and 77 bp). MM genotype (214 bp) was not observed. According to above-mentioned findings, the allele frequencies of M and N as 0.04 and 0.96 while the total genotypic frequency of MN and NN genotypes was 0.07 and 0.93, respectively. Thus, *CLPG* locus was found polymorphic and can be used for breeding programs.

**Key words:** Sheep, Callipyge Mutation, Polymorphism, RFLP.

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# EVALUATION YIELD AND QUALITY OF SOME BREAD WHEAT (*TRITICUM AESTIVUM* L.) GENOTYPES FOR KIZILTEPE IN IRRIGATED AND RAINFED CONDITIONS

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## ABSTRACT

This study was conducted in randomized complete block design with 4 replications under irrigated and rainfed conditions during 2016-2017 growing season in Kızıltepe locations. The purpose of the study is to determine genotypes with high yield, large adaptation ability and high quality. In this trial, twenty advanced lines and five check were used. In this research, genotypes were evaluated in terms of zeleny sedimentation, protein content, test weight (TW), thousand grain weight (TGW) and grain yield. According to result of analysis of variance, significant differences were observed between genotypes at the level of 1% in terms of other investigated properties except for protein content. Grain yields of genotypes ranged from 661-914 kg $da^{-1}$, zeleny sedimentation amount 31.5-46.5 ml, thousand grain weight (TGW) 26.5-40.2 g, and test weight (TW) 74.1-84.4 kg $hl^{-1}$. In order to evaluate the relationships between traits and genotype-trait relationships, biplot analysis method was performed. According to GGE-biplot results high and significant correlations were determined between test weight and thousand grain weight and grain yield, also between protein content and zeleny sedimentation amount. When the results of variance and biplot analysis were evaluated together, Candidate-12 (check) and G16 showed the best performance for grain yield, G3 in test weight, G3, G22 in thousand grain yield, and G1, G6 in zeleny sedimentation. According to the results obtained; it was concluded that the cultivation areas of candidate-12 species candidates should be expanded. In addition, it has been concluded that it will be beneficial to evaluate standing out in terms of existing features G1, G3, G6, G16 and G22 in breeding programs.

**Keywords:** Wheat, Yield, Quality, GGE-Biplot

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# DEVELOPMENT OPPORTUNITIES IN TURKISH BEEKEEPING

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## ABSTRACT

Beekeeping, which is one of the most nature-dependent animal husbandry activities, creates added value through several products such as honey, beeswax, pollen, propolis, royal jelly and bee venom. Furthermore, honeybees have an indisputable significance in the yield and quality of several crop cultivation processes due to their carrier function in the pollination of fruits and vegetables that require an intermediary in seed reproduction. Due to these features, beekeeping plays an important role in rural development and animal husbandry industry. Anatolia, which is considered among the fatherland of the honeybees used in honey production today, has been effective on the traditional outlook of beekeeping with its rich flora, suitable climate and geographical conditions. Furthermore, policies and resources allocated to improve the industry maintained the current status of beekeeping in Turkey. The developments introduced significant increases in the number of colonies and made Turkey one of the significant beekeeping nations in the world. Turkey, which is a leading country in the total number of beehives and honey production in the world, has not reached the level it deserves in honey yield per hive, which translates to productivity in beekeeping. Thus, in order to utilize the existing potential adequately and to conduct activity that would increase the producers' income in particular and national income in general, the problems that adversely affect productivity, including the uncontrolled increase in the number of colonies, should be meticulously addressed and necessary strategies should be implemented immediately.

**Keywords:** Beekeeping, Problems, Colony Count, Strategic Plan

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# OCCUPATIONAL HEALTH AND SAFETY PERCEPTIONS OF BEEKEEPERS

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## ABSTRACT

Employees, during their activities that ignore the occupational health and safety criteria, could experience accidents that could inflict harm to themselves, and these accidents could also expose the businesses to various economic burdens. The know-how of the employees is not at an adequate level on occupational health and safety, especially in the agriculture industry in the short period of time that occupational health and safety have been discussed in Turkey. In the present study, which aimed to determine the knowledge, perceptions and current status of beekeepers on the topic, the data collected using questionnaires that were completed by 55 beekeepers in Hakkari and Van provinces during face to face interviews were analyzed with SAS software. It was determined that 92.73% of the surveyed beekeepers were male, 56.36% conducted migratory beekeeping, 60.00% had no knowledge on occupational health and safety, 24.07% of the beekeepers had accidents during beekeeping activities, albeit minor small, and 25 producers suffered permanent lumbar disorder, which could be described as an occupational disease, during their occupational activities. Furthermore, it was found that the majority of the participating beekeepers (89.09%) stated that possible training they would receive on occupational health and safety would make a significant contribution to them. It could be suggested that the present study, where the correlations between all survey questions were also analyzed, would serve as a database for future studies and contribute to the formation of an occupational health and safety culture in the production-oriented beekeeping industry.

**Keywords:** Beekeeping, Occupational Health And Safety, Occupational Health And Safety Perception, Occupational Disease

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# DEFINING AND TYPOLOGY OF PART-TIME AND FULL-TIME FARMING IN HAZELNUT PRODUCTION IN EAST BLACK SEA REGION OF TURKEY

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## ABSTRACT

Rapid developments in technology, which began with the industrial revolution, have led to changes in employee-employer relations as well as in working conditions in the agricultural sector as in many other disciplines. This situation has led to a decrease in the proportion of the population working in rural areas, and in the agricultural sector. Therefore, this case has attracted the attention of researchers in the world, and has put forward the concept of part-time farming. However, there has not been any definition or classification on farming type in Turkey. In this context, the purpose of the study is to put forward definition for part-time and full-time farming, and to classify the part-time and full-time farmers in hazelnut farming in Eastern Black Sea Region, Turkey. The data was obtained from a total of 152 hazelnut growers selected by the stratified sampling approach from Ordu and Giresun Provinces of the eastern Black Sea region. The farming type was defined by theoretical analysis. Based on the theories and approaches in current literature, conceptual framework was sustained. The research findings showed that farmer was part-time farmer when their share of the family labor wage was less than 2/3 in the total wage during a production period. Thus, proportion of part-time and full-time farmers were 47% and 53%, respectively. Regarding the spatial variability, percentage of part-time farmers in Ordu was higher (54%) than that of Giresun (46%). The study recommends that evaluating farmers as a same status by ignore social and economic difference according to type of farming, leads to deficiencies and errors in the analyzes. Policy-makers should consider difference between part-time and full-time hazelnut farming when designing and regulating the agricultural policies, resulting in more contribution to better development of agricultural sector.

**Keywords:** Type of Farming, Part-Time Farmer, Off-Farm Work, Hazelnut, Strategic Management.

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# INVESTIGATION OF CHANGE OF YIELD AND YIELD COMPONENTS IN SESAME (*SESAMUM INDICUM* L.) ACCORDING TO YEARS AND LOCATIONS

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## ABSTRACT

This study was carried out to investigate the characteristics of second crop sesame growing in Manisa, Antalya, İzmir and Şanlıurfa ecological conditions between 2008-2012 and to shed light on future studies. Baydar-2001, Muganli-57, Arslanbey, Ozberk-82, Birkan, Orhangazi-99, Hatipoglu, Boydak and BATEM-Uzun varieties were used as plant material. In the second crop sesame cultivation, it was obtained that the change of ecological environmental conditions is very important. The highest seed yield was obtained from İzmir location and the lowest seed yield was obtained from Şanlıurfa location. It was concluded that Arslanbey and Hatipoğlu varieties would be recommended in Şanlıurfa location and BATEM-Uzun variety would be recommended in Aegean and Antalya locations.

**Keywords:** Sesama, Seed Yield, Location

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# THE RELATIVE INSTABILITY OF TOBACCO PRODUCTION IN MACEDONIA

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## ABSTRACT

Tobacco production in Macedonia has a long tradition due to the quality of the variety assorted on the world market. In addition to the favorable natural conditions (soil, meteorological conditions, etc.) for tobacco production, Macedonia also has a positive attitude towards tobacco with its agrarian policy, suitable legislation and so on. With agrarian policy, tobacco is in a "privileged" position compared to all other crops grown in the country, whose importance is also important for agriculture. Mostly, the country produces oriental type tobacco. Tobacco has such a market position that it provides relatively reliable production for the market, at relatively adequate prices, which allows tobacco to take precedence over other marketed crops. In particular, about 95% of tobacco in Macedonia is exported, where high value is achieved as part of the exchange of Macedonian economy with the world, especially as exports of the total economy are lower than imports. Purchase price for tobacco is in average 3 eur/kg plus stimulation of 1 euro per kg. Analysis of the volume of production over a long period, as a result of the planted areas and the realized yield, is not only unstable in the total produced tobacco, but also to the decline of the areas planted with tobacco, although there is a certain increase in the yield. The oscillations in production of tobacco that depend on the weather conditions, mostly affect the quality and quantity. According to the latest statistics for 2017, tobacco production in the country covers an area of 15 961 ha, with a production of 22.9 thousand tons and a yield of 1434 kg / ha. In recent years, the decline in production has been influenced by the fact that farmers stop growing tobacco in some regions or municipalities. Tobacco in Macedonia is produced in all eight economic statistical regions, and in over 50 municipalities (out of a total of 80). The regional distribution of tobacco production in the country shows a high concentration in two regions (Pelagonija region and South-East region) where almost 90% of total production is produced. There is a symbolic production in the Polog region (3%).

**Key words:** Oriental Type Tobacco, Instability, Production, Regions, Yield

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# DETERMINATION OF YIELD AND YIELD TRAITS OF SLAGE MAIZE (*ZEA MAYS* L.) VARIETIES GROWN AS SECOND CROP IN SIVAS / IMRANLI ECOLOGICAL CONDITIONS

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## ABSTRACT

This study was carried out in 2012 vegetation period to determine yield and yield traits of Slage Maize (*Zea mays* L.) varieties grown as a second crop in the ecological conditions of Sivas/İmranlı. In the study 10 varieties of hybrid maize (Cadiz, Mg82, Bona, 71May69, Otello, Sakarya F1, Quintero, Tuono, Ada 9516, Samada 07) were used as plant materials. The experiment was designed with "Randomized Complete Blocks Designed" with 3 replications. In the study plant height, number of leaves, silking period, taselling period, dry matter yield, ear yield, herbage yield, stover yield, crude protein ratio, ADF (acid detergent fiber) and NDF (neutral detergent fiber) were determined. As a result of the research, plant height varied from 120.5 to 191.5 cm, number of leaves per plant from 10.33 to 14,00, taselling period from 62 to 69 days, silking period from 66 to 73 days, dry matter yields from 822.66 to 1992.66 kg/da, ear yields from 0 to 2439.66 kg/da, herbage yields from 3733.99 to 4549.31 kg/da, stover yield from 131.00 to 1087.33 kg/da, crude protein ratio from 5.33 to 5.81%, ADF (acid detergent fiber) from 37.48 to 45.68% and NDF (neutral detergent fiber) from 56.99 to 67.11%.Sakarya F1 and Quintero species were found important when some remarkable parameters in terms of animal feeding were considered such as ADF-NDF, crude protein ratio and plant length.

**Key words :** Second Crop, Slage Maize, Dry Matter Yields, ADF, NDF.

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# WHY ARE *BOMBUS TERRESTRIS* L. COLONIES SO IMPORTANT IN GREENHOUSE?

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## ABSTRACT

Bumblebees, which are the second most reared bee species in more than 20 thousand bee species after honeybees, play very important role for protection of natural flora and continuousness of sustainable agriculture. *Bombus terrestris*, which is one of about 250 bumblebee species, have some advantages compared to honeybees such as being less aggressive, going on foraging activity in lower temperatures and light densities and having good adaptation ability. Therefore, *B. terrestris* species are the best pollinators for greenhouse crops. *B. terrestris* colonies are used in the pollination of many vegetables and fruits such as strawberry, pepper, melon, almond, cherry, eggplant, especially tomato, which is the most cultivated greenhouse in our country and world. Today, in greenhouse tomato cultivation, bumble bees are used almost as a solution to the problem of pollination. In recent years, the widespread using of bumblebee colonies has been abolished the old practices such as vibrating with vibrators or using hormones and similar tools for pollination. Using bumblebees for pollination purpose has economic advantages such as using less plant protection chemicals, paying less labor etc. costs. For this reason, the added value of the products produced by the farmers is increased and also contributed positively to the economy of the family and the country.

**Keywords:** Bumblebee, *Bombus terrestris*, Greenhouse cultivation, Pollination

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# THE EFFECT OF MATING WITH MALES PRODUCED BY REPRODUCTIVE WORKERS ON SEX PRODUCTION IN *BOMBUS TERRESTRIS* COLONIES

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## ABSTRACT

In contrast to honeybees, bumblebee, *Bombus terrestris*, workers are also capable of egg laying toward the end of the colony life even if in the presence of the queen. Males are produced from haploid (unfertilized) eggs laid by both workers and queens. Males, which are produced from queen and worker eggs, are the same morphologically. All collected males from colonies are mated with virgin queens in year-round rearing process under controlled conditions. Aim of this experiment is to determine whether affecting of mating with males produced by workers and queens on sex production. Virgin queens and old workers groups were formed to produce two different male groups and these males are mated with unrelated young queens. After the hibernation, colonies were founded by these queens. According to results, there were no significant difference in total number of, males and gynes are produced by young queens mated with males produced by queens and reproductive workers. (This study was supported by the Scientific and Technical Research Council of Turkey (Grant Number: TUBITAK-118O457). It was published as Master Thesis at Isparta University of Applied Sciences, The Institute of Graduate Education).

**Keywords**: *Bombus terrestris*, bumblebee, reproductive workers, sex production

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# BEEKEEPING ACTIVITES AND PROBLEMS IN ADANA

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## ABSTRACT

The present study was carried out in order to examine the structure of beekeeping in adana province, to recognize the beekeeping system, to determine the opinions, complaints and problems of the beekeepers and to determine the rate of *varroa destructor* in the bee colonies and to determine the satisfaction of the drugs and medicines used by beekeepers in the fight against this mite. The research was conducted by visiting 169 the beekeepers in adana with a total of 60 questionnaires containing various information about beekeepers. According to the survey, findings were obtained in the form 99.4% of the sex of the beekeepers were male and mean age was 47.77. In some of the districts where beekeeping is done intensively and 58.5% of beekeepers were primary school graduate. İn addition, the average of beekeeping experience was 19.22 years; the average colony number of beekeepers was 293.21. Adana province is a very important region in terms of beekeeping due to its climate characteristics, its geographical structure and being rich in plants suitable for beekeeping. Findings of the present study reveal that the bee products produced in adana province are not very different from other provinces in terms of diversity and that productivity is concentrated on honey and productivity is low. The most important reasons for the low yield are; a breeding problem, inadequate queen bee rearing, the majority of beekeepers do not have enough knowledge and experience on colony management, and many beekeepers are still beekeeping with traditional methods. It is believed that this work will shed light on the problems of future work and beekeeping.

**Key words:** Adana, Beekeeping, Beekeeping Problems, Bee Disease and Harms

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# AN OVERVIEW OF MUŞ PROVINCE AGRICULTURE

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## ABSTRACT

In this study, the agricultural structure of Muş province has been evaluated in general. In this context, the distribution of agricultural area according to plant groups was examined in addition to the existence of agricultural area of the province. Each of plant groups was examined and the cultivation areas and yield values of the cultivated plants were reported. In addition to these, the presence of animals in the province has been shown. In this study, which was prepared based on 2008 and 2018 data, it has been tried to explain how the mentioned data have changed in the last 10 years.

**Keywords:** Muş plain, Muş province agriculture, plant production, animal production

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# EVALUATION OF SOME BREAD WHEAT CULTIVARS FOR YIELD AND YIELD TRAITS

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## ABSTRACT

This study was carried out to compare some bread wheat cultivars in terms of yield and yield components in 2017 – 2018 cropping years under Kahramanmaras conditions.

Fourteen bread wheat cultivars used as materials (Basribey, Lucilla, Cumhuriyet-75, Nurkent, Adana 99, Seri 2013, Karatopak, Vittorio, Masaccio, Pandas, Kaşifbey, Cesare, Ceyhan 99 and Osmaniyem). The research was arranged in a randomized complete block design with four replications.

In the study, the traits such as plant height (PH), upper node length (UNL), head number per $m^2$ ($HN/m^2$) grain numbers per head (GN/H), grain weight per head (GW/H), thousand kernel weight (TKW), grain yield (GY), test weight (TW) and biomass yields (BY) were investigated.

According to the results, cultivars varied for all investigated traits except PH, UNL and ($HN/m^2$). Lucilla cultivar had the highest values for BY (1158.8 $kg.da^{-1}$) and GY (837.33 $kg.da^{-1}$), while Cesare had the highest GN/H (69.6 numbers), GW/H (3.04 g) and TW (79.625 kg). In addition, the highest TKW was obtained from Masaccio cultivar with 48.7 g.

Among the investigated traits, there were significantly and positively correlations between GY and BY and TW.

**Keywords;** wheat, yield, cultivars, yield traits.

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# INVESTIGATION OF RADISH PLANT CROP EFFECT ON EAR AND GRAIN QUALITY CRITERIA OF CORN PLANT

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## ABSTRACT

In the study, it was aimed to determine effects of pure corn, radish between corn and corn row, together radish and corn intrarow application on ear and grain quality criteria of corn. Because radish is a plant with allelopathic effect. The trial was carried out the split-plot design with three replications in the second crop planting time under Kahramanmaraş conditions in 2016. The ear silk-out time, ear lenght, diameter of ear, row number per ear, number of grains on row per ear, ear weight, protein ratio, starch ratio, oil ratio and dry matter ratio properties of PL 472 LR and Macha LR corn varieties were investigated. Except for row number per ear, the differences between the varieties were significant in terms of other properties. It was observed that corn radish planting application had statistically significant differences on the ear silk-out time, ear lenght, diameter of ear, number of grains on row per ear. It was noted that corn radish sowing practices had no significant effect on corn grain quality criteria.

**Key word:** corn, radish, ear, grain

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# BAZI YULAF ÇESİTLERİ İLE YEREL GENOTİPLERİNİN TARIMSAL ÖZELLİKLERİNİN KARŞILAŞTIRILMASI

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## ÖZET

Yulaf (*Avena sativa* L.) bitkisinin son zamanlarda insan ve hayvan beslenmesinde kullanımının artması, araştırıcıları yulafla ilgili çalışmalara yönlendirmiştir. Bu çalışma, Kahramanmaraş koşullarında 2016-2017 ürün yılında 5 ticari yulaf çeşitleri ile ( Fetih, Sarı, Kahraman, Arslanbey ve Kırklar) 6 yerel yulaf hatları (TL38, TL137, TL139, TL576, TL42 ve TL452) kullanılarak, tesadüf blokları deneme desenine göre 4 tekerrürlü olarak yürütülmüştür. Denemede, vejetatif periyod (gün), tane dolum periyodu (gün), bitki boyu (cm), sap kalınlığı (mm), salkım uzunluğu (cm), salkımdaki tane sayısı (adet), salkımdaki tane ağırlığı (g), ekim olgunlaşma süresi (gün) ve tane verimi (kg/da) gibi tarımsal özellikler incelenmiştir. En erkenci çeşit (91.00 gün vejetatif periyod ve 139.75 gün ekim olgunlaşma değerine sahip olan) Arslanbey genotipinde bulunmuştur. Tane veriminde en yüksek değer Fetih çeşidi (236.67 kg/da), onu Kırklar çeşidi (233.33 kg/da) ikinci, TL 576 hattı (214.17 kg/da) üçüncü ve TL 38 hattı (209.38 kg/da) dördüncü sırada izlediği kaydedilmiştir. En kısa yulaf genotipi (73.84 cm) TL137 genotipi olurken, en uzun bitki boyu (140.41 cm) TL42 genotipinde tespit edilmiştir. Araştırmada kullanılan en yüksek değerler sap kalınlığında (4.40 mm) Sarı genotipinde, salkım uzunluğunda (29.02 cm) TL452 genotipinde, salkımdaki tane sayısı (40.55 adet) TL139 genotipinde, salkımdaki tane ağırlığı (4.830 kg) TL576 genotipinde kaydedilmiştir.

**Anahtar Kelimeler:** Yulaf, tarımsal karakterler, yerel hatlar, ticari çeşitler.

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# CORRELATIONS AND PATH ANALYSIS IN SOME BREAD AND DURUM WHEAT GENOTYPES GROWN IN BURSA CONDITIONS

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## ABSTRACT

This study was carried out to investigate the direct and indirect effects of yield components on grain yield in five different bread wheat (Hendrix, Tigre, Ceyhan, Esperia, Rebelde) and 5 durum wheat varieties (Meram, Selçuklu-97, Saragolla, Levante, Maestrale) in two different years. The research was conducted between 2016-2017 and 2017-2018 vegetation periods using a randomized complete block design with three replications at Agricultural Application and Research Center of Bursa Uludag University Faculty of Agriculture.

When the correlation coefficients of bread wheat varieties for 2016-2017 were examined, a significant positive correlation was determined between grain yield and plant height (r = 0.745**) and negatively significant relationships between test weight and the number of spikelets/spike (r = -0.724**) and the number of grain per spike (r = -0.813**). In 2017-2018, significant positive relationships were determined between grain yield and number of grains/spikes (r = 0.583*), grain weight per spike (r = 0.647**) and thousand grain weight (r = 0.583*). In durum wheat varieties for 2016-2017 when correlation coefficients of were examined, significant positive relationships were determined between grain yield and plant height (r = 0.729**) and spike length (r = 0.676**). In 2017-2018, significant negative relationships were determined between grain yield and grain number per spike (r = -0569*). Significant negative relationships were obtained between test weight and plant height (r = -0.580 *) and spike length (r = -0.704**) while there was positive and significant correlation between test weight and the number of spikelets/spike (r = 0.836**), number of grains/spikes (r = 0.679**) and grain weight/ spike (r = 0.561*).

Although the years showed differences according to the data obtained from different varieties of bread and durum wheat, plant height, grain weight per spike, number of grain per spike were the highest direct positive effect on grain yield, while the effect of thousand grain weight was determined to be negative and high.

**Key words:** Bread and durum wheat, correlation, path analysis

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# EVALUATION OF YIELD AND YIELD COMPONENTS OF ADVANCED CHICKPEA LINES BY BIPLOT ANALYSIS METHOD UNDER DIYARBAKIR ECOLOGICAL CONDITIONS

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## ABSTRACT

This study was carried out under Diyarbakır ecological conditions in order to determine chickpea genotypes with superior properties in terms of yield and some yield components and use them in the chickpea breeding programs. The study was conducted in the trial area of the GAP International Agricultural Research and Training Center during the 2015-2016 growing season. In this research, 36 advanced chickpea lines selected from different observation nurseries of GAP International Agricultural Research and Training Center and 5 check cultivars were used as genetic material. The study was carried out on four blocks in augmented trial design, with 9 lines and 5 check cultivars in each block. The variation range of grain yield per hectare, the number of flowering days, plant height, first pod height and 100 grain weight were examined in the research. The data were analyzed by variance. The results of analysis of variance indicated that there were statistically significant differences between genotypes mean for properties discussed in study. There was a great variation for flowering days 101.4-115.3 days, plant height 50.65-69.73 cm, first pod height 22.12-36.42 cm, 100 grain weight 31.85 - 47.04 g and grain yield 34.90-52.09. kg $h^{-1}$. The relationship between the characters and genotype-character relationships were determined by Biplot analysis method. According to Biplot analysis results, a positive and significant correlation was found between the number of flowering day, plant height and the first pod height, while a negative and significant relationship was found between seed yield and the number of flowering day and 100 seed weight. G24, G26 and G23 genotypes were prominent in terms of number of flowering days, plant height and first pod height. G34, G33, G25 and G30 genotype for grain yield; G8, G39 and G47 genotypes were prominent for 100 seed weight. These genotypes, which have superior characteristics, have been selected and evaluated in yield trails and chickpea breeding programs.

**Key words:** Biplot, chickpeas, yield, yield components

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# EVALUATION OF THE POTENTIAL OF THE PROVINCE IN TERMS OF BARLEY AGRICULTURE CURRENT SITUATION AND NEEDS PERSPECTIVE IN VAN PROVINCE

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## ABSTRACT

Growing barley as a summer crop in the irrigated areas of Van province is not widely adopted by the farmers as they prefer other crops with high market value. On the other hand, the required amount of barley to fulfill the need of livestock feed of the province is 771.5 thousand tons, while the current amount of barely produced is only 13.700 tons from 67.700 da. Thus, 3-3.5 million da is needed to produce the sufficient amount of barley needed for the livestock.

Considering the presence of sheep and sheep based on grazing in the pastures for 4-5 months, it can be concluded that the barley requirement of the province is 500.000-550.000 tons and the required area is 2.7 million da. This need may be relatively well covered by the areas of fallow, unused agricultural areas and surpluses allocated to wheat farming areas.

The support provided by the government agricultural departments, Van Yuzuncu Yil University barley production program studies, regional trials, and research institutes investigations, the winter barley experiments has been carried out in order to replace summer growing. The positive results of these studies made summer barley cultivation replaced with winter barely cultivation in the region.

**Keywords:** Van province, Barley production, Presence of animals, Barley needs

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# RELATIONSHIP BETWEEN GROSS PRODUCTION VALUE AS A RURAL DEVELOPMENT INDICATOR AND AGRICULTURAL

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## ABSTRACT

The aim of this study is to determine the relationship between gross agricultural production value, which is one of the economic indicators of rural development and total agricultural loans among agricultural financing instruments. The study covers the years 1988-2016, and the data are included in the annual dollar frequency analysis. The total gross value of agricultural production and agricultural credit data, The Food and Agriculture Organization of the United Nations (FAO) and the Banks Association of Turkey (TBB) has been compiled from official website.

In this study, the unit root test was developed with the Advanced Dickey-Fuller (ADF) test in order to avoid the false regression problem and to make the right model selection. After determining the unit root levels of the variables by ADF unit root test, Engle-Granger two-stage cointegration analysis was used to determine whether there was cointegration relationship between the variables. In the first stage, error terms are estimated by Least Squares (OLS) method. In the second stage, the unit root test is performed for the error term obtained.

If the absolute value of the test statistics obtained from the unit root test is greater than the critical values of the two-stage Engle-Granger (1989) test, cointegration between the series; if it is small, there is no cointegration. In this study, Engle-Granger two-stage cointegration analysis was preferred because the variables became stationary at the first level and at the same level.

As a result of the study, it can be stated that total agricultural loans and gross agricultural production value variables act together. In other words, it is determined that the gross agricultural production value, which is one of the economic indicators of rural development, and the agricultural loans among agricultural financing instruments are long-term relationships.

**Key words:** Gross agricultural production value, agricultural credit, rural development

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# AGRICULTURAL CREDIT AND AGRICULTURAL PRODUCTION IN TURKEY

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## ABSTRACT

Financial support is an important issue sustainability of agricultural activities. Agricultural credit are considerable in providing financial support to farmers for their activities. We can explain the agricultural credit is the type of credit that given to provide for the production inputs of farmers. It is stated that agricultural credits serves as a bridge between the income and expenditures of the farmer and is an essential ingredient in the growth strategy of agricultural sector.

In this study we aim that determined whether there is a causal relationship between the using agricultural credit and agricultural production. For this purpose we use13 year time series data that between the years of 2005-2018. Agricultural production value data and banking sector agricultural credit data are obtained from T. C Central Bank Electronic Data Distribution System. Variables are included in the analysis in logarithmic form.

In the study relationship between the using agricultural credit and agricultural production analyzed econometrically Granger causality test for the period of 2005- 2018. However, the Granger Causality test reveals only the linkage and direction of the linkage and no relationship between the pairs is established. Thus, in the analysis of time series data, first of all, unit root test should be applied to determine whether the time series data is stationary or not. Augmented Dicky Fuller and Phillips Perron unit root tests are employed in order to check the stationarity of the variables. Variables, which are non-stationary at level, are again checked to assure the stationary after taking first difference and second difference. Therefore, firstly, we use Phillips-Perron (PP) unit root test to determine the stationarity properties of the variables examined. After determining the stasis levels of time series, Granger causality test is used to determine whether there is a causality relationship between agricultural credits and agricultural production and if there is a relationship.

As a result of the study, it is determined that there is a unilateral causality relationship from agricultural credit variable to agricultural production variable. In this case, it can be said that agricultural credits affect the agricultural production value.

**Key words:** Agricultural credit, agricultural production, Granger causility test, Turkey.

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# DETERMINATION OF TOXIC EFFECTS OF EXTRACTIONS FROM *AMANITA PANTHERINA*, *PAXILLUS INVOLUTUS*, AND *INOCYBE RIMOSA* TOXIC MUSHROOM ON RED CALIFORNIA EARTWORMS (*EISENIA FETIDA*) MODEL AND USING AS BIOPESTICIDE

**Mine KÖKTÜRK[1*], Mehmet Zeki KOÇAK[2], Ahmet Metin KUMLAY[3]**

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## ABSTRACT

The primary aim of the study was to determine the effects of extracts obtained from some mushroom species on non-target invertebrat0e (Red California worm = *Eisenia fetida*) model organisms and to determine the appropriate doses for extracts from the different toxic mushroom species. Another purpose of the study is to prevent or limit the use of intensive pesticide usage, which is an important problem today in many developed/developing countries, and to discover new substances that can be used as less harmful or harmless biological controlled products. *Amanita pantherina*, *Paxillus involutus* and *Inocybe rimosa* poisonous mushroom species collected from Van and Igdir surroundings were brought to the laboratory in appropriate containers and were identified by experts. Red California worms (*Eisenia fetida*) (400-600 mg individual weight), which was purchased commercially and cultivated in worm manure production unit at Igdir University School of Applied Sciences, Department of Organic Agriculture Management were used as a model organism. Red California worms are model invertebrate organisms that are frequently used in ecotoxicological studies and does not require ethical committee permission. The laboratory was maintained under controlled temperature (20 ± 2 °C), 75% humidity and complete dark conditions for 2 weeks before starting the experiment. Freshly collected mushrooms from nature were cut into small pieces and dried in the oven at 60 °C. The dried poisonous mushrooms were boiled at 80 °C for 3 hours to obtain water extract. The direct injection method into the coelomic cavity used by many researchers was used to investigate the toxic metabolism of the mushrooms extracts in earthworms in vivo. The mortality and malformation situation of earthworms were recorded during 24 and 48 hours. As a result of the study, after application of water extracts mushrooms, there was significant effect of *Inocybe rimosa* species (83.3%), however, *Paxillus involutus* had little effect (16.6%) and *Amanita pantherina* had no effect on mortality. In this concern, it could be advised that *Inocybe rimosa* could be used as a biopesticide for further studies after new concentrations and in vitro research on new model organisms. It is also strongly suggested to perform toxic tests on target organisms for using these toxic mushrooms as biopesticides.

**Keywords:** Mushroom, Biopesticide, Toxicology, *Inocybe rimosa*

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# EVALUATION OF PLANT DEVELOPMENT ACCORDING TO CIE-LAB COLOR SPACE SYSTEM PARAMETERS

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## ABSTRACT

Color can be defined as the perception of visible radiation with different wavelengths reflected from objects in the human eye. Color is one of the important features that determine the quality and quality of the materials. In food and agriculture, color is an important feature used to determine the quality of the material examined. Color measurement systems have been developed in order to determine the color feature more objectively. Color measurement systems are generally systems that determine the color of the object numerically according to its reflection or permeability. Different brand and model color measurement systems and different color models are used in the application. Color spaces are; are mathematical models used to describe colors.

The CIE L *, a *, b * color space system allows us to measure color in three dimensions. The axes in this three-dimensional color space system are L *, a *, b *. The L axis is the axis that gives a measurement of the darkness and lightness of an object. It takes values between 0 and 100. The a axis is the axis that gives the measurement of redness and greens. The b axis is the axis that gives the measurement of jaundice and blueness. Values a and b take values between -128 and +127 and approach numerically for neutral colors, while numerically increasing for more saturated sharp colors.

In this study; In the agricultural production of color spaces, the current studies carried out in order to follow the quality and development of the products are evaluated and suggestions are presented.

**Key words:** Vegetative Growth, CIE L *, a *, b * Color Space, Aesthetic Appearance

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# EVALUATION OF ANKARA KEÇİÖREN KANUNİ SEMT PARK IN TERMS OF SOIL AND PLANT PROPERTIES

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## ABSTRACT

In this study; The plant selection of Kanuni Park which is located at 39.969360 latitude and 32.836571 longitude in the Aşağı Eğlence Quarter of Keçiören district of Ankara province was investigated in terms of soil and climate requirements. In terms of soil analysis and literature studies, 7 different tree species (*Pinus nigra, Pinus sylvestris, Platanus orientalis, Catalpa bignonioides, Picea pungens, Ailanthus altissima, Cupressus sempervirens, Thuja plicata*) were found in Kanuni Park (*Lavandula angustifolia*), *Juniperus sabina, Rosmarinus officinalis L., Buxus sempervirens, Pyracantha coccinea, Berberis thunbergi*) aesthetic appearance, plant forms and environmental compatibility of plant selection according to their suitability were evaluated. The role of soil properties as well as climate in plant selection in parks or gardens is emphasized with examples in the study area. Therefore, it is important to carry out soil analysis before deciding on plant design.

As a result of this study, it is understood once again the importance of making decisions by evaluating soil and climate characteristics together in order to grow well-developed plants with high aesthetic quality and uniform forms in parks or gardens.

**Key words:** Neighborhood park, Soil analysis, Crop assessment, Ankara

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# THE EFFECTIVENESS OF TIME AND SEVERITY OF DEFOLIATION ON COLD HARDINESS OF DORMANT BUDS OF CV. KARAERIK (*V. VINIFERA* L.) GRAPEVINE

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## ABSTRACT

A traditional crop load regulation technique, leaf removal is a very innovative technique in viticulture used for crop management and the benefits effects has been demonstrated. The effects of defoliation (the first four, five and six basal leaves on main shoots) performed manually at three different phonological stages (pre-bloom, bloom and fruit set stages) on the cold hardiness of Karaerik (*Vitis vinifera* L.) dormant buds were studied, and compared with non-defoliated controls. Mean low temperature exotherm temperatures (mLTEs) of buds (the first 1st, 2nd, 3rd, 4th, 5th and 6th basal buds on main shoots) were evaluated by differential thermal analysis (DTA) in 2015. Additionally, cold hardiness of buds (the first 1st, 2nd, 3rd, 4th, 5th and 6th basal buds on main shoots) was determined by using a binocular microscope after opening buds with a razor blade, checking for tissue discoloration after winter temperature in 2016. Pre-bloom defoliation (four, five and six) improved bud freezing tolerance compared with both no leaf removal and other defoliation stages during vine hardening in both years. Moreover, pre-bloom leaf removal of five basal leaves per shoot did increase cold hardiness of dormant buds when compared to other leaf removal treatments and control. Vineyard mean air temperatures of -17.5°C caused the dormant bud kill that ranged from a mean of 8.30 % with one node (five leaf removal) to 98.46% with six nodes (four leaf removal). Field mortality levels of dormant buds were accurately bracketed by DTA estimates of mLTE values, which had been obtained in the middle of winter in 2015. In general, in all leaf removal treatments including the control, the buds on first node were exhibited more frost tolerance compared to other buds on the nodes. Pre-bloom leaf removal of five basal leaves per shoot could be used as a powerful technique by grape growers to improve cold hardiness of buds.

**Keywords:** *Vitis vinifera* L., Erzincan, defoliation, cold tolerance, Karaerik

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# A NEW PEST ON ALFALFA IN NORTHERN CYPRUS: *VANESSA CARDUI* (LINNAEUS, 1758) (LEPIDOPTERA: NYMPHALIDAE)

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## ABSTRACT

Livestock is one of the important agricultural activities in the economy of Northern Cyprus. The livestock sector, both sector provides input to industry and creates employment. Alfalfa is one of the main sources of feed in sustaining livestock. Alfalfa is long lived, highly nutritional value and yield which is a forage crop. Because water is scarce in northern Cyprus, alfalfa is grown in areas with irrigation opportunity.

In april 2019, based on growers complains for unknown harmfull pest in 23 da alfalfa fields in Paşaköy of Mağusa were examined. It was observed that almost all of the leaves of the alfalfa plant were eaten by the larvae except the stems. At the same time, a great number of larvae and pupae of Lepidoptera were found on plants. An average of 39 larvae were counted per square meter. 100 larvae and pupae were collected and were cultured in 20x20x30 cm plastic containers in the laboratory.

It was determined that all of the butterfly species were painted lady, *Vanessa cardui* (Linnaeus, 1758) (Lepidoptera: Nymphalidae). *V. cardui* is a migratory and polyphagous species that is widespread all over the world, except in certain regions of South America and rainforests. Although, the presence of this species is already known in the island of Cyprus, the damage of alfalfa was recorded in this study.

**Key words:** Alfalfa, damage, *Vanessa cardui*, painted lady, Northern Cyprus

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# A PRELIMINARY STUDY ON THE PREDATOR, *XYLOCORIS FLAVIPES* (REUTER) (HEMIPTERA: ANTHOCORIDAE) OF INSECT PESTS OF STORED IN NORTHERN CYPRUS

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## ABSTRACT

*Xylocoris flavipes* (Reuter) (Hemiptera: Anthocoridae) is an effective predator of stored pests. Nymphs and adults of *X. flavipes* are fed with eggs, larvae and pupae of insect pests of stored. *X. flavipes* are distributed in Africa, Australia, Europe and North Asia (except China), North America, South America and South Asia. This predator insect was first recorded in cereal stored of Northern Cyprus.

Studies for the detection of predatory and harmful insects in the same stored were conducted in the months of April in 2018 at totally 4 grain storehouses with capacity of 5.000-15.000 tons, including 1 in Akdoğan, 1 in Haspolat subject to Lefkoşa; and 2 in Mağusa (1 in Türkmenköy and 1 in İnönü). Sampling was made as aggregation from trashes in storage departments of each storehouse and from 5 different locations and different depths of stored product. Samples of nearly 1 kg were taken from aggregations prepared and put into fabric bags with the labels including information regarding the storehouse or storage information, and then brought to laboratory. Samples in bags were sieved and examined under stereo binocular. Larvae and adults of harmful insects were cultured in 2 liter plastic jars together with their nutrients in the laboratory and adults of *X. flavipes* were taken into 70% alcohol by means of soft tip brush.

At the end of the study, stored pests such as *Sitophilus zeamais* Motschulsky (Coleoptera: Curculionidae), *Cryptolestes ferrugineus* (Steph.) (Coleoptera: Laemophloeidae), *Latheticus oryzae* Waterhouse (Coleoptera: Tenebrionidae), *Ephestia kuehniella* Zeller (Lepidoptera: Pyralidae), *Sitotroga cerealella* Olivier (Lepidoptera: Gelechiidae), *Rhyzopertha dominica* Fabricius (Coleoptera: Bostrichidae), *Tenebrio* sp. (Coleoptera: Tenebrionidae), *Oryzaephilus surinamensis* Linnaeus (Coleoptera: Silvanidae), *Carpophilus* sp. (Coleoptera: Nitidulidae) and *Tribolium* spp. (Coleoptera: Anobiidae) were found in the same stored with *X. flavipes*.

**Key words:** *Xylocoris flavipes*, predatory, insect pests of stored, Northern Cyprus

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# EVALUATION OF AGRONOMIC AND MORPHOLOGİC CHARACTERİSTİCS OF DİFFERENT FENUGREEK GENOTYPES

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## ABSTRACT

The study was carried out in order to evaluate the morphological and agricultural characteristics of different fenugreek genotypes in the 2016-2017 vegetation period in Kahramanmaraş ecological conditions. In this research, the fenugreek genotype was used from 18 different places. The experiment was established according to the split-plot design with 3 replications. In all genotypes, 50% flowering time, ripening time, natural plant length, main stem length, number of bean per plant, bean length, number of seed per bean, seed yield, green yield, and hay yield were investigated as agronomic traits. Protein and ash content were also determined in all the genotypes.

According to the results of the research; 50% flowering period 139.33-145.33 days, maturation period 200.66-208.66 days, natural plant height 14.50-28.20 cm, the length of the main stem was found to vary between 42.26-63.41 cm. The number of bean per plant 8.83-24.46 piece /plant, the number of seeds in the bean 13.63-15.56 piece/bean, the length of the bean 10.77-14.35 cm, yield seed 97.81-199.38 kg/da, green grass yield 84-926 kg/da, dry grass yield was determined to be 15.05-155.68 kg/da. Genotypes; the ratio of crude protein was found to be between 18.87-22.78% and the crude ash ratio was 8.67-11.01%.

**Keywords:** fenugreek, *Trigonella foenum graecum* L., yield components

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# EFFECT OF SOLID STATE FERMENTATION WITH WHEY ON PHTIC ACID RATIO OF POMEGRANATE PEEL SUPPLEMENTED SUNFLOWER MEAL

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## ABSTRACT

In this study, it was aimed to decrease phtic acid ratio of the sunflower meal (SM) with pomegranate peel (PP) addition and subjected to the solid state fermentation (SSF) with whey (W). Experiment was conducted with six groups, the first group was SM + TW (tap water), the second group SM + W, the third group SM + W + 0.5% PP, the fourth group SM + W + 1% PP, the fifth group SM + W + 1.5% PP and the sixth group SM + W + 2% PP. The mixtures were prepared to complete 100 grams of sunflower seed meal with 0, 0,5, 1, 1,5 and 2 grams of pomegranate peel (PP), respectively. Each group consisted of eight replicates. Prepared mixtures were placed in 500 ml erlenmayers, 120 ml tap water was added to the mixing of first group and 120 ml whey was added in other groups and then mixed homogeneously. Four of the erlenmayers prepared for each group without being fermented were dried at room temperature. The remaining erlenmayers were fermented in 32°C±2 for 48 hours. After fermentation, in fermented and non-fermented feeds, phytic acid ratios and phytase activities were determined. As a result of the study; phytic acid ratio was decreased due to increased phytase activity. Finally, the was functional properties of sunflower seed meal have been gained.

**Keywords:** Sunflower meal, pomegranate peel, whey, solid phase fermentation, phytic acid

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# THE REVERSING EFFECTS OF ENDOPHYTE BACTERIA ON THE DROUGHT STRESSED PEPPER SEEDLING

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## ABSTRACT

This study was carried out as a pot test in climate room conditions in order to determine the effects of endophyte bacteria (EB) on the development of pepper seedlings grown under drought stress. In this study, one pepper cultivar (Mostar F1) grown under drought stress and two EB isolates (Ochrobactrum sp. CB36 / 1 and Bacillus sp. CA41 / 1) were employed in the study. EB application to seedling growing medium was 10 ml at the stage where the first cotyledon leaves were parallel to the ground at a density of 109 cfu / ml and 15 ml at the second application two weeks later. Approximately 7 weeks after the seed sowing, all pots were watered in equal amounts for the last time in order to create drought stress and irrigation was stopped completely. Water was not applied for 7 days and drought stress was formed. After stress condition, irrigation was reinstated and for 10 days, all pots were regularly irrigated and plants were reversed. Morphological, enzymatic and mineral changes in the reversed plants were investigated. Fresh shoot weight, dry shoot weight, fresh root weight, dry root weight, stem diameter, number of leaves, CAT, SOD, APX, MDA, K and Ca contents were examined. According to the results of the research, drought stress had negative effects on plant development in general and when the condition was reversed to normal, it was determined that the negative effects of the drought stress were ameliorated. EB had generally positive effects in some parameters (number of leaves, CAT, SOD, MDA etc.).

**Keywords:** Drought, endophyte bacteria, pepper, reversing, seedling development.

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# DETERMINATION OF SCREENING AND QUANTIFICATION OF ROUNDUP READY SOY, MON89788 AND A2704-12 IN PROCESSED AND NON -PROCESSED SOY-DERIVED PRODUCTS

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## ABSTRACT

This research was performed in Central Research Institute of Food and Feed Control in Bursa and supported by General Directorate Of Agricultural Research and Policies. In the research, 48 processed and un-processed food products –containing soy on the label- were purchased randomly from markets in Bursa, Turkey. The GMO screening was based on the detection of 35S promoter, NOS terminator, FMV and bar. No positive sample was found. Therefore, identification and and quantification of Roundup Ready Soybean, MON89788 and A2704-12 analyzes were not performed.

**Keywords:** DNA extraction, soybean, food, GMO quantification, MON89788, A2704-12, RRSoy

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# HARRAN PLAIN DIFFERENT FERTILIZER SOURCES EFFECT ON POMEGRANATE YIELD

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## ABSTRACT

This research was carried out at Koruklu Talat Demirören Research Station in Harran Plain between 2012-2016. The randomized blocks were constructed as three replications according to the experimental design. In the first experiment, chemical nitrogen fertilizer doses (0, 150, 300, 450 and 600 g N tree-1) were used, in the second experiment (0, 150, 300, 450 and 600 g N / tree equivalent) organic fertilizer doses and 3. In the experiment (control, vetch, vetch + 75 g N, vetch + 150 g N, vetch + 225 g N, vetch + 300 g N tree-1 was designed to be. According to the four-year yield values, the highest pomegranate yield in chemical nitrogen fertilizer experiment was obtained from N3 subject (110.78 kg tree-1), where 5539 kg da-1 and 450 g tree-1 nitrogen were applied. When we look at the average of 4 years in organic fertilizer experiment, the highest pomegranate yield of 4797.13 kg da-1 and 450 g tree-1 nitrogen equivalent of organic fertilizer O3 (95.94 kg tree-1) was obtained. Green fertilization + reduced nitrogen fertilizer doses to determine the effect of pomegranate yield 4 years in the experiment carried out the highest yield green fertilizer + 75 g tree-1 nitrogen equivalent of organic fertilizer applied Y2 subject 6250.25 kg da-1 (125.01 kg tree-1) obtained.

**Keywords:** Harran plain, nitrogenous fertilizer, organic fertilizer green fertilizer, pomegranate

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# İKİNCİ ÜRÜN MISIR BİTKİSİNDE SICAKLIĞIN VERİM ÜZERİNE OLUMSUZ ETKİLERİ

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## ABSTRACT

Bu çalışmada MGM 173393, MGM 144697, MGM 157028 ve MGM 116521mısır çeşitleri ve standart olarak P 3394, P 32T83, DK 5783 ve SHEMAL mısır çeşitleri bitki materyali olarak kullanılmıştır. İkinci ürün hibrit mısır çeşitlerinin tane verimi değerleri % 5 düzeyinde önemli bulunmuş, tane verimleri değerleri 939-667 kg/da arasında değişmiş, denemede kullanılan standart çeşitlerin ortalaması 822 kg/da, genel ortalama tane verimi ise 765 kg/da hesaplanmıştır. En yüksek tane verimi P 32T83 hibrit mısır çeşidinde, en düşük tane verimi MGM 157028 hibrit mısır çeşidinde bulunmuştur. Hibrit mısır çeşitleri MGM 173393, MGM 157028 ve MGM 116521 tane verimi bakımından hem standart çeşitler ortalaması, hem de genel ortalamanın altında yer almışlardır. MGM 144697 çeşidi ise Genel ortalamanın üzerinde verim vererek istatistiki olarak denemede standart olarak kullanılan P3394 mısır çeşidinden daha yüksek verim vererek DK 5783 çeşidiyle aynı grupta yer almıştır. Araştırmanın yürütüldüğü (2010) yıl kaydedilen iklim verileri (Temmuz, Ağustos ve Eylül aylarında) 40 ˚C'nin üzerinde ölçülen maksimum sıcaklık değerleri ve 38.7 mm gibi uzun yıllar ortalamasının (74.9 mm) altında düşük yağış yağış değerleri kaydedilmiştir. İklimin en önemli bu iki parametresi çeşitlerin gelişmesini ve döllenmesini olumsuz yönde etkilemiş, sonuçta sıcaklığın 32-36 ºC derecenin üzerine çıkması çeşitlerin verim performansını önemli ölçüde düşürmüştür.

**Keywords:** Mısır, iklim, sıcaklık, stres

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# USEFUL AND HARMFUL SPECIES AND THEIR DISTRIBUTION IN THE BARLEY AREAS OF VAN PROVINCE

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## ABSTRACT

Barley is the second most important cereal product produced after wheat in Van province. In this study, it was aimed to determine the harmful and beneficial species in barley cultivation areas in Van province and its affiliated provinces Erciş, Muradiye, Çaldıran, Tuşba, Özalp, Saray, Edremit, Gürpınar, Başkale, Gevaş, Çatak and Bahçesaray. The study was conducted in May-August 2017. Harmful and beneficial species were collected using sweepnet, observation-collection and pitfall traps. At the end of the study, 62 species belonging to 8 ordos and 40 families were found by sampling in 209 differrent fields. Species distribution was recorded as 17 species belonging to 9 families in Coleoptera, 11 species belonging to 8 families in Hemiptera, 11 species belonging to 9 families in Diptera, 11 species belonging to 8 families in Hymenoptera, 1 species belonging to 2 families in Odonoata, Neuroptera 2 species belonging to 1 family, 1 species from Lepidoptera and 2 species belonging to 1 family from Orthoptera. With this study, a comprehensive research has been completed fort he first time on the harmful and beneficial species, distribution areas and densities in the barley production areas in Van Province.

**Keywords:** Van, barley, fauna of harmful and beneficial species of barley, distribution areas

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# NOHUT BİTKİSİNDE BİTKİ SU STRES İNDEKSİ (CWSI) DEĞERLERİNDEN FAYDALANARAK KURAKLIĞA DAYANAKLI GENOTİPLERİN BELİRLENMESİ

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## ABSTRACT

Bu çalışmada bitki materyali olarak kullanılan 34 adet nohut genotipinin bitki su stres indeksi değerlerinden faydalanarak kuraklığa mukavemetleri test edilmiştir. Araştırma Siirt (Kurtalan İlçesi) çiftçi koşullarında 2015 yılında açık tarla koşullarında yürütülmüştür. Çalışmanın amacı faydalı nemi ekonomik bir randımanla kullanan nohut genotiplerini tespit etmek ve bu amaçla sulama öncesi ve sonrası yapılan yaprak taç sıcaklığı ölçümlerinden faydalanarak bitki su stres indekslerini (CWSI) belirlemektir. Yapılan varyans analizi sonuçlarına göre CWSI'i değerleri istatistiki olarak 0.01 önem seviyesinde farlılık göstermiştir. Yapılan LSD gruplamada ise İzmir-92, Cevdet Bey, Aydın ve Canıtez genotipleri en yüksek (0.49) CWSI'i değerleri ile A grubunda (1.grup) yer alırken, Diyar 95 ve İnci düşük (0.18) CWSI'i değeri ile H grubunda (Sonuncu grup) yer almıştır. Diğer genotipler ise bu iki grup arasında yer almışlardır. Sonuç olarak CWSI'i düşük çıkan genotiplerin diğerlerine kıyasla kurağa mukavim çeşit geliştirme (ıslah) çalışmalarında değerlendirilebilir özelliklere sahip olduğu, yüksek çıkanların ise hassas olduğu söylenebilir.

**Keywords:** Nohut, bitki su stres indeksi, kuraklık

# ENSURING THE WIND RESISTANCE OF URBAN TERRITORIES IS THE BASIS OF GREENERY SAFETY

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## ABSTRACT

Trees are one of the main components of city landscaping. They form the microclimate of the urban environment and the aesthetic perception of urban space. However, trees can also pose a threat to residents if they do not receive proper care. One of the care activities is pruning trees. Incorrect pruning reduces the vitality of trees, as well as their resistance to wind loads. Having lost stability, trees fall or break. Falling trunks and skeletal branches damage cars, various designs, and can lead to death of the person. On July 10, 2019, a storm passed through the city of Perm. This storm tumbled down a large number of trees in the city. Investigations into the causes of the fall of trees showed that in some cases these fall of the trees was caused by preliminary rash business activities of people. First of all, these activities include irresponsible pruning of tree crowns. Pruning was carried out without taking into account the wind regime of the territory, as well as without knowing the features of the formation of tree crowns. Pruning of trees should be carried out taking into account the mutual influence of their crowns on each other. It is especially important to consider this in areas where the wind speed increases due to the peculiarities of the location of houses. Near a growing tree, not only the crowns depend on each other, but also the root system is formed one-sided. In the case of pruning one of the two trees, the second tree also needs to be thinned or reduced in height to reduce the crown sailage. To form trees, it is necessary according to the method of structural pruning. The principle of structural pruning is the proper coordination of skeletal branches inside the crown. Another important point is the timely removal of natural seeding of trees and superfluous trunks of sprouting trees. Developing in this way, the trees form dense thickets. Subsequently, these thickets become the main source of trees dangerous for residents.

**Key words:** Wind resistance, urban greenery, structural pruning

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# SEARCH FOR MODERN MECHANISMS OF COMPETITIVE FUNCTIONING OF DAIRY FARMING UNITS

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## ABSTRACT

With the collapse of the Soviet State with its centralized planned economy in the late 20th century Russia faced the necessity to select a new socio-economic development mechanism. The market relations were chosen as the new mechanism. Initially this direction did not contribute to the expected increase in the efficiency of the economy, including the agricultural sector of the economy in the Russian Federation. On the merits, the development orientation of agriculture due to its organizational-economic, legislative and legal unpreparedness had a pseudo-market nature. This led to the elimination of many of the agricultural productive structures. Solving the problem is primarily linked with the adaptation to changing conditions and the internal and external environmental factors that allowed creating for agricultural enterprises stability conditions and viability in a competitive market. Special attention, in our view, should be directed to the development and implementation of innovative management practices at dairy companies. Crises in the agricultural economy, which began in 1991, had led to a reduction in dairy cows with 20.8 million up to 8.5 million head to the present date. The result of these events is the total reduction of the actual capacity of the Russian dairy market. Russia may consider experience of foreign economic entities in market terms for developing a strategy for strengthening the agricultural sector of the economy, including the production of milk. Scenario and directions of further development of dairy agricultural sector should be based on the state support in the management of financial and economic conditions to ensure expanded reproduction. The main ones are:

- guaranteed prices for dairy products and the elimination of price disparity;
- market conditions to minimize investment risks in the industry;
- the growth of subsidies for the purchase of forage and technical tools to improve the production and preparation;
- strengthening of material and technical base of agricultural producers based on the favorable conditions of long-term lending and adjustments to the legal framework of use of leasing;
- the practice of preferential tax treatment of milk producers;
- adjustment of the legal framework in order to strengthen the dairy business insurance.

The increase in the share of expenditures in the federal and regional budgets to support the agricultural sector in general, and the milk sector in particular is a path to agro-industry's effective functioning.

**Keywords:** Dairy farming, milk production, dairy industry, management efficiency, agribusiness.

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# FUZZY OPTIMIZATION MODEL OF VIRTUAL WATER EXCHANGE FOR AGRICULTURAL PRODUCTS

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## ABSTRACT

Nowadays, water resources researchers emphasize the revision of water resources management policies and approaches. One of the policies that have a significant impact on water resources is the management of virtual water trade. In this study, by developing a fuzzy optimization model, the optimal values of virtual water exchange for agricultural products were determined. The studied basin is Lake Urmia Watershed which is located in northwestern of Iran. The fuzzy optimization model was solved using Kumar and Jayalakshmi methods. The criteria of selecting the best model was considered the highest profit in return for lowest water withdrawal of the basin. For the study, 18 scenarios were defined based on two subjects which were available water (equal to present available water, 20% and 40% reduction in present available water) and crop pattern policy (no limitation for planting, 10< change rate of each crop area< 0.1 for a midterm plan and 2< change rate of each crop area < 0.5 for a short-term plan). The results revealed that if the amount of water withdrawn decreases by 40% and the second cropping pattern policy (intended for midterm changes in the basin) is implemented, the basin farmers' income would increase 21.5% by using Jayalakshmi method's optimal virtual water trade. This increased revenue is 0.35% more than the Kumar method. Moreover, by applying Jayalakshmi solving method, the crop areas were reduced from 0.13% to 0.86%. To meet the needs of the watershed, it is necessary to import crops from outside the basin which, at the same time, virtual water would be imported from outside too. Therefore, by employing the proposed optimization model, in one hand the maximum benefit will be provided for farmers, and on the other hand, virtual water imports would reduce basin water stress which is crucial for saving Lake Urmia.

**Keywords:** Fuzzy optimization, lake urmia, virtual water, water trade

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# CRITICAL APPROACHES ON EFFICIENT MANAGEMENT OF IRRIGATION WATER IN SOUTHEASTERN ANATOLIA REGION OF TURKEY

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## ABSTRACT

The amount of irrigation water more than 10 000 $m^3$/ha has been using in the most of irrigation schemes in Turkey. Approximately, only one third of total amount of water delivered from the reservoirs are used directly by crops. In addition, crop evpoatranspiration and irrigation water requirement are very high since climatic conditions such as higher air temperature and lower relative humidity in the Southeastern Anatolia Region of Turkey. For this, use of irrigation systems saved much more water and some other agronomic practices will be important. For instance, amount of irrigation water used could be decreased up to 5000-6000 m3/ha in case drip irrigation is used. In addition, water productivity (WP) is an important evaluation criteria in terms of efficient water use and sustainability. WP is defined as a value of product per used water. Water economic productivity (WEP) ($/m3) is also defined as net revenue per volumetric water and land economic water productivity (LEP) ($/ha) is net revenue per land. Water productivity must be evaluated and analysed based on plant, field, farm, irrigation scheme and basin levels. Gross water economic productivity, in other word, gross income per volumetric water was 0.27-0.68 $/m3 in the western regions of Turkey. According to the experimental results for winter wheat, cotton and corn, WEP in Souheatern Anatolia Region of Turkey was 0.13-0.22 $/m3. The values of WP and LEP ranged 19.6 - 0.36 kg/m3 and 430-1110 $/ha depending on different crops and regions, respecticely. The experimental results showed that surface drip (SD) and subsurface drip (SDI) irrigation provided water saving about 30-40 % compared to the conventional irrigation systems. SD and SDI also resulted in more WP, WEP and LEP. Thus, WP, WEP and LEP must be considered for sustainability, water physical and economical productivity. Use of drip irrigation system is one of the most appropriate way to save water and to increase water productivity.

**Keywords:** Irrigation, southeastern anatolia region, turkey, water management, water productivity

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# A SYSTEMATIC RESEARCH ON CANNABIS SATIVA L.

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## ABSTRACT

*Cannabis sativa* L. is an important herbaceous species originated in Central and East Asia. It also has a wide distribution range from the Caspian and Himalayas to China and Siberia. Cannabis is an annual and dicotyledonous flowing plant, commonly known as hemp. It is usually dioecious, but can also be monoecious. Throughout history, it has been counted among five major grains and used in the field of textiles, rope, paper and energy. Since the ancient times, some parts of cannabis plant have been utilized in folk medicine as well as an important source of textile fiber. This study presents the analysis of the micromorphology and anatomy, seed size variation and morphological features of the seeds of both drug- and fiber-type *Cannabis* according to the published literatures. Based on the size of seeds, these two types of *Cannabis* were easily distinguishable, and comparatively bigger sized seeds were observed in the fiber type. On the other hand, *Cannabis sativa* L. is the only valid name of the cannabis plant that is given to different taxa in different studies.

**Keywords:** *Cannabis sativa* L., hemp, drug type

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# EMBRYO CULTURE: A VALUABLE IN VITRO TOOL FOR FRUIT BREEDING

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## ABSTRACT

Embryo culture is a type of plant tissue culture that is used to grow embryos from an immature or mature zygotic or hybrid embryo under sterile conditions on an aseptic nutrient medium containing proper growth substances with the goal of obtaining a viable plant in in vitro conditions. In embryo culture, the plant develops directly from the embryo or indirectly through the formation of callus and then subsequent formation of shoots and roots. The technique has been developed to rescue immature zygotic, seedless triploid embryos or embryos from interspecific and intergeneric crosses and from embryos that do not fully develop naturally, to shorten the breeding cycle, to test the vitality of seeds, to provide material for micropropagation in forestry, and to bypass seed dormancy, production of rare species and haploid plants. In this review, embryo culture techniques, usage areas of embryo culture, factors affecting the success of embryo culture and the importance of embryo culture in rootstock production of fruit trees are reviewed**.**

**Keywords:** Embryo culture, hybrid embryo, embryo rescue, micropropagation.

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# DETERMINATION OF SPATIAL VARIABILITY IN SOME SOIL PROPERTIES USING DIFFERENT INTERPOLATION METHODS

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## ABSTRACT

Understanding of spatial variability of some soil parameters is crucial for determining soil health, productivity, and developing sustainable soil management strategies in agricultural lands. It was well known that there are critical important relationship between the yield and soil properties and topographic characteristics for precision agriculture. Interpolation methods are most useful for obtain the knowledge of characteristics, distribution and variability of soil parameters. This study was carried out in Düzce province to determine some soil physical and chemical properties in agricultural land uses. The objective of this work was to investigate the spatial variability of the properties with different methods and determine the relations pertaining to distance among them. For this purpose, one hundred and twenty five surface soil samples were collected from a soil sampling grid for determining some physical ( %clay, % silt, % sand) and chemical properties (pH, electrical conductivity (EC), calcium carbonate content) through the research area. It was produced descriptive statistics for each soil properties. Five different interpolation methods such as inverse distance weighting (IDW), radial based function (RBF), ordinary kriging, simple kriging and universal kriging were employed for analysing the spatial distribution of each soil parameters for sustainable agriculture, and spatial distribution maps of the each soil parameters were produced the most appropriate model obtaining the distribution. While determining the most appropriate methods for the research area, the method resulting in the lowest root mean square error (RMSE) value was computed as the most suitable one. Overall results showed that simple kriging produced smaller root mean square error than the other interpolation methods for clay, pH and EC but inverse distance weighting with power 1 was superior for sand and silt content of the research area.

**Keywords:** Soil physical and chemical properties, interpolation, spatial variability, geographic information systems

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# SERUM CHEMISTRY VARIABLES AND BRIX% AS PREDICTORS OF PASSIVE TRANSFER STATUS IN GOAT KIDS

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## ABSTRACT

The main objective of this study was to assess certain serum chemistry variables viz. Sodium (Na+), Potassium (K+), albumin (ALB), Alanine Transaminase (ALT), Aspartate Transaminase (AST) and Gamma Glutamyl Transferase (GGT) as predictors of passive transfer status through their comparison with Brix% (by Brix refractometer) in goat kids (n=26) of Dera Ghazi Khan district, Punjab, Pakistan. The blood samples were collected during January to April, 2018. The kids were divided as per breed (teddy and cross-bred), gender (male and female), age (1-4 days, 5 days, and above 5 days) and parity (1st, 2nd, 3rd and >3). The overall mean (±SE) values for Na+, K+, ALB, AST, ALT and GGT were 82.5±2.2meq/L, 5.0±0.5meq/L, 2.8±0.2U/L, 1444.4±32.1U/L, 735.1±32.3U/L and 223.0±3.7U/L, respectively. Overall mean Brix% value was 11.2±0.9% which coincided with IgG level of 43.25g/L. Only Na+ and K+ were significantly ($P \leq 0.05$) different within teddy and cross-bred kids being higher for the latter. Mean Brix% values for cross-bred and teddy were 10.9±0.2 and 11.6±0.3%, respectively coinciding with IgG values of 40.2 and 46.6g/L, respectively. The IgG level decreased as the kids got older, though non-significantly ($P \geq 0.05$). Regarding correlation coefficients, K+ was negatively and ALT was positively correlated to estimated IgG at $P \leq 0.05$. In a nutshell, results of our study indicate that teddy and cross-bred goat kids have substantial circulating IgG level. Furthermore, serum chemistry variables, especially ALT, can reliably be correlated with Brix% for establishing a passive transfer status.

**Keywords:** Passive transfer, serum chemistry, teddy goat, Pakistan

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# BIOLOGICAL OBSERVATIONS ON PACHYCERUS SEGNIS (GERMAR, 1823) (COLEOPTERA: CURCULIONIDAE) FEEDING ON HELIOTROPIUM EUROPAEUM L. WEED AT ARAS VALLEY

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## ABSTRACT

*Heliotropium europaeum* L. (Boraginaceae) is an annual plant species, economically important weed containing toxic alkaloids threating livestock. It is native to southern and central Europe, northern Africa, and western Asia. Beyond this distribution range, it is reported from Australia, Afghanistan, Pakistan, China, Russia and South Africa. In Australia, H. europaeum has directly caused losses of hundreds of millions of dollars to sheep production. The presence of this weed in different agroecosystem of Turkey is reported based on several published articles. The genus Pachycerus Schoenherr (Coleoptera: Curculionidae) include moderate sized weevils, distributed at Palearctic and African regions, and associated with Boraginaceae plants. The species Pachycerus segnis (Germar, 1823) (Cleonini) widely distributed Europe, North Africa and Asia including Turkey. The aim of this study is to determine life cycle of Pachycerus segnis preferring *Heliotropium europeum* as host plant. The field research was conducted in Iğdır territory along the Aras Valley during April-August 2019. According to investigation results that both adult and immature stages of *P. segnis* feeds on *H. europeum*. The eggs were laid on root including lateral branches by female fixated glued-similar secretion. The legless white integument colour larvae are freely able to move in sandy soil to reaching roots of host plant for feeding. Mature larva make solitary soil-case and pupa development occur in the same place at moderate deep of soil around host plant. Thereafter, new generation adults become occur inside soil-case, waiting some period for chitinization and melanisation in the same place before emergence from soil. This species produce one generation in a year in Aras Valley climatic condition.

**Keywords:** Pachycerus, Heliothropeum, weed, biological observation, Aras Valle

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# INSECT SPECIES SHARING OUR FOODS IN STOREROOMS OF IĞDIR CENTRUM

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## ABSTRACT

In the city centre of Iğdır province, 11 species of insects feeding on wheat, corn, rice, bean, flour, dried fruit (mulberry, date palm, apricot) which are found in storerooms are specified: Sitophilus oryzae Linnaeus (Coleoptera: Curculionidae), Cryptolastes ferrugineus (Stephens) (Coleoptera: Laemophloeidae), Rhyzopertha dominica Fabricius (Coleoptera: Bostrichidae), Tribolium confusum Jacquelin du Val, Tribolium castaneum Herbst, Latheticus oryzae Waterhouse (Coleoptera: Tenebrionidae), Oryzaephilus surinamensis Linnaeus (Coleoptera: Silvanidae), Acanthoscelides obtectus Say (Coleoptera: Chrysomelidae), Plodia interpunctella Hübner, Pyralis farinalis L. and Ephestia kuehniella Zeller (Lepidoptera: Pyralidae). Among these detrimental, it is determined that Tribolium confusum ve T. castaneum caused significant harm on wheat, while Oryzaephilus surinamensis did the same on corn, Sitophilus oryzae, Cryptolastes ferrugineus, Rhyzopertha dominica, Latheticus oryzae on wheat, and corn, Pyralis farinalis L. and Ephestia kuehniella on flour, Plodia interpunctella on dried fruits, Acanthoscelides obtectus on beans. The hot and semi- arid climate of the region causes a significant problem in the food stored in storerooms by affecting the reproduction capacity, development period and population size of insects positively. The determined species and the harm that they give to food are presented as digital data. On the other hand, the precautions that need to be taken for the protection of stored food from the insect harm were discussed.

**Keywords:** Storerooms pest, dried food, pest insects, Iğdır

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# THE WILD OF MUS TULIP IN MUS AND AROUND (*TULIPA SINTENISII* BAKER), PHENOLOGICAL, MORPHOLOGICAL CHARACTERİZATION AND RECOMMENDATIONS FOR TO BE CULTIVATED

**Şevket ALP**

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## ABSTRACT

Bulbous plants are ornamental plants that everyone knows, loves and adds color to life. Tulipa is one of the most produced and consumed Bulbous plants. Tulip; is a Bulbous plant that has attractive, bright colors and delicate forms, which is appreciated and used as an ornamental plant since the old times. There are 120 taxa in the world and 15 taxa in Anatolia. *Tulipa sintenisii* Baker in Gard (Muş Tulip) is an endemic species, was firstly collected by Paul Sintensis near Erzurum. There is natural Tulipa population within the borders of Mus Province. The tulip population is known as the widest spread over a wide area in Turkey. In this study, phenological and morphological characterization of wild Muş tulips is researched, which are naturally grown around Muş and the surrounding area. This study was carried on Muş TİGEM land in 2011. This land was divided into 5 parcels and each plot was carried out on at least 40 plants. Traits contemplated for tulips in selected plots in order to determine whether there are differences between populations. For this purpose two-factor analysis of variance is performed. Duncan multiple comparison test was performed to identify different groups followed by analysis of variance. 99% and 95% statistical interval of significance were applied for comparison and SPSS statistical software was used for the calculations. In the result, we obtained no major differences according to phenological and morphological characterizations between Muş tulips and the variety percentage of the population was lower. By this situation, the idea has been dominated that population came and spread from another source to the region. Efforts to ensure that the population in the Muş plain are meticulously preserved and maintained in its natural environment will also contribute to better transmission of the genetic reserve of the species to future generations.

Keywords: tulip (*Tulipa sintenisii*), Conservation, Cultivation, Genetic resource

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# FARMERS' POINTS OF VIEWS OF RURAL ISSUES AND THEIR RECOMMENDATIONS FOR SOLUTIONS: A CASE STUDY OF ÇARŞAMBA DISTRICT

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## ABSTRACT

The primary purpose of this study was to investigate the major problems encountered by farmers operated in Çarşamba District of Samsun Province, and also possible solution recommendations proposed by the participants. A stratified sample of 350 farmers was contacted through face to face interviews in the summer of 2016. Respondents were qualitatively asked to list the most important problems they faced in their agricultural activities as well as non-agricultural occupations in rural areas. A questionnaire was developed to collect data on farmers' socioeconomic characteristics and problems encountered during their production process, and their stay in the rurality. Farmers' recommendations for the solutions of the problems they identified were also asked in open-ended questions. Both quantitative and qualitative methods were used for data analyses. Descriptive statistics included frequencies, standard deviations, means, and percentages were used to analyze socioeconomic characteristics of farmers. Since this study was basically focused on the farmers' points of views of their problems and solutions, their comments on the open-ended questions were noted by the researchers during the data collection process. Researchers observations about the topic were also noted. Farmers responses on the main problems they faced were categorized considering the most frequently mentioned and stressed issues relating to farming and rural livelihoods. Research results showed that the major problems faced by farmers were lack of marketing opportunities for the farm commodities they produced, high input prices, improper shape and low-level production capacity of the lands owned by farmers, problems with plant protection, and lack of extension and training activities. Farmers suggest that the government should tame more initiative to solve these problems. Results of this study are expected to provide useful information for farmers, farmers' organizations, Ministry of Agriculture and Forestry, and non-governmental agencies in the region

Keywords: Farmers' problems, Rural issues, Farmers' points of views, Çarşamba

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# THE EFFECT OF DIFFERENT INTRAROWS DISTANCES ON SOME QUALITY CRITERIA OF SAGE (*SALVIA OFFICINALIS* L.) IN SIIRT ECOLOGICAL CONDITIONS

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## ABSTRACT

Sage (*Salvia officinalis* L.) is used as the material of this research was carried out in Siirt ecological conditions in 2018. The experiment in which distances of intrarows are applied in sage; It was established as a randomized block trial design with four replications in the experimental areas of the Faculty of Agriculture at Siirt University. In the experiment, the distance between the rows was 70 cm and the intrarows was 20, 30, 40, 50 and 60 cm. In the study, essential oil ratio (%) and essential oil components were determined. According to the results of the study, the effect of intarow distance on the number of plant height branch number of essential oil was statistically significant. When the results are evaluated generally; the highest volatile oil content of 1.15% from 20 cm intrarow distance, the lowest essential oil ratio was taken from 0.86% to 60 cm intrarow distance. á-Thujone's, Camphor, 1,8-Cineole, endo-Borneol, l-Limonene, Bornylacetat A, Epiglobulol, trans-Caryophyllene, alpha-Caryophyllene, A-Myrc main and a-Terpinene field was found to be mainly essential oil components.

Keywords: Salvia officinalis L., Camphor, 1,8-Cineole, Limonene, Essential Oil

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# EFFECT OF HYDROGEN PEROXIDE PRETREATMENT ON PHOTOSYNTHETIC DEVICE IN MAIZE SEEDLINGS UNDER COPPER STRESS

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## ABSTRACT

Although copper is a necessary micro element in trace amounts for plants, it over-accumulates in the plant structure, affecting many biochemical parameters, causing significant damage to cell components. Since copper (Cu+2) is a redox-active molecule, it affects tilacoid membranes adversely. The Cu + 2 ion can be displaced by the central atom of the chlorophyll pigment, Mg + 2, or displaced by the Mo + 2 ion, the cofactor of the key enzyme, in the cleavage reactions of water that releases O2. In addition, reactive oxygen species (ROS) can cause significant changes.

In this study, it was investigated on photosynthetic device whether hydrogen peroxide ($H_2O_2$) pretreatment, which has metabolic activities ending in copper stressed plants and has very important functions, is a remedy for the adverse effects of copper stress on maize (Zea mays) plants. Maize seedlings (Akpınar and 31G98 varieties) were grown in the plastic pots containing forest soil under controlled conditions for 25 ± 2 days and then cut from the above soil. A portion of the cut seedlings was treated with 10 mM $H_2O_2$ for 6 hours while the other group was kept in pure water. Each group was then exposed to 12 hours of pure water or 0.5 mM copper ($CuSO_4.5H_2O$). After application, samples were taken for biochemical data by liquid nitrogen followed, Copper content was determined by ICP device, abscisic acid (ABA) contents was determined by ABA Elisa kit, hydrogen peroxide content determined by spectrophotometric method, photosynthesis rate detemined by infrared gas analyzer, Elektron transfer rate (ETR) determined by OS1-FL, fluorometer, Rubisco content determined by westernblot method and Rubisco activity determined by spectrophotometric method. In the results obtained, copper stress caused significant changes in all parameters measured in both types of maize and that the $H_2O_2$ pretreatment under copper stress conditions provided significant improvements by increasing the photosynthesis rate, ETR and on the other parameters against the adverse effects of copper stress.

**Keywords:** Hydrogen Peroxide ($H_2O_2$), Maize, Copper (Cu) Stress, Photosynthetic Device

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# DETERMINATION OF SUITABLE SOWING TIME FOR KIRIK AND TIR IN ERZURUM CONDITIONS

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## ABSTRACT

In recent years, the importance of local varieties has been understood and various studies are being carried out in order to expand the sowing areas. The local varieties widely planted in East Anatolia Region are KIRİK and TİR bread wheat varieties with alternating character and can be cultivated as winter, freeze and summer. These varieties have high quality values, especially in breeding studies are used as parents. Kırık was registered by the Eastern Anatolia Agricultural Research Institute in 2010 and started to produce elite seeds. Seed demand is increasing gradually for the production of these varieties.

The aim of the study is to determine the appropriate sowing time in order to obtain high yield from local varieties. For this purpose, 3 different sowing time (winter, freze and summer) was applied in the Pasinler and Aziziye districts of Erzurum and the appropriate sowing time was determined using the data obtained in the experiment carried out in 3 replicates. In the trial, Palandöken 97 and Gerek 79 varieties, which are widely cultivated and winter type, were also used. When the results were evaluated, the differences between sowing times, varieties and locations were found to be significant ($p<0.01$). It was obtained the average of the highest yield from winter sowing (267,3 kg/da), the lowest yield from summer sowing (116,9 kg/da): when the locations were evaluated, the highest yield was obtained from Kırik (202.5 kg/da), the lowest yield from Tir (169.6 kg/da); when the locations were evaluated, the highest yield was obtained from the Pasinler location (201.0 kg/da), and the lowest yield from the Aziziye location (178.6 kg/da). As a result, Kırık and Tir local varieties reached the highest yield in freze sowing (respectively 226,7kg/da; 184,6 kg/da,); Palandöken 97 and Gerek 79 (respectively 375,3 kg/da; 321,0 kg/da) in winter sowing. In among the varieties, Kırik has the highest yield variety with 202.5 kg/da in terms of the general average of locations and planting times. The reason for this is due to the fact that all sowing-times have approximately average yield values.

**Keywords**: Kırik, Tir, sowing time, yield

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# DETERMINATION OF THE YIELDY AND WINTER DURABILITY CHARACTERISTICS OF SOME BREAD WHEAT (*TRITICUM AESTIVUM*) GENOTYPES IN AQUEOUS CONDITIONS

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## ABSTRACT

Bread wheat is the most important plant species used in human nutrition and most of the daily protein and calorie needs of people are met from this plant. 25 advanced bread wheat lines, 1 candidate for registration and 4 bread wheat varieties have been compared in terms of yield and 3 different (-17, -19 and -210C) cold level parameters in this study. Durable genotypes were determined according to the LT50 value (the degree when 50% of the plants perish with cold stress). As a result of the observations, it was noted that lines 14, 16, 17, 21, and 27 were superior in terms of resistance to cold and lines 6 and 15 displayed superiority in terms of yield compared to the other varieties. It is concluded that these lines may be suitable variety candidates for wheat cultivation in the region. Furthermore, it has been concluded that it is important to include cold test studies in breeding programs in regions like the East Anatolia Region where harsh winters prevail.

**Keywords:** Plant breeding, bread wheat, cold resistance

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# YIELD AND QUALITY CHARACTERISTICS OF RHODES GRASS (CHLORİS GAYANA) GENOTYPES SELECTED IN THE SECOND CYCLE OF RECURRENT SELECTION IN THE BREEDING PROGRAM UNDERMEDITERRANEAN CONDITIONS IN TURKEY

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## ABSTRACT

This research was carried out to develop Rhodes grass (*Chloris gayana*) varieties with high yield and quality as well as being suitable for forage production and pasture establishment in the regions with Mediterranean climate in Turkey. In the research, 100 genotypes of Rhodes grass selected in the second cycle of recurrent selection from a population of Rhodes grass in the breeding program were studied in plant height, green forage yield, hay yield as well as ADF, NDF and crude protein contents. The Field experiment was conducted at the Eastern Mediterranean Agricultural Research Institute during the years of 2014-2016. According to the two-year averages, the highest plant height (135 cm), green forage yield(6513 g/plant), hay yield (942 g/plant), lowest ADF ratio (35.89%), NDF ratio (70.28%) and highest crude protein ratio (15.68%) was obtained from the lines of 31, 91, 50, 1, 3 and 1, respectively.

**Keywords:** Breeding, Rhodes grass, warm season grasses

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# FUNCTION OF TRICHOMES IN PLANTS

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## ABSTRACT

The focus in plant biology has shifted from studying the organization of the whole plant or organs towards the single cell. Trichomes are special hairs found on the plant surface of about 30% of vascular plants. They exhibit high diversity between species, within species or even individual plants in shape or the compounds they secrete. Glandular trichomes are an important source of essential oils that can be used by the pharmaceutical industry, for protection against herbivores and pathogens. In classical breeding programs or genetic engineering, it is aimed to optimize trichome density and physiology to facilitate essential oil production or to enhance crop protection. Seed companies are currently marketing varieties of glandular-haired alfalfa (*Medicago sativa*), with resistance to the potato leafhopper (*Empoasca fabae*). This study is targeting to provide information to researchers on plant trichomes with a special focuse on forage crops.

Keywords: Trichomes, crop protection, forage crops

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# TÜRKİYE'DEKİ SIĞIR YETİŞTİRİCİLİĞİNİN SÜRDÜRÜLEBİLİRLİĞİ VE GIDA GÜVENLİĞİ AÇISINDAN SÜT ÜRETİMİNİN ÖNEMİ

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## ÖZET

Kişi başına yıllık kırmızı et üretimi ortalaması Türkiye, Afrika, Asya, Amerika ve Avrupa için sırasıyla; 16,3 kg, 10,6 kg, 22,2 kg, 47,2 kg ve 51,4 kg'dır. Domuz eti hariç, kişi başına yıllık kırmızı et tüketimi sırasıyla; 16,3 kg, 9,1 kg, 6,3 kg, 29,8 kg ve 16,8 kg'dır. Diğer taraftan tereyağı üretimi hariç tutulmak kaydıyla kişi başına yıllık süt üretim rakamları sırasıyla; 90 kg, 193,9 kg, 43,8 kg, 60,3 kg, 168,8 kg ve 215,1 kgdır. Dünya'da hayvansal protein üretiminin ürünlere göre dağılımında %47 ile et üretimi önemli bir paya sahiptir. Et üretimini, süt, su ürünleri ve yumurta üretimi izlemektedir. Türkiye'de ise hayvansal protein üretiminin %51'i ile süt ilk sırada gelmektedir. Süt üretimini, et, yumurta ve su ürünleri üretimi izlemektedir. Kişi başına hayvansal protein üretimi açısından Türkiye 32 gram hayvansal protein üretimi ile Dünya ortalamasının üzerinde, ülkeler arasında ise 87. sırada yer almaktadır (FAOSTAT, 2013).

Türkiye 17 milyon büyükbaş hayvan, 46 milyon küçükbaş hayvan, 1300 baş domuz, 38 milyon kanatlı hayvan, 7 milyon 991 bin kovan varlığına sahip olup, yıllık 22 milyon ton süt, 1 milyon 389 bin ton kırmızı et, 2,1 milyon ton kanatlı eti, 114 bin ton bal ve 1 milyon 205 bin ton yumurta üretimi ile önemli bir potansiyele sahiptir (TUİK, 2017).

Kişi başına canlı hayvan üretimi 1980 yılında koyun, keçi ve sığır türleri için sırasıyla; 1,09 baş, 0,43 baş ve 0,36 baş iken 2018 yılında azalarak aynı hayvan türleri için sırasıyla; 0,43 baş, 0,21 baş ve 0,13 baş olarak belirlenmiştir. Diğer taraftan 2001 yılında kişi başına süt üretimi 148 litre iken, 2018 yılında artarak 274 litreye ulaşmıştır (TUİK, 2018). Türkiye 2050 yılı nüfusunun yaklaşık 93 milyon kişiye ulaşacağı varsayılırsa, nüfusun gelecekteki hayvansal protein ihtiyacının karşılanması açısından süt üretimi ve üretimdeki payı itibariyle sığır yetiştiriciliğinin stratejik bir öneme sahip olacağı öngörülmektedir.

2013 yılı inek sütü ve sığır canlı ağırlık piyasa fiyatları sırasıyla, 489,7 $/ton ve 4.957,6 $/ton iken, 2017 yılında inek sütü piyasa fiyatı 338,6 $/tona gerilemiş, sığır canlı ağırlık piyasa fiyatı ise 5635,7 $/tona yükselmiştir (FAOSTAT, 2017). Diğer taraftan 2016-2017 yılları arasında üretilen çiğ süt ile buğday ve arpa alım gücü artarken, mısır, fabrika karma yemi ve mazotun alım gücü gerilemiştir (TDSYMB, 2017). Piyasada çiğ süt aleyhine gelişen bu tablonun gelecek yıllarda da devam etmesi, sığır yetiştiriciliğinin sürdürülebilirliği ve buna bağlı olarak hayvansal proteinin önemli bir kaynağı durumundaki çiğ süt üretiminin geleceği açısından risk oluşturmaktadır.

**Anahtar Kelimeler:** Nüfus, Hayvansal Protein, Sığır, Çiğ Süt, Kırmızı Et.

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# DETERMINATION OF FEED VALUE OF GONOCYTISUS ANGULATUS L. SPACH IN DIFFERENT SEASONS

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## ABSTRACT

There are three species of Gonocytisus shrubs; *G. angulatus, G. dirmilensis, G. pterocladus* that grow naturally in Turkey and, that belong to the Fabaceae or Leguminosae family. *Gonocytisus angulatus* is native to the eastern Mediterranean and can grow to 5 m. They are mostly found in maquis shrublands and rocky areas and common in places up to 1000 meters above sea level.

The aim of this study was to determine the changes in the seasonal nutrient contents of leaves and stems of *Gonocytisus angulatus* L. Spach, which is widely grown under the ecological conditions of the Saricakaya Valley of Eskisehir Province.

The study was conducted on 15 selected specimens in 2010 from *Gonocytisus angulatus* shrubs. The samples were collected from three different periods as spring, summer and autumn. The plant leaves and stems samples were oven-dried at 48°C for 72 hours, then analyzed for chemical composition. Dry matter (DM) was determined by drying the samples at 105 °C for 4 h while total ash was determined by igniting the samples in muffle furnace at 550 °C for 4 h. Nitrogen (N) content was measured by the Kjeldahl method (AOAC,1990). Crude protein (CP) of samples was calculated as N x 6.25. Cell wall contents (NDF and ADF) of samples were determined using the method described by Van Soest et al., 1991. Condensed tannin (CT) of samples was determined by butanol-HCl method as described by Makkar et al., 1995. The samples were exposed to *in vitro* digestion using ANKOM DAISY$^{II}$ incubator (Ankom Technology Corporation, Fairport, NY, USA) using the method outlined by Goering and Van Soest (1970). Data for nutrient content were analyzed using the General Linear Model (GLM) procedures based on a 3×2 factorial arrangement of season, plant parts and their respective interactions. Duncan's multiple range test was used to evaluate the significance of the difference.

The nutritional contents of spring period samples were found to be higher than those of autumn and summer period samples ($P<0.01$). Also, nutritive values differed significantly ($P<0.01$) between different plant parts. The CP content of leaves (231.4 g kg-1 DM) was significantly ($P<0.01$) higher than that of stems (195.2 g kg-1 DM). The CT contents of the leaves and stems were 37.0 g kg-1 DM and 25.9 g kg$^{-1}$ DM respectively and results indicated that *Gonocytisus angulatus* L. Spach had lower CT contents than 5% of DM. Results showed that the *in vitro* true digestibility of dry matter (IVTDDM) in *Gonocytisus angulatus* L. Spach decreased depending on maturity, and NDF, and ADF contents increased. Results also indicated that *Gonocytisus angulatus* L. Spach due to its high CP content is a valuable source of forage for livestock.

Although the shrubs generally have woody structures, they have a significant amount of soft tissue, such as leaves and fresh stems. Some ruminants, especially goat and sheep, can consume these soft tissues and meet their quality forage requirements throughout the year, which suggests that shrub lands can be used as pastures.

**Keywords:** Shrubs, nutrient content, feed value.

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# OPTIMUM DRYING TEMPERATURE OF BASIL LEAVES IN INFRARED DRYER

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## ABSTRACT

In this study, basil leaves were dried at different temperatures to determine the optimum drying temperature in infrared heat dryers. The basil leaves were dried at, 67 °C, 69 °C, 71 °C, 73 °C, 75 °C, in the drying oven. Specific energy consumption of leaves during drying time and their moisture contents according to dry and wet basis were determined. Whereas the initial moisture contents of leaves were 6,04 g water / g dry matter, this value decreased to 0.0851 g water / g dry matter after drying process. With regard to specific energy consumption, it was between 28,80 MJ / kg and 37,21 MJ / kg. Whereas the dry product quality obtained in all experiments varied, all other parameters including the color, aroma, odor, and energy consumption were optimum at 73 °C. The drying processes below this degree causes increase of aroma and smell in paralel with energy consumption. On the other hand, at higher temperatures from 73 °C smell, aroma and energy consumption decrease.

**Keywords:** Infrared drying, Basil leaves, Dry.

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