INTERNATIONAL JOURNAL OF ANATOLIA AGRICULTURAL ENGINEERING SCIENCES
-IJAAES-

ULUSLARARASI ANADOLU ZİRAAT MÜHENDİSLİĞİ BİLİMLERİ DERGİSİ -UAZİMDER-

Uluslararası Hakemli Dergi

International Pear Reviewed Journal

INTERNATIONAL JOURNAL OF ANATOLIA AGRICULTURAL ENGINEERING SCIENCES
-IJAAES-

e-ISSN : 2667-7571
Yıl / Year : 2019
Cilt / Volume : 1
Sayı/ Issue : 1

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İÇİNDEKİLER/CONTENTS

UAZİMDER Uluslararası Anadolu Ziraat Mühendisliği Bilimleri Dergisi ISSN : 2667-7571
IJAAES International Journal of Anatolia Agricultural Engineering 2019 (1): 1-6

Teslim / Received: 10.12.2018 **Araştırma Makalesi / Research Article**
Kabul Edilme / Accepted: 15.01.2019

Elma Yetiştiriciliğinde Meyve Kalitesi Üzerine Polinasyonun Etkisi

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Özet

Çalışma Ordu ekolojik koşullarında yürütülmüştür. Bölgede fındık iç kurdu ile mücadele dönemi elmaların çiçeklenme dönemine rastlamakta ve bal arıları kimyasal ilaçtan zarar görmemesi amacıyla bölge dışına çıkartılmaktadır. Daha önceden yapılan gözlem ve değerlendirmelerde yetersiz tozlanmaya bağlı olarak elma meyvelerinde önemli düzeyde şekil bozukluğu görülmüştür. Bu amaçla, 2013 yılı hasat döneminde Sınap elma çeşidinden ekonomik verim çağında ve tahminen 25 yaşında bir ağaç seçilmiş ve ağaç üzerindeki meyvelerin tamamı hasat edilmiştir. Hasat edilen meyvelerin toplam miktarı 82,5 kg olarak belirlenmiştir. Bu miktarın % 6'sı (5kg) ekstra, % 24'ü (20 kg) 1. sınıf ve % 70'i (57.5kg) 2. sınıf (bozuk şekilli, küçük ve çürük…) olarak tespit edilmiştir. Ortalama meyve ağırlığı Ekstra sınıf olan elmalarda 101.36 g, 1. Sınıf elmalarda 91.86 ve 2. Sınıf elmalarda ise 46.38 g olarak bulunmuştur. 2.Sınıf elmalarda genel olarak çekirdek oluşumu gözlenmemiş ya da yeterli düzeyde çekirdek gelişmemiş, bu sınıf elmalarda şeklin bozuk olduğu, meyvelerin yeterince gelişmediği, pazar değerinin olmadığı belirlenmiştir.
Anahtar Kelimeler: Elma, Sınap elması, polinasyon, meyve kalitesi, yetersiz tozlanma

The Effect Of Pollination On Fruit Quality In Apple

Abstract

The study conducted in Ordu. The nut weevil (Curculio nucum L) with the fighting in the region of the inner nut and honey bees period coincided apples blooming period in order to avoid damaging chemicals outside the region. Observations and assessments made previously disqualified dusting apple fruits as related disorder was a significant level of shape. During the 2013 harvest year, and an estimated age of 25 years Sınap cv apples picked from a tree and a tree full of fruit harvested on the agents. Total Amount of harvested fruit were determined as 82.5 kg, 6% of this amount (5kg) extra, 24 % (20 kg) class 1 and 70 % (57.5 kg) 2nd class (shape, small size, rotten) as detection agents. The average fruit weight maintenance 101.36 g of apples with extra class, 1st class and 2nd grade apples apples 91.86 g is found to be 46.38 g. In general, there was the formation of core enough apples or 2nd year core rudimentary level, this class is garbled shape apples, fruits enough not growth, there is no market value is determined.
Keywords: apple, Sınap apple, polinasyon, fruit quality, poor pollination

1.Giriş

Dünya'da çok geniş yayılma alanı gösteren elmanın yetiştiriciliği Güney ve Kuzey yarımkürenin 40° ve 50° kuzey enlemlerinde, Avrupa ve Kuzey Amerika'da 30°ve 40° kuzey enlemlerinde, Asya'da 20° ve 40° güney enlemlerinde olmak üzere güney yarımkürede yoğunluk kazanmıştır (Eren ve ark. 2009). Elma (*Maluscommunis L.*) *Rosales* takımı, *Rosaceae* familyası, *Pomoidea* alt familyası ve *Malus* cinsine girer (Janick and Moore, 1975). Ilıman iklim meyve türleri içerisinde elma en fazla üretilen ve tüketilen türdür. Besin değeri son derece yüksektir. Elma fosfor, kalsiyum, potasyum, sodyum, magnezyum, silisyum gibi bir çok mineral maddeler ile organik asitler, meyve asitleri ve doğal aroma maddeleri içerir. A, B1, B2, C ve E vitaminleri bakımından oldukça zengindir. İnsan sağlığı için çok faydalı olan elmanın beslenme rejimlerinde kullanılan bir meyve olması, yağ içermemesi, günümüzün

sağlıklı beslenme eğilimleri doğrultusunda ürüne vazgeçilmez meyve özellikleri yüklemiştir (Anonim, 2007).

Dünyada 6000'den fazla önemli elma çeşidi olduğu bildirilmektedir, fakat bunların çok azı ticari olarak öneme sahiptir (O'Rourke, 2003). Ticari elma üretimi daha çok üretiminde ve pazarlamasında güçlü avantaja sahip bölge ve ülkelerde yoğunlaşmıştır. Ayrıca sıcağa toleranslı ve uzun vejetasyon gösteren çeşitlerin (Örn; Granny Smith, Pink Lady) geliştirilmesiyle yetiştiricilik daha sıcak bölgelere de yayılmıştır. Son yıllarda Kuzey Amerika, Güney Afrika, Yeni Zelanda ve Avustralya'da ileri düzeyde elma yetiştiriciliği yapılan alanlar oluşmaktadır. Böylelikle dünyanın çok farklı coğrafik, ekolojik kültürel ve sosyo ekonomik koşullarında elma yetiştiriciliği yapıla gelmektedir (Yıldırım, 2006). Dünyada elma üretim miktarı 83.139.326ton olup, Çin 41.391.500 ton ile ilk sırada yer almaktadır. Türkiye ise 3.032.164 ton üretim ile 3. sırayı almaktadır (Anonim, 2018a) (Çizelge 1).

Ülkemiz bağ bahçe tarımı açısından son derece elverişli iklim özelliklerine sahip olup, tarımsal alanlarının % 12'sinde meyvecilik yapılmaktadır. Meyve ekolojik şartların uygun olması nedeniyle yurdumuzun hemen hemen her yerinde yetiştirilebilmekle birlikte son yıllarda belirli bölgelerde yoğunlaşmış durumdadır (Eren ve ark., 2009).Türkiye'de meyve üretiminin % 23.9'unu yumuşak çekirdekli meyve türleri almaktadır. Yumuşak çekirdekli meyve türleri içerisinde ise ağaç sayısının % 70'ini ve meyve üretiminin % 83,7'sini elma oluşturmaktadır (Yaşasın ve ark., 2006). 2018 TÜİK verilerine göre, ülkemizdeki yumuşak çekirdekli meyvelerin üretim miktarı 3.728.742 ton olup, bunun 3.032.164 tonu elmadan elde edilmektedir. Ülkemizdeki meyve veren elma ağaç sayısı ise 55.771.000 adettir (Anonim, 2018). Ülkemiz elma üretiminde ilk beş sırada yer alan iller ve üretim miktarları Çizelge 2.'de gösterilmiştir.

Çizelge 1. Türkiye Elma Üretiminde İlk Beş Sırada Yer Alan İller ve Üretim Miktarları (TUİK, 2018b).
Table 1. Top Five Provinces of Apple Production in Turkey

İller	**Üretim miktarı (ton)**
Karaman	398.085
Isparta	382.995
Niğde	376.906
Antalya	281.019
Denizli	196.329
……	
Ordu	6.532

Ekolojik özellikler bakımından büyük farklılıklar gösteren ülkemizde her bir farklı ekolojiye uygun ve mahalli olarak yetiştirilen500'ün üzerinde elma çeşidi bulunmaktadır. Türkiye, elma türlerinin gen merkezi durumunda olup, bu türlere ait kültür formlarının çoğu burada meydana gelmiştir (Güleryüz, 1977; Özbek, 1977).

Bitki türlerinde tozlaşma ve döllenme oluşumunda bazı farklılıklar gözlenir. Aynı çiçekteki çiçek tozları dişicik tepesine temas ederek veya aynı bitkideki başka çiçeklerden rüzgar ya da böcekler vasıtası ile çiçek tozu transfer edilerek, tozlaşma sağlanmaktadır. Böyle bitkilere "kendine tozlar" veya "kendini döller" bitkiler denmektedir. Birçok bitki türünde ise meyve ve tohum bağlamanın gerektiği gibi olabilmesi için bu bitkinin çiçeğindeki dişicik tepesine çiçek tozlarının aynı türe ait bir başka bitkinin çiçeğinden gelmesi gerekmektedir. Bu bitkilerdeki tozlaşmaya da "yabancı tozlaşma" (krospolinasyon) adı verilmektedir. Elma, armut, erik, kiraz ve badem gibi meyveler genel olarak kendine kısır durumda iken şeftali, nektarin, kaysı ve vişne kendine döller çeşitlerden oluşmaktadır (Free, 1992, 1993; McGregor,1976).

Çizelge 2. Yıllara Göre Ülkelerin Elma Üretimi (FAO, 2018a).
Tabe 2. Apple Product of CountriestoYears (FAO, 2018a).

Ülkeler	**Üretim (2010)**	**Ülkeler**	**Üretim (2012)**	**Ülkeler**	**Üretim (2017)**
Çin	33.263.000	Çin	37.000.000	Çin	41.391.500
ABD	4.214.599	ABD	4.110.046	ABD	5.173.670
Türkiye	2.600.000	**Türkiye**	2.889.000	**Türkiye**	3.032.164
İtalya	2.204.972	Polonya	2.877.336	Polonya	2.441.393
Polonya	1.877.906	Hindistan	2.203.400	Hindistan	2.265.000
Dünya Toplam Elma Üretimi (Ton)					83.139.326

Elma çiçekleri de diğer birçok bitkiler gibi meyve teşekkülü için tozlaşmaya gereksinim gösterirler (Özbek, 1977). Elma çiçekleri genel olarak kendine verimli değildir. Çiçektozları normal yapıda ve çimlenme yeteneğinde, yumurta hücresi de normal yapıda olmasına rağmen, kendiyle uyuşmazlık göstermelerinden dolayı meyve tutumu az olmaktadır. Elma çeşitlerinin bir kısmı kromozom yapısı bakımından diploittir. Böyle çeşitler genellikle düzgün şekilli, homojen irilikte ve yüksek oranda çimlenen çiçek tozu oluşturur. Bu nedenle, elma bahçelerinde tozlayıcı (pollinizer) olarak diploit (2n=34) elmalar kullanılır. Elma çeşitlerinin bir kısmıda 51 kromozoma sahiptir. Böyle çeşitlere triploid denir. Triploid çeşitlerin tamamı kendine kısırdır. Elma çeşitlerinde tozlaşma böcekler, bunun da % 90'ı arılarla sağlanır. Arı çiçek zamanında çok önemli olup açık, sakin ve güneşli havada çok iyi çalışır. Sıcaklığın 14 ºC'nin altında olduğu havalarda arı hemen hemen hiç çalışmaz. 29 ºC'nin üzerinde ise çalışma yavaşlar (Anonim, 2009). Tozlamayı sağlamak üzere elma bahçeleri için 1 hektara 4 kovan arı konmalıdır.

Tozlaşma sonucu döl1enen elma çiçeklerinde meyve teşekkül etmekte ve meyveler içerisinde de çekirdekler oluşmaktadır. Çekirdekler de çevredeki doku yapımını kamçılayan auxin meydana getirmektedir. Meyve oluşumu için yumurtalık içerisindeki her yumurtanın döllenmesi gerekli olmamakla beraber çekirdeklerin iri ve çok sayıda olması meyve gelişmesine olumlu etki yapmaktadır. İyi bir meyve oluşumu için bir meyvede 6-7 çekirdeğin bulunması gerektiği belirtilmektedir (Özbek, 1977; Özbek, 1978).

İyi döllenmiş bir elmada 10 taneye kadar çekirdek bulunur. Tohumun gelişmesi, elmanın yenen kısmının gelişmesini de etkiler. Örneğin 3 tohumlu bir elmada 3'ü de aynı yüzeyde ise o yüzey hızlı, öteki yüzey yavaş gelişir (Anonim, 2009). İyi bir tozlanma ve döllenme olmadığı takdirde meyveler gelişmelerini tamamlayamayarak dökülür. Döllenmenin noksan olduğu durumlarda, birkaç tohum taslağının teşekkülü sonucu meyveler ağaç üzerinde kalsalar bile bunlarda da meyve şekli bozulmakta ve sofralık değeri düşmektedir.

1.1. Elmanın Sınıf Özellikleri

1.1.1.Ekstra

Bu sınıfa üstün kalitedeki elmalar girer. Bunlar şekil, irilik ve renk bakımından, yetiştikleri bölgeye göre, çeşidin özelliklerini taşımalı, meyve sapı zedelenmemiş olmalıdır. Nitelik bakımından meyvenin genel görünüşünü ve ambalaj içindeki durumunu etkilemeyecek çok hafif yüzeysel kabuk özürleri bulunabilir. Ürünün dış görünüşünde ambalaj içinde sunumunu ve kalitesini etkilemeyecek çok hafif yüzeysel kusurlar dışında kusur bulunmamalıdır. Çeşidi garanti edilmemiş elmalar ve tanımlanmamış karışımlar bu sınıfa girmez.

1.1.2. Sınıf I

Bu sınıfa iyi kalitedeki elmalar girer. Bunlar, yetiştikleri bölgeye göre, çeşidin tipik özelliklerini göstermeli ve meyve eti sağlam olmalıdır. Şekil, renk ve gelişme bakımlarından hafif özürler kabul edilebilir, sap hafifçe zedelenmiş olabilir.

Kabukta, nitelik bakımından meyvenin genel görünüşünü, kalitesini, depolanmasını ve ambalaj içinde sunumunu etkilemeyecek derecede hafif kusurlar, aşağıdaki sınırları aşmamak ve her meyvede bunlardan yalnız bir tanesi bulunmak koşulu ile kabul edilir. Bunlar hafif şekil kusurları, hafif gelişme kusurları, hafif renk kusurlarıdır. Sınırları geçmemek üzere hafif kabuk kusurları, uzunluğu 2 cm'yi geçmeyen kusurlar, bulunduğu takdirde diğer özürler alanının toplamı 1 cm^2'yi, kara leke alanı ise 0,25 cm^2'yi geçmemeli, hafif çürüme alanı 1 cm^2'yi geçmemeli ve renk değişimi olmamalıdır. Meyve sapı bulunmayabilir, sap kırığı varsa temiz olmalı, kabuk ile bitişik olduğu kısımda hasar bulunmamalıdır.

1.1.3. Sınıf II

Bu sınıfa, daha üst sınıflara giremeyen, fakat genel özellikleri karşılayan elmalar girer. Bunlarda şekil, gelişme ve renk bakımlarından meyvenin özelliklerini ve depolanmasını etkilemeyecek özürler bulunabilir. Meyve kabuğu zedelenmemiş olmak koşulu ile sap kopmuş olabilir. Meyve etinde belirgin özürler bulunmamalıdır. Her meyvede aşağıdaki sınırları aşmamak koşulu ile kabuk özürleri bulunabilir. Bunlar şekil kusurları, gelişme kusurları, renk kusurlarıdır. Sınırları geçmemek üzere hafif kabuk kusurları, uzunluğuna boyu 4 cm'yi geçmeyen özürler, bulunduğu takdirde, diğer özürlerin toplam alanı 2,5 cm^2'yi, kara leke alanı ise 1 cm^2'yi geçmemelidir. Hafif çürüme alanı 1,5 cm^2'yi geçmemeli ve hafif renk değişimi olabilir. Ürünün dış görünüşünde ambalaj içinde sunumunu ve kalitesini etkilemeyecek kusurlar kabul edilir.

2. Materyal Ve Yöntem

Çalışma Sınap elması üzerinde yürütülmüştür. Sınap elması, et rengi beyazımsı-sarı, kabuk rengi sarı-beyaz üzerine kırmızı yanaklıdır. Sulu bir elma çeşidi olup mayhoş bir tadı vardır. Sınap elması Eylül sonu Ekim ortasında hasat edilir. Dayanıklı bir elma çeşididir. Raf ömrü uzundur.

Çalışma Ordu ili Öceli mahallesinde (Ordu Merkez'in güney-batısında ve Merkeze 3 km uzaklıktadır) yürütülmüş ve çalışma yerinin koordinatları Enlem: 40,958º, Boylam: 37,865 º, Rakım: 175 m olarak belirlenmiştir.

Ordu ilinde iklim kışlar serin, yazlar ılık geçer. Yılın hemen hemen bütün aylarında yağış vardır. Kıyıya paralel uzanan dağlarla sahil arasında geçiş iklimi görülür. Burada kıştan bahara bilhassa yaza geçiş yavaş olur. Sonbahar ılık olup, kış ortasına kadar sürer. Kar yağışı kıyılarda çok azdır ve kısa sürer. Buna karşın iç kesimlerde kar yağışı hem yoğundur, hem de kış mevsimi uzun sürer. 52 yıllık ortalama verilere göre yıllık sıcaklık ortalaması 14ºC olup, en düşük sıcaklık -7ºC, en yüksek sıcaklık ise 37ºC'dir. En soğuk ay 6,6 ºC ile Şubat, en sıcak ay 23,1 ºC ile Ağustos ayıdır. Yıllık toplam yağış miktarı metre kareye 927 kg olup, ortalama nem oranı %72'dir. Yılın ortalama 121 günü kapalı, 186 günü bulutlu olup çok az kısmı açık geçmektedir (Anonim, 2013).

Çalışmada, verim çağında olan tahmini 25 yaşında (Şekil 1) bir Sınap elma ağacı seçilmiş ve hasat döneminde meyveleri derilerek Ektra, 1. sınıf ve 2. sınıf olarak gruplandırılmıştır. Meyve örnekleri hassas terazide tartılarak, ortalama meyve ağırlığı belirlenmiştir.

Şekil 1. Sınap Elma Ağacı ve Meyveleri.
Figure 1. Sınap Apple Tree and Fruits

3.Bulgular

Ordu ekolojik koşullarında yürütülen çalışmada Sınap elması ağacından alınan toplam meyve miktarı: 82.5 kg'dır. Bunun % 6'ı Ekstra, % 24'ü 1. sınıf ve % 70'i 2. sınıf olarak belirlenmiştir.

Ağırlık bakımından ortalama meyve ağırlığı Ekstra sınıf olan elmalarda 101.36 g 1. sınıf elmalarda 91.86 g ve 2. sınıf elmalarda ise 46.38g olarak tespit edilmiştir (Çizelge3, Şekil 2).

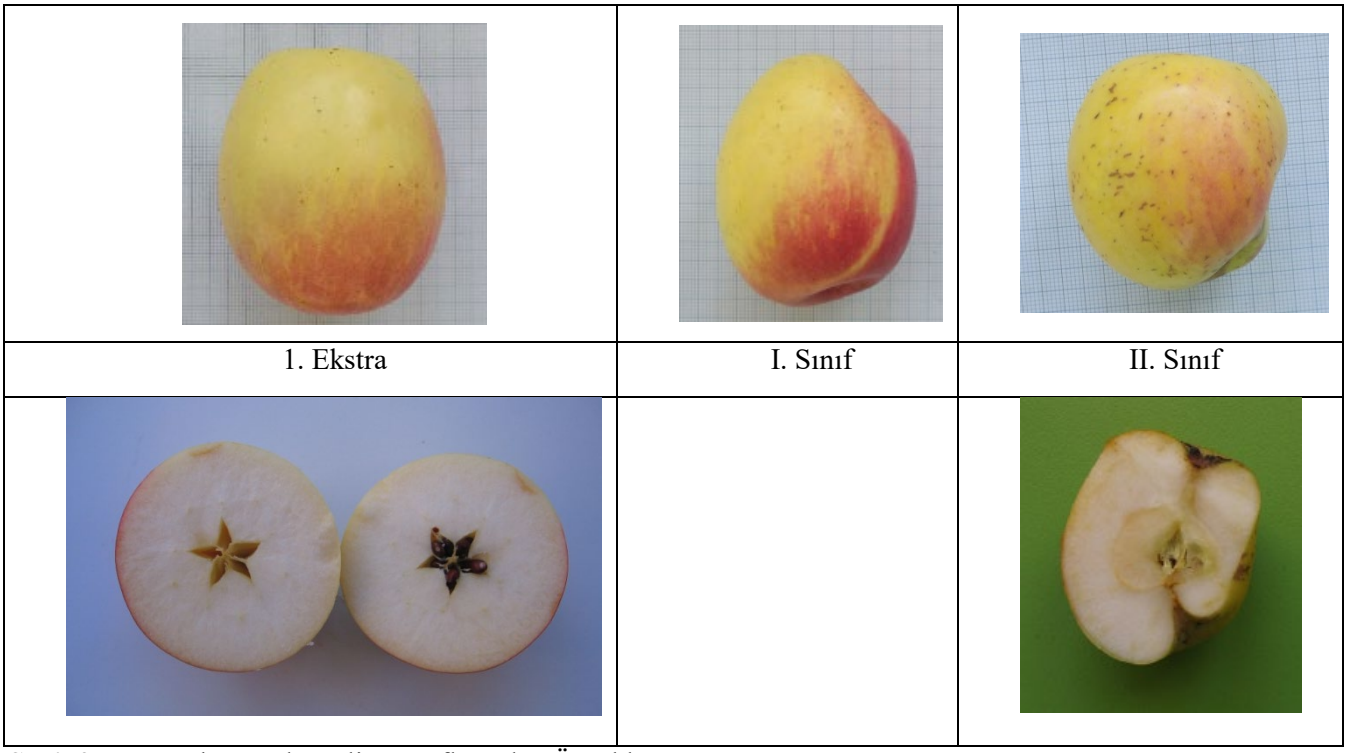
Çizelge 3. Hasat edilen meyvelerin kalite sınıflarına göre ortalama ağırlıkları.
Table 3. Average Weight Class By The Quality of The Harvested Fruits.

Meyve Kalite Sınıfları	1 Adet Ortalama Meyve Ağırlığı (gr)
Ekstra	101.36
1.Sınıf	91.86
2. Sınıf	46.38

4. Tartışma Ve Sonuç

2013 yılında Ordu ili Öceli Mahallesinde yürütülen bu çalışmada sağlıklı, tam verim çağında bir Sınap elma ağacından hasat edilen meyveler kalite sınıflarına ayrılarak, her sınıfın meyve miktarı ve niteliği belirlenmeye çalışılmıştır. Meyvelerin % 70'i şekil bozukluğu ve küçük oluşundan dolayı 2. sınıf grupta değerlendirilmiştir. Elmadaki şekil bozukluğu ve küçük meyve oluşunun birçok sebebi olabilir. Bunlar arasında kusurlu döllenme, çok fazla meyve tutumu, meyvenin beslenme yetersizliği, kültürel uygulamalardaki eksiklikler, hastalık ve zararlılar gibi birçok sebep sayılabilir. Ancak, literatürlerden de anlaşılacağı üzere, şekil bozukluğu ve küçük meyve oluşu gibi meyve kalitesindeki noksanlıklar genel olarak tozlanma ve döllenme noksanlığından kaynaklanmaktadır (Özbek 1992; Delaplane and Mayer, 2000; Morse and Calderone, 2000; Free 1993; Free and Williams, 1976). Bu gruptaki elmaların pazar değeri 2018 yılı fiyatlarına göre 20 krş olduğu göz önüne alındığında, elma üretimimizin önemli bir kısmı maalesef girdi maliyetlerini dahi karşılayamamaktadır. Ordu ili elma üretiminin 6.532 ton olduğu (Anonim, 2018b), bunun % 70'nin ikinci sınıf elma olması durumunda 4.572 tonunun piyasada 20 krş değerinde alıcı bulacağı varsayılmaktadır. Yine, Türkiye genelinde elma üretimin 3.032.164 ton (Anonim, 2018a) olduğu ve tozlanmaya bağlı olarak şekli bozuk ve küçük meyve oranının % 70'ler civarında olması durumunda, pazarlanabilir Ekstra ve 1.sınıf elma

miktarımızın 909.649.2 ton dolayında olacağı, geriye kalan 2.122.515 ton elmanın aslında meyve suyuna işlenmesi gereken meyve olduğu ortaya çıkmaktadır. Ya da, iç piyasada tüketicilerimize 2. sınıf elma yedirmeye devam etmekteyiz. Ülkemiz elma üretiminde, elma yetiştiriciliğinin yoğun yapıldığı yörelerde kültürel uygulamaların yerinde ve zamanında yapıldığını kabul ederek, 2. sınıf elma oranının % 70'lerin altında olacağını ümit etmekteyiz. Yine de elma ihracatımızın neden çok düşük düzeylerde kaldığı sorusunun cevabı bulunmalıdır.



Şekil 2. Sınap Elmasında Kalite Sınıflarından Örnekler.
Figure 2. Examples of Quality Class in Sınap Apple.

Yurt dışında yürütülen çalışmalarda bal arılarının elma üretiminde verimi olumlu yönde etkilediği, polinasyonda kullanılan kolini sayısının artmasına bağlı olarak elma üretiminde artışın olduğu ifade edilmektedir (Morse and Calderone, 2000). Benzer şekilde, kivi, çilek ve bir çok üzümsü meyvelerde arı ziyaretinin defalarca olması çekirdek sayısında önemli artış sağlamakta, bu da meyvede şeklin düzgün olmasına, tat ve aromaların yüksek oluşmasına imkan vermektedir (Blanchet and al., 1991; Svensson, 1991).

Sonuç olarak, elma yetiştiriciliğinde bal arılarının tozlanma ve döllenme üzerine etkileri bilimsel olarak ortaya koyulmuş, ancak bunun önemi yetiştiriciler tarafından halen iyice anlaşılamamıştır. Kaldı ki bal arılarının, oransal olarak az da olsa bazı elma yetiştiricilerince bahçelerine zarar verdiği, öyle ki "değil bahçeden arı, yılan dahi geçse bahçeye zarar verir"şeklinde bir kanaatlerin olduğu bilinmektedir. Şunu rahatlıkla ifade edebiliriz ki, gerek elma gerekse böceklerle tozlanan diğer meyve bahçelerinde bal arıları meyve tutumunu ve meyve kalitesini önemli düzeyde artırmakta, dolayısıyla pazarlanabilir meyve oranı artarken, ıskarta olarak ifade edilen ya bahçede bırakılacak ya da meyve suyu fabrikalarına 20 krş'a satılacak meyve miktarında önemli oranda azalma, diğer yandan, yüzlerce tonluk polen ve nektarlarımız değerlendirme imkanına kavuşmuş olacaktır.

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UAZİMDER Uluslararası Anadolu Ziraat Mühendisliği Bilimleri Dergisi ISSN : 2667-7571
IJAAES International Journal of Anatolia Agricultural Engineering 2019 (1): 7-13

Teslim / Received: 5.12.2018
Kabul Edilme / Accepted: 15.01.2019

Araştırma Makalesi / Research Article

Conservation Of Plant Genetic Resources For Rare And Endangered Species In Turkey

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Abstract

Plants in the world are used as food supply for human and animals. Many plants are utilized as pharmaceutical and industrial purposes, too. Human activities and natural phenomenon can cause some of the plants near to extinct. Therefore, the extincted species, which are consumed by human will be lesser than today and people can face with starvation in the future. Thus, the conservation of plant genetic resources isbeing carried out today. In this review we have focused onthe rare and endangered plant species and their conservation by ex-situ and in-situmethodshighlighting the plants' varieties from Turkey.
Key Words: Endangered,rare,species, genetic resources, conservation

Introduction

Plants regulates the life on earth by all means endangered plants mean that the plant population facing with the higher risk of extinction. Habitat change, high rate of death, low birth rate can cause the plants extinction (Gundu and Adia, 2014). On the other hand, rare species grow in small places and they spread in limited area (Işık, 2011). Because of both rare and endangered species are faced with extinction, there are some methods to save their genetic materials. Besides saving these plants, conserving the other plant resources are important, too.

One in five of the world's plant species is threatened with extinction according to the 2010 first global analysis of extinction risk. Tilman et al. predicted a massive ecological change to terrestrial plants within the next 50–100 y, accompanied by an increase in the number of global plant species facing extinction (Tilman and Lehman, 2001). Global warming is one of the threats to endangered plant species which is caused by the consumption of fossil fuel, industrialization, energy production and urbanization. Other factors like landsliding, over-grazing, uncontrolled fire and soil erosion are also destroying plant genetic resources. Further, as a result of human activities, it is estimated that 20% of the global biological diversity will be lost by 2020 due to the continuous and wrong use of natural resources.Turkey which is rich in biological diversity, also facing loss due to various negative factors.Because of that, sustainable protection of plant varieties is the need of time (Karagöz, et. al., 2010).

This review highlights how genetic resources are conserved, and giving information about endangered and rare species. Also, encompasses endangered species, and conservation strategies of plants in Turkey.

According to the IUCN Red List (2018) there are more than 26,000 species are threatened with extinction. Among them plants include just 25452, and 4537 are in endangered category such as Newmaniaorthostachys, Dialiumexcelsum, Ochrosiaborbonicaetc. In Turkey, there are 37 endangered plants found in 2018. These 37 plants are written on the Table 1.

Table 1. Endangered plant species in Turkey region (IUCN Red List, 2018).Turkish names were determined by using NezahatGökyiğitBotanikNahçesiBizimBitkiler web site (https://bizimbitkiler.org.tr/yeni/demos/technical/)

Plant Species	**Plant Species**
Waterwheel (*Aldrovanda vesiculosa*)	Artvinian Alyssum (*Alyssum artvinense*)
Teltırfil-Dwarf Pillwort (*Pilularia minuta*)	Taşyumağı-Pontic Fescue (*Festuca pontica*)
Pıtraknohut (*Cicer bijugum*)	Meraşincarı-Amblyophyllous Goldendrop (*Onosma obtusifolia*)
Yanıküvez (*Sorbus roopiana*)	Adjarian Angelica (*Angelica adzharica*)
Kadıncıkçalısı (*Flueggea Anatolica*)	Sintensis' Globe Thistle (*Echinops sintenisii*)
Calamagrostis Parsana	Ovitzarifesi-Thin-Fruited Tracle Mustard (*Erysimum leptocarpum*)
Yılkıkulak (*Rumex Bithynicus*)	Woronow's Centaury (*Centaurea woronowii*)
Narin buğday (*Amblyopyrum muticum*)	Tortumtülübaşı-Straw-Coloured-Headed Centaury (*Psephellus straminicephalus*)
Artvinian Barbarea (*Barbarea lutea*)	Engindikeni-Root-Headed Centaury (Centaurea rhizocalathium)
Yartülübaşı- centaury (*Psephellus pecho*)	Kirno-Ciliate Lily (*Lilium ciliatum*)
Kayışdağ Soğanı (*Allium peroninianum*)	Susuzsoğan (*Allium Pseudoalbidum*)
Choruhian Bellflower (*Campanula choruhensis*)	Ovittülübaşı-Appendage-Bearing Centaury (*Psephellus appendicigerus*)
Çanyumağı-Fescue (*Festuca xenophontis*)	Kösebelumotu-Rod-Shaped Woodruff (*Asperula virgata*)
Lazçiğdemi-Aerial Crocus (*Crocus aerius*)	Günlükağacı-Oriental Sweetgum (*Liquidambar orientalis*)
Sarıtülübaş-Centaury (*Psephellus taochius*)	Yerçanı-Massalsky's Campanula (*Campanula massalskyi*)
Delişeytanayağı-Divided Thoroughwax (*Bupleurum schistosum*)	Gevrekbaldıran-Similar Laserwort (*Laserpitium affine*)

In global there are 1929 plant species face with near to threatened, and besides other countries, 13 of them are placed in Turkey (Table 2).

Table 2. Species near to threatened in Turkey (IUCN Red List, 2018). Turkish names were determined by using NezahatGökyiğitBotanikNahçesiBizimBitkiler web site (https://bizimbitkiler.org.tr/yeni/demos/technical/)

Pazlakçayı-Mountain Tea (*Sideritis scardica*)	Arap ayakotu (*Carex iraqensis*)
İncesolucanotu-Elatine Faux Alsine (*Elatine alsinastrum*)	Püskülsoğanı-Luz (*Allium calocephalum*)
Malus trilobata	Sakızlık-Atlantic Pistachio (*Pistacia atlantica*)
Dişbudak-Common Ash (*Fraxinus excelsior*)	Datçahurması-Theophrastus's Date Palm (*Phoenix theophrasti*)
(*Salix libani*)	Laz salebi (*Dactylorhiza euxina*)
Sutopuzu-Lesser Water-plantain (*Baldellia ranunculoides*)	Tavşanbıyığı (*Poa pseudobulbosa*)
Kelebekfiği (*Vicia barbazitae*)	

Seventeen endangered plant families are classified as endangered and threatened in Turkey are listed in Table 3.

***Table 3.**List of rare and endangered plant families and species from Turkey

Risk categories of determined rare and under threatened plant species

Family	Species	Endemic / Rare	IUCN category
Pinaceae	*Abies cilicica* subsp. *isaurica*	Endemic	LR (lc)
	Pinus halepensis	Rare	VU
Aceraceae	*Acer monssupessulanum subsp. oxalianum*	Endemic	VU
Aquifoliaceae	*İlex aquifolium*	Rare	VU
Betulaceae	*Alnus glutinosa* subsp. *antitaurica*	Endemic	LR(nt)
	Alnus orientalis var. pubescens	Endemic	LR (lc)
Brassicaceae	*Alyssum peltarioides* subsp. *virgatiforme*	Endemic	LR (lc)
Caprifoliaceae	*Lonicera caucasica subsp.orientalis*	Endemic	LR (lc)
	Lonicera nummularifolia subsp. glandulifera	Endemic	LR (cd)
Celestreceae	*Euonymus latifolius* subsp. *cauconis*	Endemic	LR(nt)
Fabaceae	*Astragalus aintabicus*	Endemic	LR (cd)
	Astragalus balkısensis	Endemic	DD
	Astragalus commagenicus	Endemic	LR (lc)
	Astragalus eriophyllus	Endemic	DD
	Astragalus haussknechtii	Endemic	LR(nt)
	Astragalus macrocepus	Endemic	LR (nt)
	Astragalus suberosus subsp. *ancyleus*	Endemic	VU
	Astragalus ruselli	Rare	VU
	Genista libanotica	Rare	DD
Fagaceae	*Quercus petrea subsp. pinnatiloba*	Endemic	LR (lc)
Lamiaceae	*Thymbra sinteninsii* subsp. *sinteninsii*	Rare	LR (cd)
	Phlomis longifolia var.bailanica	Endemic	LR (cd)
Mimosaceae	*Albizzia julibrissin*	Rare	VU
Oleaceae	*Fraxinus ornus subsp. cilicica*	Endemic	LR (lc)
Plumbaginaceae	*Acantholimon libanoticum*	Rare	VU
Rhamnaceae	*Rhamnus punctatus* var. *angustifolius*	Rare	VU
	Rhamnus punctatus. var. *punctatus*	Rare	VU
	Rhamnus petiolaris	Endemic	LR (lc)
Rosaceae	Amygdalus korshinsky	Rare	VU
	Crateagus aronia var. *minuta*	Endemic	VU
	Crataegus davisii	Endemic	VU
	Cerasus mahalep var. *alpina*	Endemic	VU
Salicaceae	*Salix caucasica*	Rare	VU
Ulmaceae	*Zelkova carpinifolia*	Rare	EN
Total Number of Family: 17	Total Number of Taxa : 34	Endemism Ratio: % 65.7 Rareness Ratio: % 34.3	
IUCN: International Union for Conservation of Nature and Natural Resources			

*This table was adapted from Iskender et al. (2006).

1. Preservation of Plant Genetic Resources

Preservation of the plant genetic resources is not possible with a couple of scientists. Beside them, governments and agricultural organizations must involve in this kind of projects. Among these agricultural and nutritional institutions, Food and Agriculture Organization (FAO) is very effective on taking the attention of the world to protect the products and genetic resources of forests (Cohen, et. al., 1991).

Preserving these genetic resources became compulsory for food security and well-beingof thehuman being in the future (Bilir, 2016). For this reason, the collection, storage and use of plant genetic resources have increased in order to increase and strengthen the agricultural production.Preservation of plant genetic resources may vary according to the plant species (Tan, 2013). For saving plant resources, and plants which are endangered and rare, there are some conservation and preservation techniques that are used around the World in the genetic banks. These two major methods are reported by IUCN (2009) and they are called *Ex-situ* and *In-situ* conversation.

1.1.Ex-Situ Conservation

In this conversation technique the plants replaced from their area to other place. This place could be wild or it could be controlled from human being. So basically when the plant population is facing threat, they placed in well-protected area which is made by man. Botanical Gardens and Aquarias are those places that are good examples (Corker, 2003a). Other method of ex-situ conversation is saving of reproduction parts for future such as Seed banks, Germplasm banks and Gene banks (IUCN, 2010).

There are 1,500 botanic gardens in the world and they have 35,000 plant species which means they include more than 15% plant in the world's flora. Approximately, there are 25,000 of plant species are grow in England Royal Botanic Gardens, so within these species 2,700 of them are rare, endangered or threatened (Corker, 2003a). Turkey has 9 botanical gardens which are belong to state institutions and private organizations. Table 4 shows these gardens and their provinces (Çarbuğa and Pekerşen, 2017). Although these numbers of botanic gardens are fewer than some European countries, Turkey has high number of endemic plants than them (Kaya and Aksal, 2005; Çarbuğa and Pekerşen, 2017). In 1979, Turkey signed the agreement of European Convention on the Protection of Wildlife and Living Environments and till that year Turkey has taken necessary administrative and legal measures to protect endangered plants species together with their natural habitats. One of the endemic plant in Turkey is *Centaureatchihatcheffii* which is facing with extinction and got protected by this agreement (Bern, 1979).

Table 4. Name of botanic gardens and their province

Name of Botanic Gardens	Province
Ankara University Botanical Garden	Ankara
SüleymanDemirel University Botanical Garden	Isparta
Atatürk Arboretum Botanical Garden	Istanbul
Ege University Botanic Garden Research and Application Center	Izmir
Cukurova University Botanical Garden	Adana
Istanbul University Botanical Garden	Istanbul
Gaziantep Botanical Garden	Gaziantep
Karaca Arboretum Botanical Garden	Istanbul
NezahatGökyiğit Botanical Garden	Istanbul

Another type of ex-situ conversation is called seed bank. Cryogenic laboratories that keep the seeds for a long time and these seeds do not lose fertility. There are 1,400 seed banks in the world, but there is one distinguished seed bank, called Svalbard Global Seed Vault, opened and become popular in 2008. It is popular because they have an aim to store all plant seeds in the world (Mellgren, 2007). In Turkey, gene source determination and collection studies in cultural plants started with personal studies. The first gene resource collection was initiated by Mirza Gökgöl. Today, some of his collections are still stored in the herbarium of the Plant Gene Resources Research Institute in Izmir (Tan, 1992). In Turkey, the first gene bank was opened in Izmir in 1974. After that another gene bank founded in Ankara and it became the world's third biggest gene bank after USA and China. It has got 300,000 plants capacities. Not only plants but also it includes viruses, bacteria and fungi (seedturkey.wordpress.com).Genetic reserve. Two reserves have specifically been established in the center of diversity to conserve wild wheats, at Ammiad in Israel (Anikster et al., 2000) and Ceylanpinar in Turkey (Firat and Tan, 2000).Further, T.monococcumis less conserved in Turkey need immediate attention.

Indeed, present genetic reserves in Turkey and other forms of protected areas in the Mediterranean contain clover species, but here the conservation is 'passive', (Maxted et al., 2000),and thusexposed to moreun-noticed genetic erosion and taxonomic extinction.

Two decades ago a number of forage and grain legume collection missions have been initiated in the Eastern Mediterranean, which comprised the collection of many Trifolium species. Bennett et al. (1998) collected 28 species of Trifolium in the Caucasus, in south-west Turkey.Furthermore, there is another technique such as in-vitro storage can be used for ex-situ conservation. Plant genetic material such as meristem, shoot tip and bud are generally preserving in-vitro in two ways. (Karagöz, et. al., 2010).Preservation by slowing down the development of culture (saving them inside the mineral oil, preserving by low pressure and oxygen, taken the sugar from the nutrient medium, dehydration, adding abscisic acid (5-10 mg/l) inside the medium, adding mannitol (% 3-5) or succinic acid (50 mg/l), preservation at low temperature) (Karagöz, et. al., 2010).Cryopreservation; freezing the plant parts inside the low temperature with liquid nitrogen (Karagöz, et. al., 2010).

The ex-situ conservation of plants has been active since 1964 in Turkey, and it is administered under the "National Program on Conservation of Plant Genetic Resources/Diversity". Both generative and vegetative parts of plants are stored at National Gene Bank and field gene banks. 55.000 materials are stored at National Gene Bank, and up to 2,700 species are preserved. Also, inside of 20000 materials, there are 2,221 wild species.Field Crop Research Institute has the copy of these materials for safety; beside these nearly 10000 of field crops are preserved in there, too. Thus, totally 65,000 of plant materials are accessed in gene banks (Tan, 2010). Further, extensive methods and strategies has been stated in detail for ex-situ conservation (Hawkes et al., 2012). Exploration and field collection, seed gene bank conservation, field gene banks, botanic gardens in vitro, DNA and pollen conservation can be performed for the rare and endangered plant species of Turkey which are stated in Tables 1, 2 and 3.

1.2.In-Situ Preservation

There is no replacement occur in this method as ex-situ conservation. Endangered plants are placed in their own habitat. All in all, in this method those ecosystems are protected and the populations within (Corker, 2003b).Just in case of some changes such as climate change, environmental pollution and all kinds of natural and human-based disturbances, in the initial phase of the in-situ conservation the representative materials and seed samples are taken into the long term conservation in gene banks (Tan, 2002).

One of the important in-situ conservation is national parks which are the areas that lead to propagation, preservation, and control of flora and fauna. Turkey has 23 national parks and according to the IUCN they are all in IV category (Table 5) which means particular species or habitats are aimed to keep safe and control in protected areas by Category IV, habitat/species management area (Dudley, 2008).

Table 5. Nationalparks in Turkey(http://www.nationalparks-worldwide.info/turkey.html)

National Parks	Province	IUCN Category
Camgol Forest	Samsun	IV
Ciglikara	Antalya	IV
Corum-Catak	Corum	IV
Dilek Peninsula	Aydin	IV
Duzce-Samandere	Duzce	IV
Goksu Deltasi	Mersin	IV
Gokce Camligi	Karaman	IV
Goreme	Nevsehir	IV
Koycegiz-Dalyan	Mugla	IV
Kackar Mountains	Rize	IV
Koprulu Kanyon	Isparta - Antalya	IV
Kovada Lake	Isparta	IV
Macka Altindere	Trabzon	IV
Meryem Ana Forest	Aydın	IV
Sarikum Lake	Sinop	IV
Soguksu	Ankara	IV
Sultan Sazligi	Kayseri	IV
Uludag	Bursa	IV

Future Of Genetics Resources

Plant genetic resources are important sources of improved quality and quantitiy of yield. They can offer bioforitfication, biotic and abiotic stress tolerant cultivars, phytoremediation, medicinal benefits, important sources of nutrients, metabolites and vitamins. However, sometimes due to unwanted/undesired genetic traits in genetic resources are posing barrier to achieve the specific trait due to genetic linkage. Those genetic linkage of unwanted trait can be removed by using state of the art CRISPR/Cas9 genome editing technique (Sameeullah et al., 2017). Therefore, incorporating the genome editing technology in crop improvement can foster our breeding

programs without harsh impact on the environment, cultivated or wild plant species. Incorporating biotic tolerant genes will reduce the frequent application of pesticide which will ultimately promote the less use of pesticides to save environment and eco-friendly pollinators. Thus utilization of wild crop relative's genetic resources which are mostly tolerant to insect pests and abiotic stresses while also promote organic farming hence ensuring safe and quality nutrition (Bretting, 2018).

Conclusion

Timely protection and habituating in protected environment would be one of protection measure. Other measures of conservations including ex-situ and in-situ conservation must be practiced simultaneously in order to foster the conservation process of endangered and rare plant species. These protection measure should be taken at national and international level and to educate the public to participate actively in protection of endangered plant species.

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UAZİMDER Uluslararası Anadolu Ziraat Mühendisliği Bilimleri Dergisi ISSN : 2667-7571
IJAAES International Journal of Anatolia Agricultural Engineering 2019 (1): 14-19

Teslim / Received: 09.12.2018 **Araştırma Makalesi/ Research Article**
Kabul Edilme / Accepted: 15.01.2019

Productivity Of European Grapes Clones In The Conditions Of Atu Gagauzia

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Abstract

The article provided information on the total vineyard area by the ATU Gagauzia, its dynamics over the past 10 years. Analyzed the area of fruiting the grapevines plantations as well as their yield. In recent years, in the ATU Gagauzia, a special scientific and industrial interest and state status have been massively introduction to the assortment the ranks of certified virus-free clones of classic European varieties. Presents information of the growth and development of the vines of the European clones. Actual is the identification of optimal ecological parameters for the cultivation of European clones of grapes, which make it possible to make full use of their agrobiological potential in the agroecological conditions of ATU Gagauzia. The study of new varieties or their clones in specific ecological conditions of the terrain makes it possible to determine the influence of individual physiological parameters and agrotechnical techniques on the growth, development and fruiting of the grapevines. In the clone R5 of the Cabernet-Sauvignon variety, in the agroecological conditions of ATU Gagauzia, the introduction of vines in fruiting is observed on the 3rd year after planting, and the completion of the period of the forming the mature vine on the 4th. Bushes of grapevines of this clone an average of 28,1 shoots, the average length of 144,1 cm. On each shoot 38 leaves are developed with the area of leaves 148,3 cm2. The number of grapes is 40,3 on bush, the average weight is 127,1 gram. During the growing season grapes accumulated 252 gram/dm3 sugar and acids declined to 8,9 gram/dm3(SM-84).

Keywords: Cabernet Sauvignon, climatic, conditions, clone R5, grapes, growth, productivity, quality,variety, vineyards

Введение

Виноградная лоза находится в постоянной зависимости от физико-географических факторов. Поэтому к изучению связи продуктивности винограда и качества урожая с климатическими условиями и условиями размещения, как с главными воздействующими факторами природной среды, ученные обращались неоднократно, пытаясь найти её строгое количественное выражение. Тем не менее, считать эту проблему окончательно решенной ни в коем случае нельзя и она по-прежнему остается актуальным предметом исследований во многих виноградно-винодельческих странах мира.

В последние годы в Республике Молдова, в том числе и в АТО Гагаузия, особый научно-производственный интерес и государственный статус получило массовое внедрение в сортимент ряда сертифицированных безвирусных клонов классических европейских сортов. Планируется основную посадку виноградников осуществлять привитым посадочным материалом этих клонов [1].

Необходимость продолжения исследований в этой области вызвана также тем, что прогресс науки и техники ежедневно предоставляет в распоряжение ученых новые методы и средства познания, позволяющие по-новому взглянуть на казалось бы уже давно изученные вопросы и подходы.

Это особенно важно сейчас, когда появилось много новых сортов, клонов, и их поведение в конкретной экологической нише необходимо знать, всесторонне и грамотно использовать в целях повышения продуктивности кустов и качества получаемой продукции.

Новые интродуцированные клоны винограда классических винных сортов превышают по урожайности исходные сорта на 20-30% и дают высококачественные столовые вина и шампанские виноматериала. Однако особенности формирования их продуктивности от конкретных экологических и технологических условий возделывания в АТО Гагаузия изучены не достаточно.

Материалы И Методика

Исследования проводились в АО «Томай-Винекс» на клоне R5сорта Каберне-Совиньон, привитом на подвое БхР Кобер 5ББ.

Виноградные плантации расположены на склоне юго-западной экспозиции с крутизной 50, почва – чернозем карбонатный мощный суглинистый на суглинке. Схема посадки - 2,75х1,5м. Форма кустов – двухсторонний двухштамбовый горизонтальный кордон с высотой штамба 80 см, шпалера – вертикальная с 4-мя ярусами проволок с вертикальным расположением прироста. Первый ярус проволоки располагается на высоте штамба, второй, на высоте 20-25 см от первого, третий на высоте 35-40 см от второго, четвертый также на высоте 35-40 см от третьего. Промежуточные столбы устанавлены высотой 1,8 м, а краевые на высоту 2 м под углом 450 противоположно к направлению ряда и закреплены якорной оттяжкой. Все яруса проволок натянуты с использованием приспособления Gripple, что обеспечивает прочность конструкции шпалеры и позволяет ей выдерживать нагрузку общей массы зеленых побегов и гроздей.

Учет урожайности кустов проводили в конце созревания [6]. Определяли: количество гроздей, в шт./куст; среднюю массу грозди, в г; урожайность, кг/куст и ц/га.Определение качества урожая: содержание сухих веществ в соке ягод, с помощью рефрактометра, выражали, в %; содержание титруемых кислот – методом титрования ⅓ N-ным раствором щелочи, мг/л [6]. Массовую концентрацию сахаров и титруемых кислот рассчитывали согласно StandartMoldoveanSM-84 [3], в г/дм3. Статистическую обработку данных проводили с использованиемдисперсионного и корреляционного анализа по Б.А. Доспехову [4]. Расчеты проводились в табличном редакторе MS Excel 2003.

Результаты Исследований

АТО Гагаузия является одним из основных производителей винограда в Молдове, это объясняется природно-климатическими условиями, особенностями рельефа и почв, традиционной ориентированностью населения, имеющие навыки виноградарства и виноделия [5].

Программа восстановления и развития виноградарства имеет главной целью создание современной отрасли по производству винограда – высокого качества, конкурентоспособного на рынках сбыта и имеющую высокую экономическую эффективность.

АТО Гагаузия расположена в южной части Республики Молдова и относится к самостоятельному экономическому региону страны. Для территории АТО Гагаузия характерен умеренно-континентальный климат. Зимой температура воздуха неустойчива. Частые оттепели и безморозные дни оказывают отрицательное влияние на сельскохозяйственные культуры, зачастую возобновляют вегетацию. Самым холодным месяцем года является январь со средней температурой: -2,5…-5,5^{0}С. При проникновении с севера арктического воздуха и задержке в антициклонах, температура воздуха может снизиться до -28^{0}С..

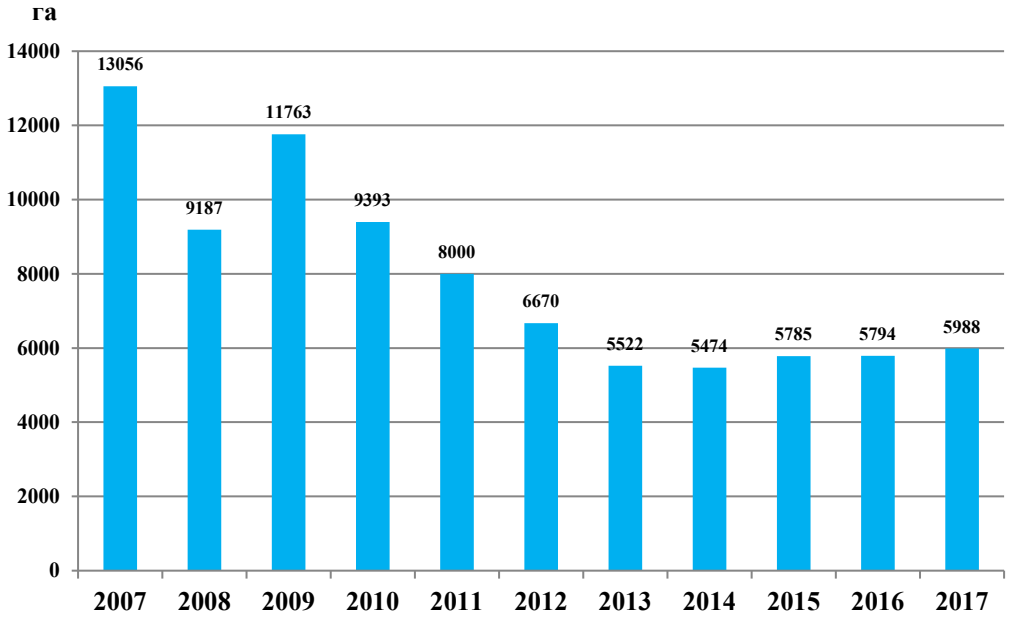

Рис.1. *Общая площадь виноградников, АТО Гагаузия, (по данным Главного управления АПК АТО Гагаузия, 2018).*

Территория АТО Гагаузия расположена в Буджакской степи, которая является частью южно-молдавской холмистой равнины. Ее поверхность рассечена широкими долинами, а склоны изрезаны многочисленными оврагами. Рельеф характеризуется степями и небольшими возвышенностями, также имеются небольшие реки Ялпуг, Ялпужел, Лунга и Лунгуца. АТО Гагаузия, как и вся Республика Молдова расположена в Карпатской сейсмической зоне.

В 2007 году общая площадь виноградников АТО Гагаузия составляла – 13056 га к 2017 году сократилась до 5988га (рис.1). Таким образом, можно отметить, что за 10 лет произошло уменьшение площадей в 2,2 раза.

Из всей площади виноградных насаждений на сегодняшний момент времени 5264 га – плодоносящие, 724 га – молодые.

В последние годы, площадь плодоносящих виноградников уменьшились за счет раскорчевки старых насаждений, но за счет ввода в плодоносящие молодых виноградников с высоким потенциалом урожайность и валовой сбор винограда постепенно увеличился, и к 2017 году составил 45 тыс. тонн, при урожайности около 80 ц/га.

Хозяйство АО «Томай-Винекс» расположено в южной агроклима-тической зоне республики, с.Томай, Чадыр-Лунгского район.

По многолетним наблюдениям среднегодовая температура воздуха на территории Чадыр-Лунгского районасоставляет $9,7^0$C. Положительная температура удерживается около девяти месяцев. Среднемесячная температура самого теплого месяца (июль) составляет $21,4^0$C, а самого холодного (январь) – $2,2^0$C. Среднегодовая сумма осадков посреднемноголетним данным составляет 466мм.

Фенологические наблюдения в виноградарстве играют очень большую роль, так как комплекс выполненных агротехнических мероприятий полностью относится к фазам вегетации виноградного растения. Также фенофазы имеют своей конечной целью совершенствование технологии и, соответственно, получение высоких урожаев продукции виноградарства.

В задачу наших наблюдений входило изучить и зафиксировать наступления фаз вегетации у насаждений винограда клона R5 сорта Каберне-Совиньон в агроэкологических условиях АО «Томай-Винекс».

Нами выявлено в результате проведенных исследований, что фаза начала сокодвижения наступала с 30.03 по 15.04 этот период самый благоприятный для выделения сока (табл.1) [2].

Таблица 1. Календарные сроки наступления фенологических фаз насаждений винограда клона R5сорта Каберне-Совиньон. *АО «Томай-Винекс», 2016г.*

№ п/п	Фенологические фазы	Даты наступления и окончания фенологических фаз	Продолжительность, дней
1.	Сокодвижение	30.03-15.04	16
2.	Рост побегов	16.04-30.05	44
3.	Цветение	31.05-15.06	15
4.	Рост ягод	16.06-20.08	65
5.	Созревание ягод	21.08-03.10	43
6.	Листопад	04.10-01.11	28

Интенсивность рост побегов зависит от внешних условий: температуры воздуха, которая должна быть не ниже 8°С с суммой активных температур 120°-200°С, влажности воздуха не меньше 45-50%, достаточного поступления воды в прорастающие глазки и доступа к ним кислорода воздуха.

Цветения характеризуется раскрытием и опаданием венчиков (колпачков) цветков, распрямлением тычинок, разрывом пыльников и высыпанием пыльцы, опылением и оплодотворением.

При росте ягод с 16.06 по 20.08 виноградный куст претерпевает следующие изменения: замедляется прирост побегов, активно растут листья, в пазушных глазках продолжается формирование почек и соцветий, в нижней зоне побега идет отложение крахмала и др.

Когда наступает фаза созревания, ягоды становятся мягкими, в них интенсивно идет процесс сахаронакопления, кислотность сока при этом снижается. К концу фазы ягоды приобретают типичную для сорта окраску и форму, их кожица становится тонкой, эластичной, равномерно покрывается пруином.

Листопад характеризуется тем, что в листьях уменьшается интенсивность фотосинтеза, который с наступлением заморозков прекращается, изменяется окраска листьев, образуется отделительная ткань у основания черешков, что способствует опадению листьев.

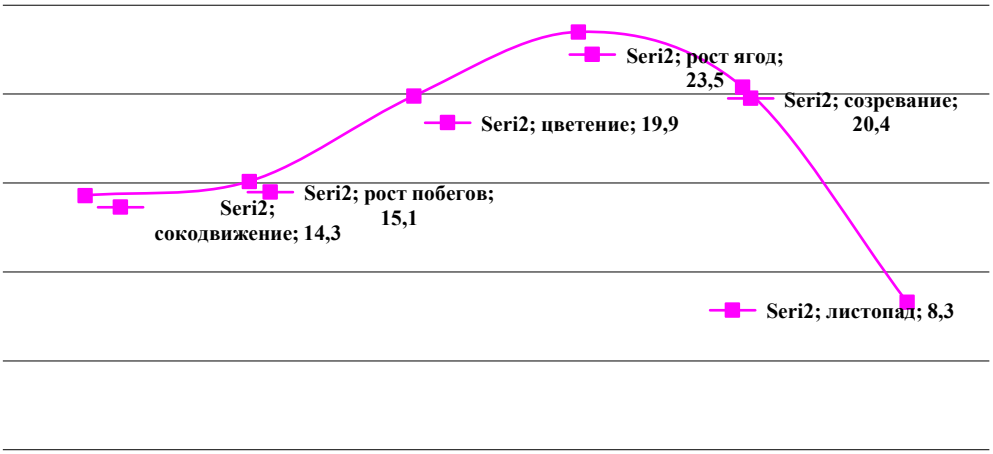

Рис.2. Изменение среднесуточных температурных показателей по фазам вегетации клона R5сорта Каберне-Совиньон.
АО «Томай-Винекс», 2016г.

По нашим наблюдениям в фазу «сокодвижение» продолжавшуюся 16 дней среднесуточная температура составляла 14,3^{0}С (рис.2.). Для благоприятного прохождения сокодвижения необходимо чтобы температура воздуха была не менее 10^{0}С. В фазу «рост побегов» - 15,1^{0}С, это благоприятная температура для данной фазы.

Растение винограда наиболее восприимчиво к изменению температурных условий в фазу «цветение», нарушаются процессы опыления и оплодотворения при снижении температуры ниже 15^0C.В условиях нашего опыта, в данную фазу, продолжавшуюся 15 дней, резких колебаний температуры не выявлено, среднесуточная температура составила $19,9^0$C.

Выявлено, что у клона R5 сорта Каберне-Совиньон продолжительность фазы «рост ягод» наиболее продолжителен и составил в климатических условиях АТО Гагаузия 65 дней при среднесуточной температуре $23,5^0$C.

Фаза «созревание ягод» проходила с 21.08 по 03.10, таким образом, данный клон созревает в наших условиях в первой декаде октября.

Таблица 2. Урожайность кустов винограда клона R5 сорта Каберне-Совиньон. *АО «Томай-Винекс», 2016г.*

№ п/п	Варианты опыта	Среднее число гроздей шт./ куст	Средняя масса грозде й, г	Урожайность		Массовая концентрация, г/дм^3	
				кг/ куст	ц/га	сахаров	титруе-мых кислот
1.	*Каберне-Совиньон Cl R_5 на БхР Кобер 5ББ*	40,3	127,1	5,12	124,1	252	8,9

Важнейшим критерием характеристики отдельных сортов, агроприемов, кустов и насаждений является продуктивность – способность формировать определенный биологический (биологическая продуктивность) и хозяйственный (хозяйственная продуктивность) урожай.

Хозяйственную продуктивность (урожай) составляет масса урожая гроздей с единицы площади насаждения или с куста. Хозяйственная продуктивность виноградника (урожайность) складывается из суммарной хозяйственной продуктивности составляющих его кустов и может быть потенциальной, эмбриональной и фактической.

Нами установлено, что при возделывании клона R5 сорта Каберне-Совиньон в климатических условиях АТО Гагаузия среднее число гроздей составляет 40,3 шт./куст средней массой 127,1 г.

Урожайность клона составляет 5,12 кг/куст или 124,1 ц/га при массовой концентрациисахаров – 252 г/дм^3, титруемых кислот 8,9 г/дм^3. Таким образом, качественные показатели урожая данного клона находятся в пределах технологических требований, предъявляемых к этой группе сорто-клонов.

Выводы

1. Для максимального раскрытия природного потенциала новых интродуцированных клонов необходимо соответствие климатических, а также технологических параметров ухода за виноградным растением их биологическому потенциалу;

2. Изучение новых сортов или их клонов в конкретных экологических условиях местности позволяет определить влияние отдельных физиологических параметров и агротехнических приемов на рост, развитие и плодоношение виноградного растения;

3. Климатические условия АТО Гагаузия по фазам вегетации клона R5 сорта Каберне-Совиньон благоприятны для роста, развития и продуктивности кустов винограда;

4. Установлено, что урожайность при возделывании в климатических условиях АТО Гагаузия клона R5 сорта Каберне-Совиньон составляет 124,1 ц/га, при массовой концентрации сахаров 252 г/дм^3, титруемых кислот 8,9 г/дм^3.

Библиография

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UAZİMDER Uluslararası Anadolu Ziraat Mühendisliği Bilimleri Dergisi ISSN : 2667-7571
IJAAES International Journal of Anatolia Agricultural Engineering 2019 (1): 20-23

Teslim / Received: 10.12.2018
Kabul Edilme / Accepted: 15.01.2019

Araştırma Makalesi/ Research Article

Diastereoselective Synthesis of 3,4-Dıbenzoil-3,4-Dihydro-1H-Spiro [Benzo[cd]Indol-5,3'-Indoline]-2,2'(2aH)-Diones

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Abstract

Diastereoselective syntheses of 3,4-dibenzoyl-3,4-dihydro-1H-spiro[benzo[cd]indole-5,3'-indoline]-2,2'(2aH)-dionesin boiling DMF have been carried out starting with 3-(2-phenyl-2-oxoethylidene)indolin-2-ones via a Diels-Alder addition reaction. Theoretical and practical investigations of structure-activity relationships in the group of synthesizedspirooxindoleshave been performed.

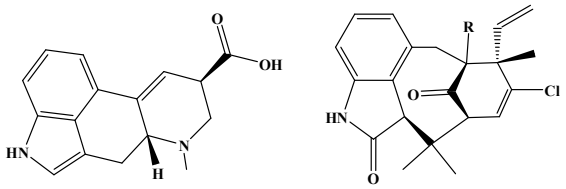
Keywords: Oxindoles, spirooxindoles, dimerisation, Diels-Alder reaction.

Introduction

A successful development of the spiro-compounds'chemistry in recent years has beencaused by numerous studies of their syntheses, as well asby the search for new biologically active entities among them (Macaev et al., 2011; Millemaggi and Taylor 2010). The work carried out in this direction led to the creation of new effective drugs that have become part of the therapy of a number of pathologies (Hansch et al., 1990). In this regard, investigation of new effective synthetic methods for the selective synthesis of polyfunctionalizedspirooxindolesis an actual task and is of practical interest with the view to the study of the structure-bioactivity relationship.

Results and Discussion

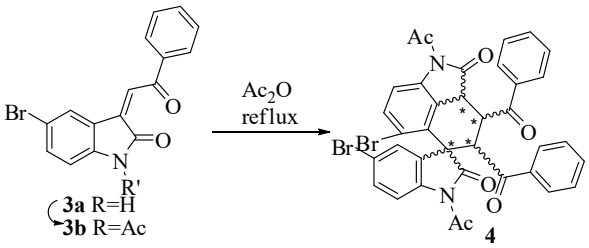
In this article, the synthesis of derivatives containing in its structure a residue of lysergic acid 1 and velvitindolinolinone2 (Figure 1) is reported, with the latter belonging to the group of alkaloids extracted from blue-green algae.



1 2

Figure 1: The structure of lysergic acid **1** and velvitindolinone**2**

We have previously reported that compounds **3a** can be obtained in two-step synthesis from the corresponding isatins (Radul, 1983). However, it was not possible to obtain the N-acetyl-5-bromo derivative **3b** via this syntheticpathway. Therefore, we attempted to synthesizecompound **3b** by direct acetylation of **3a** according to the Scheme 1.

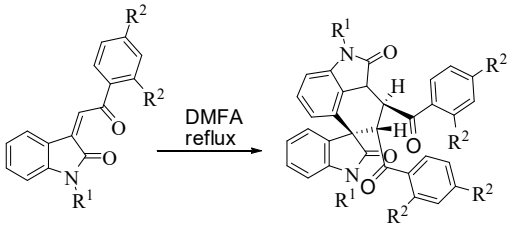


Scheme 1: Synthesis of theacetyl derivative **3b** and thediastereomers**4**.

It wasrevealed that the yield of the target product **3b** consist only 7%. The remaining part was a chromatographically inseparable mixture of four diastereomers with a predominant content of one of the isomers **4**. After a series of manipulations, the major diastereomerwas isolated in an individual form and characterized by various physicochemical methods of analysis. It turned out that under the conditions of acylation and the Diels-Alder reaction,synthesis results in the formation of the corresponding dimers **4**. It was established that the separated compound contains in its structure lysergic acid and velvitinindolinone residues. Sincethere are four asymmetric carbon atoms in the structure of this molecule, the formation of eight pairs of diastereomers is possible.

Taking into consideration that derivatives of the lysergic acid are psychotropic substances, and velvitindolinone possess antibacterial and antifungal activities, we set out to choose the conditions for diastereoselective synthesis of derivatives **4**.

After a number of studies, it was established that refluxing in DMF leads to formation of only one diastereomer**5a** from the enone**3c** (Scheme 2). As a result, it was isolated and characterized.



3c R^1=Et, R^2=H
3d R^1=Pr, R^2=H
3e R^1=Bu, R^2=H
3f R^1=Dec, R^2=Cl

5a R^1=Et, R^2=H (49 %)
5b R^1=Pr, R^2=H (57 %)
5c R^1=Bu, R^2=H (83 %)
5d R^1=Dec, R^2=Cl (53 %)

Scheme2: Diastereoselective synthesis of the compounds **5a-d**.

In order to confirm the structure of the synthesized compound **5a**, a single crystal was grown and an X-ray structural analysis was carried out (Sucman et al., 2010), the result of which is shown in the Figure 2.

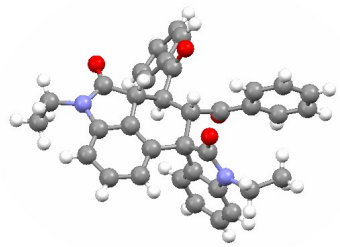
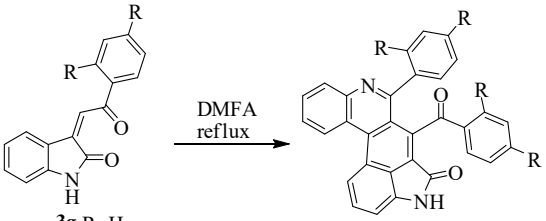


Figure 2: Structure of the compound **5a.**

The same synthetic pathway only starting with the isatins **3c-f,** resulted in theformation of products **5b-d** that were obtained individually in good yields.

We have previously shown that the presence of a 2,4-dichlorophenyl fragment in a molecule can lead to the appearanceof biological activity or to increase it (Macaev et al., 2011; Macaev et al., 2005; Geronikaki et al., 2004a; Geronikaki 2004b). Different oxindoles with the 2,4-dichlorophenyl fragment were synthesized from the corresponding isatins. However, under dimerization conditions, these substrates did not lead to the desired dimers. N-decyl derivative **3f** became an exception and was subjected to the Diels-Alder reaction with formation of the target product in a moderate yield.

It should be mentioned that unsubstituted enones**3g**,**h** lead to the condensed derivatives **6a, b**(Sch. 3).



3g R=H
3h R=Cl

6a R=H (89%)
6b R=Cl (76 %)

Scheme 3: Synthesis of the compounds **6a, b.**

Bioactivity assessment

Initially, bioactivity calculations were performed using the computerized prediction system “PASS” (Research Institute of Biomedical Chemistry RAMS) using the method (Geronikaki et al., 2004a; Geronikaki 2004b). , which showed that dimers **5** with 98.5% probability can posed cerebrovascular and cardiovascular activity in the presence of three new descriptors . These data indicate the promise of research in this direction for the creation of substances with high biological activity.

The next step was a virtual screening, which was carried out on the MolTechLeadFinder software on the HP Z800 workstation at the Scientific Research Laboratory“Molecular Pharmacology” of the Federal State Educational Institution of Higher Professional Education at the St. Petersburg State Institute of Technology. The inhibitors were searched for the following protein targets: 1) MDM2 - p53 binding domain and 2) MDMX (MDM4) - p53 binding domain. Targets, associated with the process of programmed cell death, apoptosis, were considered. Evidence has

been obtained that inhibition of E3 of ubiquitin-ligase specific to p53 with the participation of phenanthridine-5(4H)-ones **6a, b** as well as spiro[benzindole-5,3'-indoline]-2,2'-diones **4**, **5a-d**, leads to the stabilization of these proteins and suppresses the growth of tumor cells.

Further, the antifungal activity of the obtained derivatives was evaluated *in vitro*. It turned out that all of the tested compounds have significant antifungal activity, the most active compound being**5d**. *In vitro* biological studies were carried out by the group of Prof. Geronikaki from the Aristotle University of Thessaloniki, Greece.

Experimental Methods

All used solvents were of reagent quality, and all commercial reagents were used without additional purification. Removal of all solvents was carried out under reduced pressure. Analytical TLC plates were Silufol® UV-254. IR spectra were recorded on a Spectrum 100 FT-IR spectrophotometer (Perkin–Elmer) using the universal ATR sampling accessory. ^{1}H and ^{13}C NMR spectra have been recorded in2% solution in $CDCl_3$ with a Bruker -Avance III NMR spectrometer (400.13 and 100.61 MHz). Melting points were determined with a Boëtius apparatus.

Isatins**3a,c-f** were prepared using the previously described methods [10].

*General procedure for the synthesis of 3,4-dibenzoyl-3,4-dihydro-1H-piro[benzo[cd]indole-5,3'-indoline]-2,2'(2aH)-diones***5.**

The solution of compound **3**(0.001 mol) in DMFA(5 mL) was refluxed for 2.5 hours. The mixture was cooled, dissolved by water and extracted with dichloromethane. Organic layer was dried and evaporated under reduced pressure. The residue was chromatographically separated on silica gel. The mixture of dichloromethane and methanol was used as mobile phase.

5a: M.p. 221-223^{0}C. ^{1}H-NMR: 8.07 (d, 2H, J=7.2, Ar); 7.60 (t, 1H, J=7.6, Ar); 7.49 (t, 2H, J=7.6, Ar); 7.43 (t, 1H, J=7.6, Ar); 7.24 (t, 2H, J=7.6, Ar); 7.15 (m, 3H, Ar); 7.00 (m, 3H, Ar); 6.76 (d, 1H, J=8.0, Ar); 6.60 (d, 1H, J=7.6, Ar); 5.95 (d, 1H, J=8.0, Ar); 5.03 (d, 1H, J=8.0, C*H*CON); 4.44 (t, 1H, J=8.0, C*H*CO); 3.94 (d, 1H, J=7.6, C*H*CCO); 3.80 (hx, 2H, CH_2); 3.50 (dhx, 2H, CH_2); 1.25 (t, 3H, CH_3); 0.86 (t, 3H, CH_3). ^{13}C-NMR: 201.84, 199.75, 176.99, 174.46, 142.61, 142.55, 138.20, 137.60, 133.19, 132.91, 131.63, 129.18, 129.14, 128.90, 128.23, 128.09, 126.73, 126.51, 122.82, 118.48, 108.14, 106.55, 56.45, 54.43, 54.37, 46.67, 41.51, 34.82, 34.77, 30.78, 13.11, 12.27.

5b: M.p.>255^{0} C. ^{1}H-NMR:8.08 (d, 2H, J=8.4, Ar); 7.60 (t, 1H, J=7.6, Ar)7.49 (t, 2H, J=7.6, Ar); 7.42 (t, 1H, J=7.6, Ar); 7.25 (t, 2H, J=7.6, Ar); 7.16-7.13 (m, 3H, Ar); 7.00 (m, 3H, Ar); 6.73 (d, 1H, J=7.6, Ar); 6.54 (d, 1H, J=8.0, Ar); 5.98 (d, 1H, J=8.0, Ar); 5.05 (d, 1H, J=7.2, C*H*CON); 4. 39 (t, 1H, J=8.0, C*H*CO); 3.99 (d, 1H, J=7.6, C*H*CCO); 3.75 (m, 1H, CH_2N); 3.41 (m, 2H, CH_2N); 2.82 (m, 1H, CH_2N); 1.71 (hx, 2H, CH_2CH$_3$); 1.41 (hx, 2H, CH_2CH$_3$); 0.99 (t, 3H, CH_3); 0.86 (t, 3H, CH_3). ^{13}C-NMR: 201.54, 199.58, 177.37, 174.75, 169.58, 143.15, 142.95, 138.30, 137.57, 133.23, 132.74, 132.55, 131.57, 129.16, 129.03, 128.77, 128.13, 127.93, 126.64, 126.61, 122.76, 118.50, 108.07, 106.49, 56.66, 54.41, 46.50, 41.67, 41.62, 41.56, 21.08, 20.67, 11.63, 11.52

5c: M.p.>255^{0} C.^{1}H-NMR: ^{1}H-NMR: 8.08 (d, 2H, J=8.0, Ar); 7.59 (t, 1H, Ar); 7.49 (t, 2H, Ar); 7.41 (t, 1H, Ar); 7.22 (t, 2H, Ar); 7.15-7.12 (m, 3H, Ar); 7.07 (t, 1H, Ar); 6.96-6.92 (m, 2H, Ar); 6.72 (d, 1H, J=7.6, Ar); 6.52 (d, 1H, J=7.6, Ar); 5.96 (d, 1H, J=8.0, Ar); 5.04 (d, 1H, J=10.8, C*H*CON); 4.38 (t, 1H, J=11.2, C*H*CO); 3.97 (d, 1H, J=11.6, C*H*CCO); 3.82-3.75 (m, 1H, CH_2N); 3.45-3.42 (m, 2H, CH_2N); 2.89-2.85 (m, 1H, CH_2N); 1.66-1.61 (m, 2H, CH_2CH_2); 1.44-1.26 (m, 6H, CH_2CH_2); 0.99 (t, 3H, CH_3); 0.91 (t, 3H, CH_3).^{13}C-NMR: 201.54, 199.60, 177.22, 174.68, 143.01, 142.88, 138.23, 137.54, 136.89, 133.17, 132.78, 132.59, 131.59, 129.16, 129.02, 128.77, 128.14, 127.95, 126.66, 126.60, 122.78, 118.50, 108.01, 106.43, 56.57, 54.36, 46.49, 41.59, 40.78, 39.64, 29.81, 29.30, 20.12, 20.04, 13.95, 13.93

5d: M.p.>255^{0} C.^{1}H-NMR: 8.19 (d, 1H, J=8.4, Ar); 7.49 (d, 1H, J=2.0, Ar); 7.42 (dd, 1H, J_1=2.0,J_2=8.4, Ar); 7.31-7.21 (m, 5H, Ar); 7.01-6.95 (m, 3H, Ar); 6.75 (d, 1H, J=8.3, Ar); 6.66 (d, 1H, J=7.6, Ar); 5.93 (d, 1H, J=8.4, CH); 5.10 (d, 1H, J=11.04, CH); 4.30 (t, 1H, J=11.4, CH);3.78-3.69 (m, 1H, CH_2N); 3.43-3.40 (m, 2H, CH_2N); 2.81-2.78 (m, 1H, CH_2N); 1.65-1.15 (m, 32H, CH_2); 1.02 (t, 3H, CH_3); 0.96 (t, 3H, CH_3). ^{13}C-NMR: 202.11, 199.49, 177.33, 173.99, 142.89, 142.76, 138.35, 137.46, 136.56, 132.87, 132.63, 132.56, 131.62, 129.00, 128.95, 128.65, 128.22, 127.88, 126.52, 126.47, 122.78, 118.56, 108.22, 106.21, 56.68, 54.33, 46.41, 41.01, 40.15, 38.64,

29.81, 29.30, 28.03, 27.58, 26.53, 26.22, 24.03, 23.89, 23.56, 23.01, 22.58, 22.31, 21.62, 21.24, 20.12, 20.04, 13.95, 13.93.

General procedure for the synthesis of 6-benzoyl-7-phenylindolo[3,4-jk]phenanthridin-5(4H)-ones **6**.

The solution of compound **3** (0.001 mol) in DMFA (5 mL) was refluxed for 2.5 hours. The mixture was cooled,then dissolved by water. The resulting precipitate was filtered, washed with water and ethanol.

6a: .p. >255^0 C. ^{1}H-NMR: 11.06 (s, 1H, N*H*); 9.28 (d, 1H, J=8.4, Ar); 8.72 (d, 1H, J=8.4, Ar); 8.20 (d, 1H, J=8.4, Ar); 7.99-7.91 (m, 2H, Ar); 7.85 (t, 1H, J=7.84, Ar); 7.69 (, 1H, J=8.4, Ar); 7.48 (s, 1H, Ar); 7.32 (d, 1H, J=8.4, Ar); 7.27 (d, 1H, J=8.4, Ar); 7.23-6.78 (s br, 3H, Ar). ^{13}C-NMR: 209.31; 166.83, 156.71, 145.44, 140.08, 138.99, 137.81, 136.45,135.87, 135.34, 135.01, 131.50, 131.31, 130.53, 130.17, 128.67, 128.60, 128.36, 127.02, 126.39, 126.02, 125.58, 124.82, 124.32, 124.02, 120.75, 108.92.

6b: M.p. 211-213^{0}C. ^{1}H-NMR: 11.16 c (s, 1H, N*H*); 9.28 (d, 1H, J=8.1, Ar); 8.75 (d, 1H, J=8.8, Ar); 8.24 (d, 1H, J=7.8, Ar); 8.05-7.96 (m, 3H, Ar); 7.89 (t, 1H, J=7.6, Ar); 7.70 (, 1H, J=8.5, Ar); 7.64 (s; 1H, Ar); 7.38 (s, 2H, Ar); 7.31 (d, 1H, J=7.3, Ar); 7.26 (d, 1H, J=7.2, Ar).

^{13}C-NMR: 210.91, 166.92, 156.95, 145.27, 139.76, 139.02,137.88, 137.69, 136.54, 135.55, 135.36,135.17, 134.72, 132.21, 131.50, 131.31, 130.07,129.94, 129.63, 129.13, 128.65, 127.69, 126.39,126.05, 125.96, 125.45, 124.64, 124.02, 123.94, 121.29, 109.47.

Conclusion

A number of compounds with potentially high biological activity were obtained as a result of simple synthesis using commercial available and cheap reagents.

Acknowledgments

The authors of the paper are grateful for research funding offered by the National Research and Development Agency of Moldova (ANCD) under the project number 19.80012.80.07A.

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UAZİMDER Uluslararası Anadolu Ziraat Mühendisliği Bilimleri Dergisi ISSN : 2667-7571
IJAAES International Journal of Anatolia Agricultural Engineering 2019 (1): 24-29

Teslim / Received: 18.12.2018
Kabul Edilme / Accepted: 15.01.2019

Derleme Makale / Review Article

Litter Materials in Poultry Industry

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Abstract

Poultry sector or in other words the poultry meat sector, is also developing rapidly in Turkey. With this development, the positive and negative environmental impacts of the wastes, which are produced during production in the sector and evaluated as by-products, have started to attract more attention day by day. Due to the high amount of production, the economic value, the high mineral content and the high cost of alternative implementation, litter materials, which are considered as waste by some circles, should not be harmful to the environment and should be reintroduced into economy or production. This issue is even more important in terms of tourism of the country. It is thought that developments that will please all parties by working in close cooperation supported by all stakeholders and public in the sector, especially official organisations, private sector and universities would solve the issue soon.

Keywords: Poultry, poultry meat, litter material

Introduction

Poultry farming, especially broiler growing and broielr meat production, in the livestock sector to be more suitable for growing more animals in the small area due to superiority has become more and more advanced and has become an industry. The annual turnover of the broiler industry exceeds approximately $ 6 billion (Anonymous, 2011; Koca, 2015).

Litter material is one of the most important inputs used in broiler industry. Very large amounts of litter are used in almost all broiler houses. In order to give an idea about the amount and cost of the litter, Bolu region can be sampled at 10 milion broiler / year broiler growed. In this region, mostly pine shavings and alternatively rice hulls preferred as litter material and generally these materialsare used for one period. In this region, approximately 291000 ton of litter material was used in 2018 and the cost is around yaklaşık$29.638.000 with 18% VAT.

In this article, the materials used, the suitability, the overall cost and the possibilities to reduce it were reviewed.

Litter can be considered as a bed and insulation material that allows the chickens to sit warmly and softly on the chick, and when they grow up, they are not humid to the place where they sleep. It is a critical material for the development, performance, health and biosecurity of broilers.

The litteris mainly used as an absorbent bed material.The litter material helps to evaporate the moisture and gas from the stool by increasing the ground area of the house, to absorb the moisture, to produce additional heat by fermentation by microorganisms, to make the place more effective to be wetted due to water and various factors, to the insulation of moisture from the ground, to the cold ground between the chick and the ground. Litter is important to reduce the direct contact between the chicken and the manure(nitrogen), as well as to reduce the dust in the house.

Ideal litter material should be healthy, healthy on the chickens, highly absorbent, light weight, remain loose and not stick, not too dry or too moist, low ammonia level, and uniform particle size (2 - 4 cm), fast to dry, easy to obtain, reasonable in price and in vegetable production after combining feces be used as fertilizer.

Litter Materials and Features

Due to the increasing demand in broiler breeding, expanding poultry industry and competition in other markets, the availability of suitable litter is increasingly difficult. However, many materials can be used as alternative litter

material. The type of litter material to be used depends on its easy availability, physical suitability and cost.Different forest and agricultural industry by-products and some used materials can be used as litter. The most commonly used litter materials are wood (planer) shavings, paddy peel, straw, peat, fine sand, milled or cut newspaper (Table 1).

As safe and economical litter material becomes increasingly difficult to obtain, it is becoming increasingly difficult and important to provide the most suitable litter conditions in terms of maintaining the healthy and quality development of poultry, together with the house management.

Table 1. Advantages and disadvantages of different litter materils[1].
Tablo 1. Değişik altlık malzemelerinin avantaj ve dezavantajları[1].

Pine shavings and sawdust[1]	It is a very preferred litter material but its quantity is small and expensive.
Hardwoodshaving and sawdust[1]	Mostly moisture is high and if it is not stored well before use, there is a dangerous level of mold growth.
Pine or hardwood chips [1]	It can be used successfully, but if an environment is created where it can absorb moisture, it can increase the breast blisters.
Rice hulls[1]	It is a suitable litter material, but small chicks can try to eat and the price is increasing in recent years.
Peanut hulls[1]	Peanut is a litter material which is very cheap in production areas. It can form pellets or layers, but this can be prevented by taking necessary precautions. Some problems with pesticides have been reported in the past.
Sugarcane[1]	The first few weeks are prone to agglomeration but can be used effectively when taken care of.
Crushedcorn cobs[1]	It is difficult to supply because of its limited production and it can increase the breast blisters if an environment is created where it can absorb moisture as pine or harwood chips
Chopped straw, hay or corn leafs[1]	It is prone to agglomeration; its predisposition to mold growth is a disadvantage. The level of hygiene and water retention capacity can be increased by pelleted.
Processed or choppped paper[1]	Humidity control is difficult and large parts can increase the ball overflow.
Washed sand[2]	Especially when it is new it is damp and heavy, so it is expensive to transport and needs to be laid before use.
Corn by-products[3]	It has been reported that the results are close to the wood when used alone or with the sawdust.
Peat moss	Price and personalities are available when available.[4]
Dried rument contents[3]	It was seen that the desired results could not be achieved in terms of feed conversion ratio, live weight gain and fot sole problems under temperature stress.

([1]Lacy, 1991)., [2]Bilgili et al., 2004, [3]Anonymous, 2004 c, [4]Anonymous, 2018).

It is not recommended to use hard wood shavings as the moisture absorption is very low. In addition, hard splinters can easily damage the skin and gizzard, and can be applied in chemical process besides high tannin content.

Rice hulls are also not very safe as litter material. Poultry can sometimes eat a large amount of rice hulls and this may cause obstruction in the digestive tract. The dust in rice hulls can be very high and may include fungal spores, which can lead to aspergillosisand eye irritation.Rice hulls that are not very good moisture absorbers can be used if they are low in cost.

When sand is considered as litter material, it has disadvantages such as its transportation costs due to its weight, its high humidity while it is new and the need to dry it in a clean and airy place before use. However, it has advantages such as large surface area, porous structure suitable for humidity control, easy adjustment of its level, durability and use in soil improvement.

In the United States, University of Alabama has recently investigated the use of fine sand in commercial broilers as litter material. It has been reported that broiler chickens grown in sand have similar field performance with those grown in sawdust.In comparison with the houses used in sawdust, it was stated that less dust, lower bacterial density, less parasite, less clumping and more controlled temperature (cold in summer, warm in winter) are provided in the coats using sand. It is stated that chickens grown in sand have better status in terms of foot pads.It is also possible to re-use the used sand for agricultural purposes and the researches on this subject are continuing (Bilgili et al., 2004).

In a study conducted in Iran, the effect of the use of corn by-products consisting of sawdust, chopped corn stalk and residues on silage preperation process on the live weight, feed conversion ratio, nitrogen levels and foot pad were investigated.It has been reported that the litter type significantly affects live weights, feed conversion raito and nitrogen levels. Good results have been achieved when corn by-products are used, both with and without pine sawdust (Khosravinia and Azarfar, 2004).

Litter Quality and Management

The quality of the litter material in broiler houses is usually a subject that is not focused on. Broiler growers are more interested in chick quality, feed and water and are less concerned with the litter. In terms of efficient broiler production, litter management is an important issue as far as ventilation, lighting, feeding, water quality and health.

Today's modern broiler lines have great potential for live weight gain and feed conversion. However, broiler chickens cannot reach this potential when the most suitable conditions are not reached. The provision of suitable conditions in the growing environment also depends on the quality of the litter and the quality of the litter is mainly affected by many factors such as the amount of feces and moisture from birds (Lacy, 1991). The moisture and quality of the litter material are determined to many factors such as birds' age, live weight, the stocking density, litter type and house equipment, that can be changed daily, some of which can be controlled, but some are unlikely to interfere.

For example, nutriton, which is a subject that growers can control at a low level, is a factor that can affect the litter quality. It has been reported that the levels of essential nutrients in feed, such as salt, are not within the desired limits, and that for example the high levels of them can cause excess feed and water consumption and resulting in the moist litter. Some drugs may cause excessive water consumption and defecation. Breeders have a low level of influence on litter managementr and have the means to control the litter moisture to maintain good litter quality only in order to raise a healthy, productive and profitable growing.

It is very important to store the litter material in a dry area before use. When the litter moisture falls below 20% and below, the dust level increases and air quality problems arise. When the moisture level exceeds 40%, the litter starts to moisten and clumps. It is applied as a practical method to test the accuracy of moisture content of the litter. When a handful is latched and released, small litter lumps adhered to the small particles are seen.When the litter is excessively moist, these lumps are tight, and if litter are too dry, the lumps will not form at all.

In order to good litter management, with sufficient experience, the rules of temperature and ventilation must be well known and applied. Proper ventilation, water management, diarrhea and the use of anti-diarrhea medication, mixig of moist and lumpy substrates, dehumidifier treatment is required for the goog litter management. Excessive moisture in the litter can be prevented or controlled to a certain extent, taking care to ensure that the clean and good quality drinking water and nutrition that no excess salt or protein. Particularly wet or clumped areas around the drinkers and feeders often need to be replaced with fresh, not too dry or moist litter material. Very dry or agglomerated sections should be mixed or dispersed without forming excess dust or ammonia. In order to prevent leakage in terms of water management, the pressure of water line and flow rate in the drinkers should be checked frequently and adjusted if necessary. If necessary, changing the location of the bell drinkers also helps to keep the litter dry. In particular, the litter around feeders and drinkers should be checked more frequently.

The moist litter can increase the coccidiosis problem by providing an ideal environment for the oocytes to form spores. Very high litter moisture increases potential meat qualityissues such as breast blisters and healthproblems likefoot pad dermatitis, leg problems, coccidiosis, proliferation of flies and high ammonia produced

by the breakdown of uric acid by bacteria in the litter causing lung problems.

Today, one of the most important issues in broiler production is ammonia level in the house. The formation of ammonia in the houses is caused by the breakdown of the nitrogenous compounds in the litter, mainly uric acid, as a result of microbial activity. Generally, when a litter control system is not applied, the pH of the litter with the ammonia gas outlet from the litter tends to become more alkaline. Ammonia density tends to increase as the litter pH increases. Depending on the pH level of the free ammonia in the litter, unsaturated form of NH_3 (ammonia) or saturated ammonium ion (NH_4^+) is one of the form. If the free ammonia is converted to ammonium by decreasing litter pH, ammonia gas (NH_3) output can be reduced. When the litter pH is below 7.0, the ammonia output is low, but it can be difficult to change when the pH is above 8.0. Uric acid cleavage occurs most in alkaline (pH > 7.0) conditions.

Many broiler growers know the very important harmful effects of ammonia. However, although ammonia at a level of 20 ppm can normally be felt by humans, breeders (including experts) may lose these sensitivities over time. Levels higher than 20 ppm cause adverse effects on broiler performance and short-term exposure to high levels, as well as prolonged exposure to low levels are also harmful. Ammonia intensities of 50 to 100 ppm cause burns and aging in people's eyes. Broilers are sensitive to ammonia and may experience visual disturbances (keratoconjunctivitis) if they are exposed to high levels of (50-100ppm) ammonia gas for a long time. This is more common in the cold periods when the air inlets are closed and the minimum ventilation is applied. High levels of ammonia, which can cause visual impairment in chickens, naturally affect production, but low levels of 25ppm are also known to suppress growth and cause a negative effect by increasing the feed conversion ratio and low ammonia level is a problem when the litter is too dry.

If the humidity in the poultry house is too low, it can cause to dusty litter and dehydration (loss of water) in birds. In addition, a very dry or dusty litter is known as a factor in the emergence of respiratory problems. Because dust acts as a means of carrying pathogenic bacteria to the birds' respiratory system problems and can cause many breathing problems such as aspergillosis, trachea inflammation by increase condensation on the wall and ceiling of the house. The dryness of the litter can be controlled or prevented by spraying water to the litter in dry weather, by selecting a better quality litter and using water absorbent litter additives such as $MgCl_2$.

In order to ensure that the litter quality is properly maintained until the end of the growing period, environmental conditions such as poultry temperature, ventilation, and water management should be adjusted and maintained in a way to ensure the optimum values and continuity.

If the ventilation system in the broiler house is not effective in removing moisture, a decrease in air temperature or a few days of rainy and humid weather may cause wet litter. If not handled well, drinkers, fogging units and cooling pads in hot periods can also cause wet litter problems.

There are very important issues that need to be taken into account in good litter management. It would be appropriate to increase the minimum ventilation rate to reduce ammonia levels in the first few days, which is the most important period in the life of chickens.

In cold weather, the supply of fresh air into the poultry house will be effective. In poultry houses with a negative pressure system, attention must be paid to the static pressure and, accordingly, to the air velocity in the air inlets. This will help to ensure that the incoming air is quickly drawn onto the broilers and that the condensed air does not fall to the floor, so that it can be drawn in and created a good air mixture.

The blowing or mixing fans in the house can also help to dry the base by moving the warm air near the roof, which can keep more moisture and close the roof.

Drinker systems should be checked frequently for leaks and corrected if necessary.

It is necessary to keep the nipple drinker systems in accordance with the height and pressure.

If it is wet, it is necessary to remove the wet and deteriorated litter, and replace the new unused litter material.

To facilitate removal of moisture when necessary, the house can be heated slightly. This helps to remove unwanted moisture from the house as the air inside it increases as the moisture retention capacity will increase.

Leakage of moisture from the outside to floor should be prevented by a good drainage system around the poultry house.

In case the partition material is used to divide the birds in the house, removal of them, if necessary, in order to ensure that fresh air is accessible to each part of the house, may allow

dilution of free ammonia and the fight against pathogens if necessary.

Reclamation of Litter

Many polutry growers also grow other farming activities as animal breeding, crops, fruit and vegetables cutivation and they needs animal manure. Therefore, poultry breeders should pay attention to the quality of litter (hence fertilizer) at every stage of production such as cattle and sheep breeders.

The agricultural soils in Turkey are generally poor in terms of clay textures, high pH, high calcareous, nitrogen, phosphorus and organic substances (about 91.4 %), zinc and iron deficiency (Taban, 2007). According to this, it is understood that the agricultural lands in our country are not as good as they are considered in terms of efficiency. It is known that there are similar deficiencies in the land of many countries in the world.

It is necessary to make fertilizers to be more efficient in agricultural lands, to maintain their yields, and to give nutrients to the soil, which are removed or removed from the soil. This is the best way for the environment and society to use organic fertilizers. However, due to some undesirable effects of chemical fertilizers in the soil, it is necessary to make official regulations that promote the use of organic fertilizers and reduce the use of chemical fertilizers, as in developed countries.

The “used litter” obtained from broiler houses is actually a kind of “semi-finished organic fertilizer”. Because, the used litter is a natural waste of biodegradation process from feed to product and contains generally soluble and readily degradable organic matter and inorganic components. This semi-finished organic fertilizer is a fertilizer which is rich in organic matter content and thus increases the water holding capacity of the soil and provides the soil to be enriched in nutrients such as nitrogen, phosphorus, potassium and sulfur. Therefore, used poultry litter and feces or in other words, poultry manure is considered as semi-finished organic fertilizer by the agriculture and livestock industry, is a valuable nutrient provider and regulator and conditioner for the soil.It is a better and more economical nutrient supplier than commercial fertilizers when properly maturated and applied to soil (Kacar and Katkat, 2009).

This semi-finished organic fertilizer is a by-product that can be applied to the soil as organic fertilizers after composting or actual natural condition (Kacar and Katkat, 2009; Taban, 2007; Yaldız et al., 2017). This by-product can also be used in the production of heat energy by burning or production of electric energy by thermal process such as pyrolysis (Demirulus and Aydın, 1996; Moore et al., 1998; Kelleher et al., 2002).

In some regulations, this semi-finished organic fertilizer, which is called waste, can be considered as hazardous waste and the applications can be realized accordingly. When semi-finished organic fertilizer is considered as hazardous waste, it is still a by-product that is prohibited in the collection, transportation and processing of the general practices in the field and that these processes should be done by special methods. In some countries, there is no direct legislation on the evaluation and use of semi-finished organic fertilizers and is considered out of scope according to regulations such as the control of solid wastes. The studies carried out by related institutions on this subject are continuing in these countries (Anonymous, 2010, Anonymous, 2011).

In addition, the soil structure in the regions that have not been made so far should be determined in more detail by means of the analyzes to be carried out, to what extent the semi-product organic fertilizer and/or organic fertilizer should be taken into the land, and this information should be published by the relevant institutions in a way that everyone can access. It is also necessary to transfer the information published within the framework of compliance to the world and the EU (Anonymous 2004a; Anonymous, 2004b; Anonymous, 2004c).

Conclusion

According to the actual legislations, it is possible to state that the rules and regulations recommended in the houses are somewhat conservative but reliable. Using of poultry manure for agricultural purposes in the fields will continue to be a sensitive issue in the future. Conflicts between the institutions with the joint work to be done by the relevant institutions should be eliminated, temporary and permanent used litter storage and processing locations should be determined and relevant official arrangements should be completed. Thus, the concept of confusion between official institutions and between official institutions and actual practice will be eliminated and a common definition and solution will be found to satisfy all parties.

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Uluslararası Anadolu Ziraat Mühendisliği Bilimleri Dergisi
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Uluslararası Anadolu Ziraat Mühendisliği Bilimleri Dergisi - UAZİMDER -
Yayın İlkeleri

Uluslararası Anadolu Ziraat Mühendisliği Bilimleri Dergisi'nde tarım bilimleri alanında Türkçe, İngilizce ve Rusça makaleler yayınlanır. Özgün nitelikli araştırma sonuçlarını içeren makaleler yanında sınırlı sayıda derleme ve çevirilere de yer verilir. Dergi yılda en az dört kez olmak üzere Şubat, Mayıs, Ağustos, Kasım aylarında online olarak yayınlanır.

Dergiye gönderilen makaleler başka yerde yayınlanmamış ve yayın hakkı devredilmemiş olmalıdır. Çalışmaların bilimsel etik alanındaki her türlü sorumluluğu yazar/larına aittir. Yayın hakkı **Uluslararası Anadolu Ziraat Mühendisliği Bilimleri** dergisine aittir. Yazar/lara telif hakkı ödenmez.

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Makaleler Yayın Kurulu tarafından incelenerek iki adet hakeme gönderilir. Hakem önerileri ve yazarın cevap hakkı dikkate alınarak Yayın Kurulu tarafından kabul veya ret kararı alınır. İhtilaflı durumlarda Dergi Danışma Kurulu üyelerinin kararı bağlayıcıdır. Gerekli olması durumunda üçüncü bir hakemden görüş alınır. Hakem ya da Yayın Kurulu tarafından önerilen değişiklik ve düzeltmeler sorumlu yazara iletilir. Makale üzerinde bu değişiklik ve düzeltmeler dışında sonradan ekleme ya da çıkarma yapılamaz.

Uluslararası Anadolu Ziraat Mühendisliği Bilimleri Dergisi
Yazım Kuralları

Sayfa düzeni ve yazı karakteri: Makaleler A4 ebadındaki kağıda, her taraftan 2.5 cm boşluk bırakılacak şekilde, 11 punto büyüklüğünde, tek satır aralığı ve Times New Roman karakteri ile Windows uyumlu işlemcide yazılmalıdır. Şekil ve Çizelgeler dahil toplam sayfa sayısının 15'i geçmemesine özen gösterilmelidir. Paragrafların ilk satırı 0.5 cm içeriden başlamalı, paragraflar arası boşluk bırakılmamalıdır. Makale çift sütun halinde düzenlenmelidir. Sütun genişliği 7.75 cm, sütunlar arası boşluklar ise 0.5cm olmalı ve iki yana yaslanmalıdır..

Türkçe makale metni sırasıyla; başlık, yazar isim ve adresleri, özet, anahtar kelimeler,

İngilizce makale metni sırasıyla; Title, Author (s), Address, Abstract, Keywords, Introduction, Material and Method, Result(s), References bölümünden oluşmalıdır.

Rusça dilinde hazırlanmış makalelerin Başlık, Adres, Özet ve Anahtar kelimeler İngilizce verilmelidir.

Makale Başlığı: Makalenin Türkçe ve İngilizce başlığı 12 punto olacak şekilde yazılmalıdır. Kalın, düz ve ilk harfleri büyük olarak sayfanın ortasına hizalanmalı, Türkçe makale başlığından önce 3 satır aralığı ve sonrasında tek satır aralığı olacak şekilde düzenlenecektir. İngilizce makale başlığı özetten sonra tek satır bırakılarak yazılmalıdır.

Yazar isim(ler)i: Başlığın altına bir boşluk bırakılarak yazar(lar)ın isim ve soy isimleri kısaltılmadan yazılmalı, yazar(lar)ın ünvanı ve adresi yazar isimlerinin altında bir boşluk bırakılarak verilmelidir. Yazar isim ve adresleri 10 punto ile yazılmalı, sorumlu yazara ait e-posta adresi bir boşluk verilerek yazar adresinin altına verilmeli, makale başlığı, yazar(lar), adresler iki yana hizalı olmalıdır.

Özet / Abstract: Türkçe özet ve ingilizce abstract, yazar(lar)ın isim ve adresinin altında bir boşluk vererek 200 kelimeyi geçmeyecek şekilde olmalı, tek sütun olarak ve iki yana yaslı, özet başlığı 11 punto ve ortalı, özet metni ise 10 punto ve iki yana yaslı olacak şekilde yazılmalıdır.

Anahtar Kelimeler / Keywords: Anahtar kelimelerden önce özet ile arasında boşluk bırakılmamalıdır. "Anahtar kelimeler" yazısı kalın, düz (italik olmayacak şekilde), ilk harfleri büyük, 10 punto büyüklüğünde yazılmalıdır. Anahtar kelimelerin ilk kelimesinin ilk harfi büyük, diğer kelimelerin tamamı küçük harf olmalı, virgül ve bir boşluk ile birbirinden ayrılmalıdır. Anahtar kelimelerin 7'yi geçmemesine özen

gösterilmelidir. Anahtar kelimelerin seçiminde Agris–Caris sınıflandırmasından faydalanılması tavsiye edilir.

Metin: Yazı genel olarak 1) Giriş, 2) Materyal ve Metot, 3) Bulgular, 4) Tartışma, 5) Sonuç/lar, 6) Kaynaklar bölümlerinden meydana gelmelidir, 3 ve 4 maddeleri "Bulgular ve Tartışma" başlığı altında tek bölümde incelenebilir. Derleme makaleler, materyal, metot ve bulgular başlıkları dikkate alınmadan diğer kurallara uyumlu olarak yazılır. Makalenin metin bölümünde bulunan başlıkların tamamı iki yana yaslı, 11 punto büyüklüğünde, kalın ve ilk harfleri büyük olmalıdır. Ana başlıklar koyu ve normal olmalı, üstten ve alttan tek satır boşluk bırakılmalı, ikinci derece başlıklar koyu, italik olmalı ve üstten ve alttan tek satır boşluk bırakılmalı, üçüncü derece başlıklar normal, italik olarak yazılmalı ve satır boşluğu bırakılmamalıdır. Paragraflar 0.5 cm içeriden başlamalıdır.

Şekiller ve Çizelgeler: Makalede yer alan şekil, grafik, fotoğraf vb. "şekil"; sayısal değerler ise "çizelge" olarak belirtilmeli ve metin içinde atıfta bulunulmalıdır. Açıklama yazıları şekillerin altında, çizelgelerin üstünde verilmelidir. Açıklamalar Türkçe ve İngilizce olarak yazılmalıdır. Ayrıca çizelge ve şekil içerisinde kullanılan ifadelerin İngilizce karşılıkları da yazılmalıdır. Şekil ve Çizelgeler mümkün olduğu kadar birleştirilerek ve özetlenerek verilmelidir. Ortalamalar arasındaki farklılığın önemi için yapılan test ve seviyesi Çizelge altında verilmelidir. Şekiller baskı tekniğinin gereği olarak Microsoft Office programında düzenlenmelidir. Fotoğraflar baskıya uygun olarak seçilmelidir. Şekil ve Çizelge örnekleri aşağıda verilmiştir. Şekil ve çizelgeler bulundukları bölümlerin numaralarına bakılmaksızın şekiller ve çizelgeler kendi aralarında nümerik olarak numaralandırılmalıdır. Şekiller ve çizelgeler yazısı iki yana yaslı, 8 puntodan küçük ve 11 puntodan büyük olmayacak şekilde Time News Roman yazı tipinde düz ve normal olarak yazılmalıdır. Çizelgeler eğer ikinci sütuna taşacak olursa çizelge yazısından önce ve çizelgeden sonra bölüm sonu eklenerek çizelge tek sütün haline getirilmelidir.

***Birimler*:** Makalelerde SI (Systeme International d'Units) ölçü birimleri kullanılacaktır. Ondalık ayırmalarda virgül yerine nokta kullanılmalıdır.

***Kaynaklar*:** Çalışmada faydalanılan kaynaklar yazar/ların soyadı sistemine göre verilmelidir. Yazar isimleri gerek metin içerisinde ve gerekse kaynaklar listesinde baş harfi büyük diğer kısmı küçük harflerle yazılmalıdır. Metin içerisinde kaynaklar belirtilirken araştırıcının ismi ve makalenin yayın yılı cümle içinde veya cümle sonunda verilmelidir. (Örneğin: Ceviz'de randıman üzerine sulama olumlu etki yapar (Şen, 1986). İç meyve ağırlığı yönünden bölgeler arasında fark yoktur (Tekintaş, 2011; Özrenk, 2014). Aşkın ve Kazankaya (2001) yaptıkları çalışmada... gibi). Eserde faydalanılmayan kaynaklar bu bölümde gösterilmez. Kaynakça metni 10 punto, düz ve normal yazılmalıdır. Kaynakça ikinci satıra taşıyorsa ikinci satır 1 cm girinti ile başlamalıdır.

Kaynak verilişine ait bazı örnekler aşağıda gösterilmiştir.

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Tez:

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Süreli Yayınlar:

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Elektronik Kaynaklar:

Stiglitz, J.E., 1999. Whither reform? Ten years of the transition. *Annual World Bank Conference on Development Economics, Washington, DC, 28–30 April,* (www.worldbank.org/research/abcde/stiglitz.html), (Erişim: Mayıs 2019).

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