

**ABANT İZZET BAYSAL ÜNİVERSİTESİ**  
**ZİRAAT VE DOĞA BİLİMLERİ FAKÜLTESİ**

**ABANT IZZET BAYSAL UNIVERSITY**  
**FACULTY OF AGRICULTURE AND NATURAL SCIENCES**

**ULUSLARARASI TARIM VE YABAN HAYATI**  
**BİLİMLERİ DERGİSİ**

**INTERNATIONAL JOURNAL OF AGRICULTURAL AND**  
**WILDLIFE SCIENCES**

---

Cilt	<b>1</b>	Sayı	<b>2</b>	<b>2015</b>
Volume		Number		

---

Uluslararası Tarım ve Yaban Hayatı Bilimleri Dergisi	International Journal of Agricultural and Wildlife Sciences
Dergi web sayfası: <a href="http://dergipark.ulakbim.gov.tr/ijaws">http://dergipark.ulakbim.gov.tr/ijaws</a>	Journal homepage: <a href="http://dergipark.ulakbim.gov.tr/ijaws">http://dergipark.ulakbim.gov.tr/ijaws</a>

**Baş Editör**

Yrd. Doç. Dr. Hakan KİBAR, Abant İzzet Baysal Üniversitesi

Editor in Chief

**Yardımcı Editörler**

Yrd. Doç. Dr. Faheem Shahzad BALOCH, Abant İzzet Baysal Üniversitesi

Yrd. Doç. Dr. Bahtiyar Buhara YÜCESAN, Abant İzzet Baysal Üniversitesi

Associate Editors

Araş. Gör. Mehmet Zahit YEKEN, Abant İzzet Baysal Üniversitesi

**Bölüm Editörleri**

Section Editors

Prof. Dr. Mehmet Erhan GÖRE, Abant İzzet Baysal Üniversitesi

Doç. Dr. Handan ESER, Abant İzzet Baysal Üniversitesi

Yrd. Doç. Dr. İhsan CANAN, Abant İzzet Baysal Üniversitesi

Yrd. Doç. Dr. Beyhan KİBAR, Abant İzzet Baysal Üniversitesi

Yrd. Doç. Dr. Cihangir KİRAZLI, Abant İzzet Baysal Üniversitesi

Yrd. Doç. Dr. Kadir Ersin TEMİZEL, Ondokuz Mayıs Üniversitesi

Yrd. Doç. Dr. Gülsüm YALDIZ, Abant İzzet Baysal Üniversitesi

**Danışma Kurulu**

Advisory Board

Prof. Dr. Burhan ARSLAN, Namık Kemal Üniversitesi

Prof. Dr. Fikri BALTA, Ordu Üniversitesi

Prof. Dr. Wolfgang KREIS, Friedrich Alexander University

Prof. Dr. Mehmet ÜLKER, Yüzüncü Yıl Üniversitesi

Assoc. Prof. Frieder MULLER, Friedrich Alexander University

Assoc. Prof. Qasim SHAHID, South China Agricultural University

Doç. Dr. Halil KÜTÜK, Abant İzzet Baysal Üniversitesi

Assist. Prof. Muhammed Naeem SATTAR, University of the Punjab

Yrd. Doç. Dr. Süleyman TEMEL, Iğdır Üniversitesi

Dr. Khalid MAHMOOD, Aarhus University

Dr. Mueen Alam KHAN, Nanjing Agricultural University

# Ürün Bilgisi (Product Information)

**Yayıncı**  
Publisher

Abant İzzet Baysal Üniversitesi  
Abant İzzet Baysal University

**Sahibi (AİBÜZDF Adına)**  
Owner (On Behalf of AIBUZDF)

Prof. Dr. Vahdettin ÇİFTÇİ, Dekan (Dean)

**Sorumlu Yazı İşleri Müdürü**  
Editor-in-Chief

Yrd. Doç. Dr. Hakan KİBAR

**Dergi Yönetimi**  
Journal Administrator

Yrd. Doç. Dr. Faheem Shahzad BALOCH  
Yrd. Doç. Dr. Bahtiyar Buhara YÜCESAN  
Araş. Gör. Mehmet Zahit YEKEN

**Yayın Dili**  
Language

Türkçe, İngilizce  
Turkish, English

**Yayın Aralığı**  
Frequency

Yılda iki kez yayınlanır  
Published two times a year

**Yayın Türü**  
Type of Publication

Hakemli yaygın süreli yayın  
Double-blind peer-reviewed

Dergi e-ISSN  
Journal e-ISSN

2149-8245

## Dergi Yönetim Adresi

Uluslararası Tarım ve Yaban Hayatı Bilimleri  
Dergisi  
Abant İzzet Baysal Üniversitesi  
Ziraat ve Doğa Bilimleri Fakültesi  
14280, Bolu-TÜRKİYE

## Journal Management Address

International Journal of Agricultural  
and Wildlife Sciences  
Abant İzzet Baysal University  
Faculty of Agriculture and Natural Sciences  
14280, Bolu-TURKEY

Telefon: +90 0374 2534345  
Faks: +90 0374 2534346  
E-posta: ijawseditor@ibu.edu.tr

Telephone: +90 0374 2534345  
Fax: +90 0374 2534346  
E-mail: ijawseditor@ibu.edu.tr

## Tarandığı İndeksler

Indexed



---

# İÇİNDEKİLER-CONTENTS

---

<b>Nar (<i>Punica granatum</i> L.) Çeşit ve Genotiplerin Fizikokimyasal Karakterizasyonu</b> Physicochemical Characterization of Pomegranate ( <i>Punica granatum</i> L.) Varieties and Genotypes <i>Muttalip GÜNDOĞDU, Hüda YILMAZ, İhsan CANAN</i> .....	57 - 65
<b>Türkiye’de Limon Üretim Bölgesine Yakın Yerlerde Kullanılan Doğal Depoların Mevcut Durumu ile Sıcaklık ve Nem Durumlarının Araştırılması</b> The Research of Conditions, Temperatures and RH Values of Natural Storagehouses Where Close to Lemon Production Areas in Turkey <i>İhsan CANAN, İbrahim Tayfun AĞAR, Muttalip GÜNDOĞDU</i> .....	66 - 77
<b>Farklı Karbondioksit Dozlarının Hidroponik Buğday (<i>Triticum aestivum</i> L.) Çim Suyunun Verim ve Besin Değerleri Üzerine Etkileri</b> The Effects of Different Carbon Dioxide Doses on Yield and Nutritional Values of Hydroponic Wheat ( <i>Triticum aestivum</i> L.) Grass Juice <i>Muhammet KARAŞAHİN</i> .....	78 - 84
<b>Bazı Adi Fiğ Çeşitlerinde Farklı Ekim Tarihlerinin Yaprak Alan İndeksine Etkisi</b> The Effect of Different Sowing Dates to Leaf Area Index in Some Common Vetch Varieties <i>Süleyman TEMEL, Veli YILDIZ, Ahmet Eren KIR</i> .....	85 - 93
<b>Farklı Azot ve Fosfor Seviyelerinin Kuru Şartlarda Yetiştirilen Aspir (<i>Carthamus tinctorious</i> L.) Bitkisinin Bazı Verim Özellikleri Üzerine Etkisi</b> Effect of Different Levels of Nitrogen and Phosphorus on the Some Yield Components of Safflower ( <i>Carthamus tinctorious</i> L.) in Dry Conditions <i>Yusu ARSLAN, Nilgün BAYRAKTAR</i> .....	94 - 103
<b>Evaluation of Queen Bee Production in Turkey</b> Türkiye’de Ana Arı Üretiminin Değerlendirilmesi <i>Murat EMİR</i> .....	104 - 107
<b>Virus Resistance in Potato Cultivars: A Review on The Use of Pathogen-Derived Resistance Strategies as a Tool</b> Patates Kültürlerinde Virus Dirençliliği: Patojen Köken Viral Dirençlilik Üzerine Strateji Belirlemesi <i>Rabia JAVED, Javaria QAZI</i> .....	108-116
<b>Mantar Muhafazasında Hipobarik Depolama Tekniği</b> Hypobaric Storage Technique in The Mushroom Preservation <i>Hakan KİBAR, Beyhan KİBAR</i> .....	117 - 125

## Hakemler/Reviewers

Prof. Dr. Havva İLBAĞI, Namık Kemal Üniversitesi, Tekirdağ

Prof. Dr. Aysun PEKŞEN, Ondokuz Mayıs Üniversitesi, Samsun

Prof. Dr. Murat SAYILI, Gaziosmanpaşa Üniversitesi, Tokat

Prof. Dr. Mustafa TAN, Atatürk Üniversitesi, Erzurum

Doç. Dr. Kazım GÜNDÜZ, Mustafa Kemal Üniversitesi, Hatay

Doç. Dr. Bilal KESKİN, Iğdır Üniversitesi, Iğdır

Doç. Dr. Ferat UZUN, Ondokuz Mayıs Üniversitesi, Samsun

Yrd. Doç. Dr. Ziya DUMLUPINAR, Kahramanmaraş Sütçü İmam Üniversitesi, Kahramanmaraş

Yrd. Doç. Dr. Tamer ERYİĞİT, Yüzüncü Yıl Üniversitesi, Van

Yrd. Doç. Dr. Mustafa Kenan GEÇER, Iğdır Üniversitesi, Iğdır

Yrd. Doç. Dr. Duran KATAR, Osmangazi Üniversitesi, Eskişehir

Yrd. Doç. Dr. Ahmet ÖZTÜRK, Ondokuz Mayıs Üniversitesi, Samsun

Yrd. Doç. Dr. Ferhat ÖZTÜRK, Canik Başarı Üniversitesi, Samsun

Yrd. Doç. Dr. Onur SARAÇOĞLU, Gaziosmanpaşa Üniversitesi, Tokat

## Evaluation of Queen Bee Production in Turkey

Murat Emir\*

Ondokuz Mayıs University, Samsun Vocational School, Samsun, Turkey

Received: 21.07.2015

Accepted: 19.11.2015

### Key words:

Honey bee (*Apis mellifera* L), queen bee, beekeeping, production capacity, Turkey

**Abstract.** The main objective of this study is to determine the current situation of the queen bee production in Turkey. In accordance with this objective, we will suggest solutions by dealing with queen bee production capacity by country and the situation of queen bee producers. The main data contain numerous related studies conducted in Turkey and other countries. This study reviews this field studies and synthesis them to reach general deductions. The performance of the queen bee affects the performance of the colony. The quality of the queen bee is extremely important in honey yield of the colony. Honey yield of Turkey per colony is only 14 kg in 2014; the queen bee factor is among the major causes of low yield. The annual capacity of 104 queen bee producers authorized by ministry is about 351 thousands of queen bees. These producers are active in 28 provinces of the country. Consequently, the annual queen bee production capacity does not meet the requirements of seven million colonies in the country. There are no studies available on the ability of existing queen bee production facilities to increase their capacity and capital requirements. In addition, no feasibility study was carried out to establish new queen bee production facility. Moreover, there are no studies including the technical and economic activities of queen bee producers in Turkey at enterprise level. Data-based answers should be analyzed to meet this need by calculating the existing bee producers' capacity expansion trends and additional investment costs needed by the existing beekeeping enterprises in queen bee production.

### \*Corresponding author

e-mail: muratmir@omu.edu.tr

## Türkiye'de Ana Arı Üretimini Değerlendirilmesi

### Anahtar kelimeler:

Bal arısı (*Apis mellifera* L), ana arı, arıcılık, üretim kapasitesi, Türkiye

**Özet.** Bu çalışmanın temel amacı, Türkiye'de ana arı üretiminin mevcut durumunu tespit etmektir. Bu amaç çerçevesinde ülkemiz ana arı üretim kapasitesi ve üreticilerin durumuna ilişkin çözümler önerilecektir. Çalışmanın ana veri kaynağı, Türkiye ve diğer ülkelerde yapılan ilgili çalışmalardır. Bu çalışma, bu alanda yapılan çalışmaları gözden geçirerek genel çıkarımlara ulaşmak için sentezlemiştir. Ana arının performansı koloni performansını etkilemektedir. Ana arının kalitesi, koloni bal veriminde son derece önemlidir. Türkiye'nin koloni başına bal verimi 2014 yılında sadece 14 kg olurken, düşük verimin önemli nedenlerinden biri ana arı faktörüdür. Bakanlık tarafından yetkilendirilmiş 104 ana arı üreticisinin toplam yıllık kapasitesi 351 bin adettir. Bu üreticiler, ülkenin 28 ilinde faaliyet göstermektedirler. Türkiye genelinde yedi milyonu aşan koloni bulunmasından dolayı mevcut üreticilerin yıllık 351 bin ana arı üretim kapasitesi yeterli olmamaktadır. Türkiye'de ana arı üreticilerinin teknik ve ekonomik faaliyetlerini içeren işletme düzeyinde çalışma bulunmamaktadır. Ayrıca ana arı üretiminde üretici unsurları ve kalitesi konusunda yeterince çalışma mevcut değildir. Bunun yanında mevcut ana arı üretim işletmelerinin kapasitelerini artırabilme kabiliyeti ve sermaye gereksinimi üzerine çalışmalar bulunmamaktadır. Belirtilen ihtiyaca mevcut ana arı üreticilerinin kapasite artırım eğilimleri ve mevcut arıcılık işletmelerinin ana arı üreticiliği için ihtiyaç duyacağı ilave yatırım maliyetinin hesaplanması ile veriye dayalı yanıt aranmalıdır.

### \*Sorumlu yazar

e-mail: muratmir@omu.edu.tr

## 1. INTRODUCTION

For honey bee colonies, the importance of queen bee for the colonial life stems from its reproductive ability and secreting pheromones to ensure order and integrity throughout the colony.

Breeding season, flora, climate, selection of genotypes, breeding material supply, number of drones, breeding method, situation of starter colonies, feeding, condition of colony, basic thimble features, larval transfer methods, number of grafted larvae and age are of the most important factors affecting queen bee quality (Şahinler and Kaftanoğlu 1997).

Quality determinants of queen bees are such as hatching weight, diameter and volume of the seminal vesicles (spermatheca), number of ovariole and ovarium weight. Many researchers indicate these features' relationships with larvae production in the colony, population development and yield (depending on these two) and the relationships between them (Zhdanova 1967; Woyke 1967; Woyke 1971; Harbo 1986).

The majority of the queen bee needed in Turkey consists of queen bees produced with natural methods. In natural queen bee producing, there are several drawbacks such as failure to implement breeding program, using too many worker bees for queen bee production, interruption of incubation activities in the colony until the queen bee starts laying and decline in the quality of produced queen bees due to their inability to be fed enough during larvae period (Arslan and Hamgir 2010).

The fact that the inefficiency of beekeeping in Turkey depends on raising the breeding queen bees is largely explained by the problems such as lack of annual renewal of queen bees, doing beekeeping in anywhere with all kinds of genotypes regardless of ecological compatibility and not breeding the genetic material that is resistant to diseases and parasites (Firatlı et al., 2000).

There are a large number of studies on queen bees (Zhdanova 1967; Woyke 1967; Woyke 1971; Morse 1979; Harbo 1986; Şahinler and Kaftanoğlu 1997; Gençer and Firatlı 1999; Firatlı et al., 2000; Dodoloğlu and Genç, 2001; Genç et al., 2005; Güler and Alpay, 2005; Güler 2006; Dodoloğlu and Emsen, 2007; Firatlı, 2007; Akyol et al., 2008; Oskay 2008; Arslan and Hamgir, 2010; Güler 2010; Linksvayer et

al., 2011; Güler and Toy, 2013; Ozturk 2014; Wen et al., 2014).

The main objective of this study is to determine the current situation of the queen bee production in Turkey. In accordance with this objective, the purpose of this review is to suggest solutions by dealing with (i) queen bee production capacity by country and the situation of queen bee producers, (ii) the studies on queen bee production and (iii) the need for queen bee production.

## 2. THE CURRENT SITUATION OF QUEEN BEE PRODUCTION IN TURKEY

Queen bees in the colonies should be renewed once in every two years for economic beekeeping. In this case, Turkey's annual queen bee need is three million units. However the annual queen bee capacity of the 104 queen bee producing enterprises authorized by the Republic of Turkey Ministry of Food, Agriculture and Livestock is around 351 thousands in Turkey (Figure 1). This situation reveals that the existing queen bee producers can only meet 12% of the country's needs.

Erkan and Aşkın (2001), Kutlu (2014), Yalçın (2014), Emir (2015) examined to determine queen bee breeding methods in the field study about beekeepers. According to Yalçın (2014), 44% of the beekeepers in Tokat buy queen bees. However, this percentage (outsourcing) is lower in the studies conducted by Erkan and Aşkın (2001) and Kutlu (2014). About 25% of the beekeepers in Bahçesaray district of Van (Erkan and Aşkın, 2001) and 12% of the beekeepers in Gaziantep (Kutlu 2014) buy queen bees.

In the most comprehensive study conducted in Turkey with 455 beekeepers (from 37 provinces, 166 districts and 315 villages-districts), Emir (2015) found that 54% of the beekeepers raise queen bees for their own needs and do not buy; the remaining 46% of the beekeepers outsource queen bees in addition to their production. According to all these studies, it is possible to say that queen bee supply differs between provinces in Turkey. Besides, a significant portion of beekeepers has been identified to have produced queen bees to meet their own needs. It is indicated that the importance of queen bees' role in honey yield and the low yield in the country is seen

to have depended on queen bee quality. According to the studies, this situation is caused by the lack of professional queen bee production.

Emir (2015) has introduced the only study in which he dealt with the beekeepers that produce queen bees commercially. According to this study, nine of the 455 beekeepers who participated in the study are queen bee producers. There has been no study about queen bee producers at economic level other than this study. The study having limited sampling capacity dealt with cost factors, costs and sales prices of queen bee production. According to the study, the cost of a queen bee is \$5.4 and the average sales price is \$10.56.

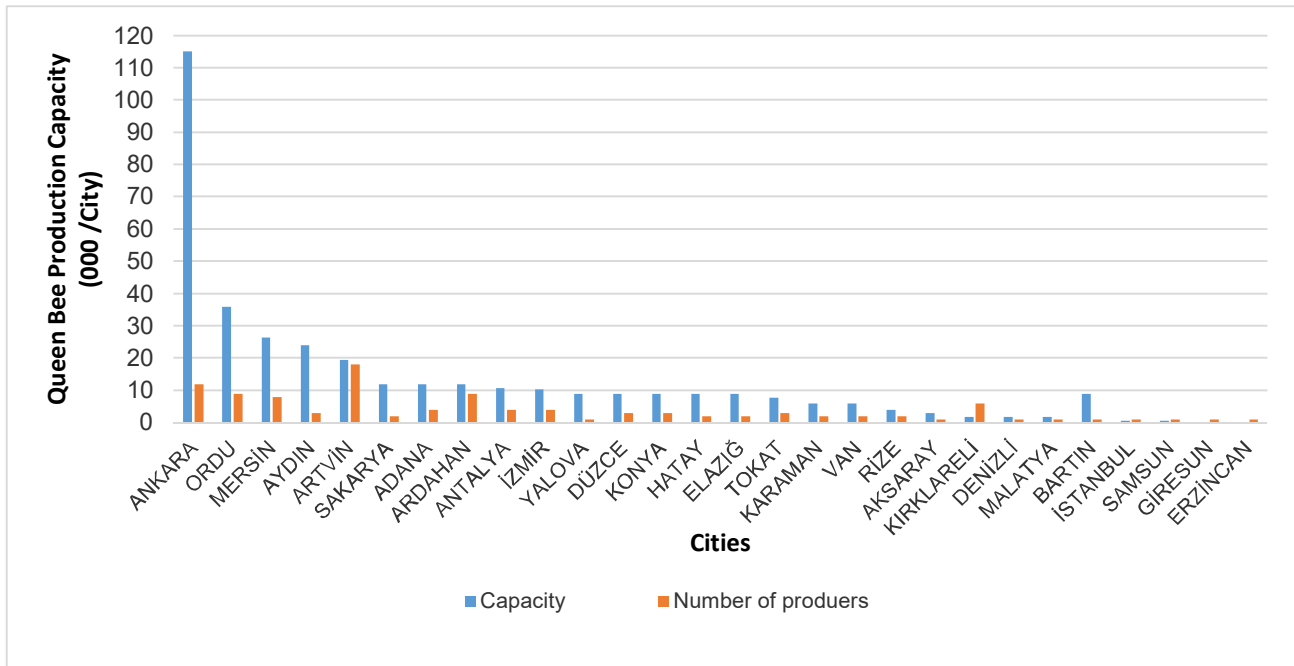
### 3. CONCLUSION

The queen bee production capacity of authorized enterprises in Turkey is 350 thousands and the total number of colonies exceeds seven million. Promoting the production of queen bees and the initiation of the capacities of the authorized

enterprises are very important. Currently, even if the authorized enterprises double their existing capacities, teaching/training the beekeepers to implement larval transfer method in queen bee breeding is a priority since that would not meet the need of Turkey.

Producer element has such a prominent position in colonial life; however, it was not discussed in depth in the studies on queen bees. There is a critical knowledge gap at enterprise level in Turkey in terms of queen bee producers' production and marketing characteristics, structural features, capital structure, annual (operational) results, production costs, cost factors etc. Therefore, there is need for studies dealing with the technical and economic structure of the queen bee producers in Turkey.

Data-based answers should be analyzed to meet this need by calculating the existing bee producers' capacity expansion trends and additional investment costs needed by the existing beekeeping enterprises in queen bee production.



**Figure 1.** Queen bee production capacity and distribution of queen bee producers by provinces (%).  
 Şekil 1. İllere göre ana üretim kapasitesi ve ana arı üretici dağılımı (%).



## REFERENCES

- Akyol E., Korkmaz A., Yeninar H and Çakmak İ., 2008. An observation study on the effects of queen age on some characteristics of honeybee colonies. *Italian Journal and Animal Sciences*, 7(1): 19-25.
- Arslan S and Hamgir B., 2010. The effects of different colony population sized queenright & queenless starting colonies and rearing season on queen bee (*apis mellifera* L.) quality and rearing parameters. *Journal of Agricultural Faculty of Gaziosmanpasa University*, 27(2): 81-88.
- Emir M., 2015. Exploring the socio economic structure of beekeepers and their production efficiency in Turkey. PhD Thesis. Ondokuz Mayıs University Department of Agricultural Economics, Samsun.
- Erkan C and Aşkın Y., 2001. The structure and activities of beekeeping in Bahçesaray, Van. *Yuzuncu Yil University Journal of Agricultural Sciences*, 11(1): 19-28.
- Fıratlı Ç., 2007. Breeding queen bee in Turkey. *Beekeeping Seminar in Aegean*, 15-16 February, İzmir.
- Fıratlı Ç., Genç F., Karacaoglu M and Gençer HV., 2000. Comparative analysis of beekeeping in Turkey, problems and suggestions. *Turkey Agricultural Engineering V. Technically Congress*, 17-21 January, Ankara.
- Gencer HV and Fıratlı Ç., 1999. Morphological characteristics of the Central Anatolian (*A. m. anatoliaca*) and Caucasian (*A. m. caucasica*) honey bees. *Turkish Journal of Veterinary and Animal Science*, 23(1): 107-113.
- Genç F., Emsen B and Dodologlu A., 2005. Effects of rearing period and grafting method on the queen bee rearing. *Journal of Applied Animal Research*, 27(1): 45-48.
- Guler A., 2010. A morphometric model for determining the effect of commercial queen bee usage on the native honeybee (*Apis mellifera* L.) population in a Turkish province. *Apidologie*, 41(6): 622-635.
- Güler A., 2006. Instrumental insemination in honey bee (*Apis mellifera* L.) and its importance for Turkey. *Ondokuz Mayıs University Journal of Faculty of Agriculture*, 21(3): 370-378.
- Güler A and Alpay H., 2005. Reproductive characteristics of some honeybee (*Apis mellifera* L.) genotypes. *Journal of Animal and Veterinary Advances*, 4: 864-870.
- Güler A and Toy H., 2013. Relationship between dead pupa removal and season and productivity of honey bee *Apis mellifera*, Hymenoptera: Apidae) colonies. *Turkish Journal of Veterinary and Animal Sciences*, 37: 462-467.
- Harbo JR., 1986. Oviposition rates of instrumentally inseminated and naturally mated queen honeybees (Hymenoptera: Apidae). *Annals of the Entomological Society of America*, 79: 112-115.
- Kutlu MA., 2014. Determining the current status of Gaziantep province its beekeeping problems and solutions. *Turkish Journal of Agricultural and Natural Sciences*, 1(4): 481-484.
- Linksvayer TA., Kaftanoğlu O., Akyol E., Blatch S., Amdam GV and Page RE., 2011. Larval and nurse worker control of developmental plasticity and the evolution of honey bee queen-worker dimorphism. *Journal of Evolutionary Biology*, 24: 1939-1948.
- Morse RA., 1979. *Rearing Queen Honey Bees*. New York, USA: Wicwas Press.
- Oskay D., 2008. Protecting diversity of native honey bee subspecies, developing a model on colony management and breeding. *Uludag Bee Journal* 8(2): 63-72.
- Ozturk AI., 2014. Quality concept in honey bee queen and factors affecting of the its quality. *Journal of Aegean Agricultural Research Institute*, 24(1): 59-65.
- Şahinler N and Kaftanoğlu O., 1997. The effects of the eggs and larvae transfer on the quality of queen honeybee (*Apis mellifera* L.). *Mustafa Kemal University Journal of Agricultural Faculty*, 2(1): 123-138.
- Wen X., Li X., Gao L and Sang H., 2014. Honey bees mating optimization algorithm for process planning problem. *Journal of Intelligent Manufacturing*, 25: 459-472.
- Woyke J., 1967. Rearing conditions and the number of sperms reaching the spermatecha. XXI. *International Apiculture Congress of Apimondia*, Bucharest, Romania.
- Woyke J., 1971. Correlation between the age at which honeybee brood was grafted characteristics of resultant queen and insemination. *Journal of Apicultural Research*, 10(1): 45-55.
- Yalçın FÇ., 2014. The production of honey and other bee products and the potential of organic production in the enterprises engaged in beekeeping in the central district of Tokat Province. Ms Thesis, Gaziosmanpasa University Graduate School of Natural and Applied Sciences, Tokat.
- Zhdanova TS., 1967. Influence of nest temperature on quality of queens produced artificially. XXI. *International Apiculture Congress of Apimondia*, Bucharest, Romania.