Harran Üniv Vet Fak Derg, 2022; 11 (2): 193-200 *Research Article*
DOI:10.31196/huvfd.1147383

Turkish Migratory Beekeepers' Opinions Towards the Current State and Problems of Apiculture Sector: A Descriptive Study in Afyonkarahisar

Ahmet AKPINAR[1,a], Zehra BOZKURT[2,b,*]

[1]Afyonkarahisar Provincial Directorate of Agriculture and Forestry, Afyonkarahisar, Türkiye.
[2]Afyon Kocatepe University, Faculty of Veterinary Medicine, Department of Animal Husbadry, Afyonkarahisar, Türkiye.
[a]ORCID: 0000-0001-6310-5297, [b]ORCID: 0000-0001-8272-7817

Geliş Tarihi: 25.07.2022 **Kabul Tarihi: 12.10.2022**

Abstract: This research was carried out to examine the opinions of the migratory beekeepers in Afyonkarahisar regarding the current situation and problems of the sector. A total of 37 items were assembled under four subgroups in the questionnaire to collect the research data. The questionnaire was applied through face-to-face interviews with beekeepers during the visits to the apiaries of the enterprises. The migratory beekeepers emphasized that marketing is the most crucial problem. They stressed that the marketing assembled with a small number of intermediary companies and the labeling not based on branding and quality standards reduce the retail price of bee products. Other significant problems were unannounced agricultural pesticide spraying, increasing decline in the flora of honey plants, high equipment costs, and the lack of specific legislation for migratory beekeeping. Also, it has been stated that there were challenges in obtaining quality queen bees, finding location areas and meeting the living needs on the migration route, and accessing training on topics such as bee diseases, organic beekeeping, and Apitherapy. As a result, it has been concluded that supporting migratory beekeepers with good input and marketing management, regulations that will facilitate migration and beekeeper accommodation, and policies to increase product quality and bee health can significantly contribute to improving their capacity to adapt to innovative and competitive national strategies to be developed for beekeeping in the future.
Keywords: *Afyonkarahisar, Beekeeping industry, Current state problems, Turkish migratory beekeepers' opinion.*

Türk Göçmen Arıcılarının Arıcılık Sektörünün Mevcut Durumu ve Sorunlarına İlişkin Görüşleri: Afyonkarahisar'da Tanımlayıcı Bir Araştırma

Özet: Bu araştırma Afyonkarahisar'daki göçmen arıcıların arıcılık sektörünün mevcut durumu ve sorunlarına ilişkin düşüncelerini incelemek amacıyla yapılmıştır. Araştırmanın verilerinin toplanması için geliştirilen ankette 37 adet madde dört bölüm altında toplanmıştır. Anket işletmelerin arılıklarına yapılan ziyaretler sırasında göçmen arıcılar ile yüz yüze görüşülerek uygulanmıştır. Göçmen arıcılar pazarlamayı en önemli problem olarak görmüşler, özellikle az sayıdaki aracı işletmeler ile yapılan pazarlama ile markalaşma ve kalite standartlarına dayalı olmayan etiketleme sorunlarının arı ürünlerinin perakende satış fiyatını düşürdüğünü vurgulamışlardır. Diğer önemli problemler ise habersiz yapılan tarımsal ilaçlama, ballı bitkiler florasında giderek artan daralma, yüksek ekipman maliyeti ve göçmen arıcılığa özel bir mevzuatın yokluğudur. Ayrıca kaliteli ana arı temini, göç rotası üzerinde konaklama yeri bulma ve barınma ihtiyaçların karşılanması ile arı hastalıkları, organik arıcılık ve Apiterapi gibi konularda eğitime ulaşmada zorluklar olduğu belirtilmiştir. Sonuç olarak, göçmen arıcıların iyi girdi ve pazarlama yönetimi, göç ve konaklamayı kolaylaştıracak düzenlemeler, ürün kalitesini ve arı sağlığını artırıcı politikalarla desteklenmesinin gelecekte arı yetiştiriciliği için geliştirilecek yenilikçi ve rekabetçi ulusal stratejilere uyum kapasitelerinin arttırılmasına önemli katkı yapabileceği kanaatine varılmıştır.
Anahtar Kelimeler: *Afyonkarahisar, Arıcılık sektörü, Mevcut durum ve sorunlar, Türk göçmen arıcıların düşünceleri.*

Introduction

According to 2019 data, 1.85 million tons of honey are produced in a total of 90.11 million hives worldwide. The part of global honey and beeswax produced in Turkey, which has 8.1 million hives, is 6.2% (114 thousand tons) and 7.2% (4.737 tons), respectively (Burucu, 2021). Most of the honey production in Turkey, which ranks second in world honey production, is carried out by enterprises engaged in migratory beekeeping (Günbey, 2007; Kösoglu et al., 2019; TKDK, 2016). Kekeçoğlu et al. (2014) also emphasized that migratory beekeeping should be performed for high production and profitability. According to 2020 data, before the forest fires on the Aegean and Mediterranean coasts in 2021, the first three regions with the most annual honey production in Turkey are the Eastern Black Sea Region (22.5%), Mediterranean Region (19.2%) and Aegean Region (13.4%) (Burucu, 2021). 95% of beekeeping enterprises in the Eastern Black Sea Region are migratory beekeepers (Kuvancı et al., 2017). Likewise, the Aegean region is the leader in hive prevalence (1.7 million) and the third-largest

honey producer, the rate of migratory beekeeping enterprises has been reported as 82% (Özbilgin et al., 1999; Korkmaz et al., 2018). There are differences between beekeeping enterprises engaged in migratory or stationary beekeeping activities in Turkey. These differences are more pronounced in terms of structural features (Takma et al., 2019), beekeeping practices (Çakmak et al., 2003), and input and output management features (Güneşdoğdu and Akyol, 2019). Compared to stationary beekeeping enterprises, migratory beekeeping enterprises have a high hive capacity (Özbilgin et al., 1999), and they use honey bee colonies with superior (Cengiz and Dülger, 2018). Migratory beekeepers can extend the honey season by moving hives on a planned route with timing to coincide with the flowering periods of honey plants (Korkmaz et al., 2018). It is reported that there are differences between the technical knowledge and skills or their approaches to the beekeeping sector of migratory and stationary beekeepers (Borum, 2017; Erkan and Aşkın, 2001). While stationary beekeepers market the honey they produce in their retail, migratory beekeepers use marketing channels with intermediary institutions in the sector (Tabur and Aziz, 2019). It has also been reported that migratory beekeepers can independently replace the queen bees of the colonies and recognize and distinguish more bee diseases and pests (Erkan and Aşkın, 2001). According to Tabur and Aziz (2019), it has been reported that migratory beekeepers keep operating and production records more regularly, and they produce with more staff, even though they are mostly family members (Takma et al., 2019). Migratory beekeepers have additional skills to continue their lives in rural areas (Sandal and Kan, 2013; Seven and Akkılıç, 2005), and most of them drive their transport vehicles to transport beehives (Akpınar and Bozkurt, 2021). Technical beekeeping processes, production capacity, differences in local and bureaucratic procedures, and difficulties experienced with other stakeholders related to finding apiaries and accommodation areas also affect the professional perspective and attitude of migratory beekeepers towards the beekeeping sector and their thoughts on problems and needs (Sandal and Kan, 2013, Seven and Akkılıç, 2005). For this reason, to increase the performance of bee product production in Turkey, it is crucial to analyze the sectoral and personal problems faced by migratory beekeepers well in terms of developing permanent solution strategies. This research was carried out to examine the opinions of the migratory beekeepers who carry out beekeeping activities in Afyonkarahisar on the current situation and problems in the beekeeping sector.

Material and Methods

The research data were collected with a four-part questionnaire, including the current and most important problems of the beekeeping sector in Turkey. In the first part of the questionnaire developed in this research, the structural problems of the beekeeping sector (9 items); in the second part, the particular problems of migratory beekeeping (11 items); in the third part, the problems related to queen bee production and vocational training (7 items), and in the fourth part, the problems related to the marketing of bee products (10 items) were included. During the development of the survey questions, besides the current problems and essential dilemmas of the beekeeping sector, national reports and scientific research on the beekeeping sector were also used (Cengiz and Dülger, 2018; Güneşdoğdu and Akyol, 2019; Korkmaz et al., 2018; TKDK, 2016). Each item in the questionnaire was subjected to a 5-point Likert-type rating as 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly Agree. The participants of the research migratory beekeepers who the owners of the beekeeping enterprises the study of Akpınar and Bozkurt (2021) was conducted, sampling method and sample size for the migratory beekeeping enterprises were planned according to the reports of Sekaran (2003) and the Ural and Kılıç (2013). A total of 92 questionnaires were administered through face-to-face interviews, and 84 questionnaires with no missing and incorrect data were evaluated. This study was approved by Afyon Kocatepe University Local Animal Ethics Committee (AKUHADYEK -140-18, 14 January 2019).

Statistical Analysis: The thoughts of migratory beekeepers about the problems of the beekeeping sector were determined by the frequency and percentage distributions, as well as arithmetic, mean, and standard deviation values. Cronbach's Alpha coefficient was calculated to define the reliability of the developed questionnaire and its four sub-dimensions. SPSS 22.0 for the Windows package program and Microsoft Excel 2007 program were used for statistical analysis of the data collected (SPSS, Inc., Chicago).

Results

Cronbach's Alpha coefficients, arithmetic mean, and standard deviations of the questionnaire and its sub-dimensions are given in Table 1. The Cronbach's Alpha value, the internal consistency coefficient for the reliability of the questionnaire, and the general mean values were 3.99 and 0.878. The average

values and Cronbach's Alpha coefficients for the sub-dimensions of the beekeeping sector, including structural, migratory beekeepings' specific problems and current marketing problems, were 4.03, 3.54, 4.02, and 4.44

Table 1. Cronbach's Alpha coefficients, arithmetic mean and standard error values for the Questionnaire developed.

Features	n	Cronbach's Alpha	$\overline{X}$	SD
Questionary	84	0.878	3.99	0.50
Sub dimensions				
Structural problems	84	0.568	4.03	0.55
Migratory beekeeping's specific problems	84	0.677	3.54	0.65
Queen bee production and vocational training problems	84	0.756	4.02	0.72
Marketing problems	84	0.889	4.44	0.69

and were 0.568, 0.677, 0.756 and 0.889, respectively. The descriptive statistics of the migratory beekeepers' opinions on the structural problems of the beekeeping sector are given in Table 2. Migratory beekeepers stated that "local farmers spray pesticides without notice" ($\overline{X}$=4.46) and "Short flora and insufficient honey forests" ($\overline{X}$=4.39) items participated in the items at a high rate. The lowest participation is "Difficulties in accessing service from professionals and experts in bee diseases" ($\overline{X}$=3.25) and "a limited number of experts and institutions receive consultancy service in beekeeping "($\overline{X}$ =3.94). The descriptive statistics of participants' opinions on the specific problems of migratory beekeeping are presented in Table 3. Most of the interviewed migratory beekeepers participated in items such as "The lack of a beekeeping law and the narrow scope of the current beekeeping regulation" ($\overline{X}$=4.18) and "Insufficient beekeeping support payment" ($\overline{X}$=4.15). However, their level of participation in items like "Difficulties in official applications for finding apiary area and colony movements" ($\overline{X}$=2.50) and "Insufficiency of professional, experienced drivers for bee colony transport " was the least. The results of migratory beekeepers' opinions on problems related to queen bee production and vocational training are given in Table 4. In this study, the highest mean values were calculated for items "Difficulties in communicating and cooperating with universities" ($\overline{X}$=4.38) and "Short-quality training opportunities for beekeeping" ($\overline{X}$=4.23). Again, the mean value was the lowest for the item "Challenges in the supply of queen bees and poor-quality problems of the queens" ($\overline{X}$=3.54). The descriptive statistics of migratory beekeepers' opinions on the problems of bee product marketing are shown in Table 5. The most favorable views on the questionnaire were "Few large intermediary companies are in the market, so honey prices are low" ($\overline{X}$=4.55), whereas the most negative responses, were given to "Lack of label and price policies based on the honey quality classification" ($\overline{X}$=4.27).

Discussion and Conclusion

The migratory beekeepers paid great attention to unannounced agricultural pesticide spraying by local farmers, the narrowness of the honey plant flora and the low number of honey forests, and the expense of the hives and equipment. In Afyonkarahisar, migratory beekeepers locate close to agricultural flowering plants and orchards in spring and early summer. Güneşdoğdu and Akyol (2019) also reported similar results from Adana. Küçük et al. (2022) and Ergün and Altıntaş (2022) stated that bee colony losses are increasing gradually (up to 42%) in Turkey. In this study, participants were also worried about the insufficient plant flora. The beekeepers show great importance to global warming, climate change, and plant loss and even take this problem relatively more seriously than mass bee deaths. This finding indicates that migratory beekeepers are highly aware of the potential negative impact of global climate change on the ecosystem and the beekeeping sector. Topal et al. (2016) and Kösoğlu et al. (2021) also reported that climate change affects the phenology of plants and sudden temperature changes affect pollen and nectar sources, leading to weak colonies, spreading disease, and increasing the threat of bee extinction. Beekeepers noted that beekeeping equipment and materials are expensive. Tunca and Çimrin (2012) reported that the hive costs of beekeeping enterprises in Thrace and Kırşehir were high. The Apiculture Regulation does not include any special requirements on migratory beekeeping, except regarding allocating apiary lands for migratory beekeepers and identifying actual or legal entities with which beekeepers have to make agreements for these apiaries.

Table 2. The descriptive statistics of the migratory beekeepers' opinions on the structural problems of the beekeeping sector.

	Items	Agreement Level (%)						
		1	2	3	4	5	$\overline{X}$	SD
1	Difficulties in accessing and receiving service from professionals and experts in bee diseases	22.60	6.00	14.30	38.10	19.00	3.25	1.43
2	A limited number of experts and institutions receive consultancy services in beekeeping	8.30	2.40	14.30	36.90	38.10	3.94	1.17
3	Lack of standards for hives	8.30	0.00	8.30	31.00	52.40	4.19	1.15
4	Beekeeping equipment is expensive, and controls in this regard are insufficient	2.40	1.20	10.70	28.60	57.10	4.37	0.90
5	Climate change is due to global warming (rains, water overflows, aridness, etc.).	2.40	2.40	10.60	28.60	56.00	4.33	0.93
6	There are few honey plant varieties in flora and a shortage of honey forests	4.80	1.20	8.30	21.40	64.30	4.39	1.03
7	Bee and colony deaths.	9.50	7.10	16.70	25.00	41.70	3.82	1.31
8	Unannounced agricultural pesticide spraying by local farmers	1.20	1.20	13.10	19.00	65.50	4.46	0.85
9	Challenges in communication and cooperation with the public in the migrated region	21.40	4.80	13.10	27.40	33.30	3.46	1.52

Table 3: The descriptive statistics of migratory beekeepers' opinions on the specific problems of migratory beekeeping.

	Items	Agreement Level (%)						
		1	2	3	4	5	$\overline{X}$	SD
1	Apiary location fee requested from migratory beekeepers	13.10	2.40	19.00	28.60	36.90	3.74	1.33
2	Complications regarding the duties and responsibilities regulated by the Beekeeping Regulation	14.20	0.00	16.70	40.50	28.60	3.69	1.28
3	Accommodation problems in apiary locations such as shelter, water, electricity, communication, etc.	11.90	0.00	14.30	26.20	47.60	3.98	1.30
4	Security issues at the accommodation (robbery, predator wild animal attacks, etc.) in apiary locations.	16.70	3.60	21.40	22.60	35.70	3.57	1.43
5	Discussions among beekeepers when apiaries are located in high density in a region.	15.50	3.60	10.70	33.30	36.90	3.73	1.40
6	Difficulties in official applications for finding apiary area and colony movements.	44.00	4.80	19.00	21.40	10.80	2.50	1.49
7	Insufficiency of professional, experienced drivers for driving bee colony transport vehicles	30.10	6,00	21.70	33.70	8.50	2.84	1.39
8	Practice non-standard techniques and poor-quality problems in beeswax sheet production	28.60	2.40	20.20	25.00	23.80	3.13	1.54
9	Lack of forceful cooperation between NGOs to increase beekeeping support payments	17.90	4.80	19.00	28.50	29.80	3.48	1.42
10	Insufficient beekeeping support payment	6.00	1.20	16.70	23.80	52.30	4.15	1.12
11	The lack of a beekeeping law and the narrow scope of the current beekeeping regulation	4.80	1.20	9.50	40.50	44.00	4.18	0.99

Table 4: The descriptive statistics of migratory beekeepers' opinion on problems related to queen bee production and vocational training.

	Items	Agreement Level (%)						
		1	**2**	**3**	**4**	**5**	$\overline{X}$	**SD**
1	Inability to produce own queen bee and high queen bee fees on the market	15.50	1.20	10.70	44.00	28.60	3.69	1.32
2	Challenges in the supply of queen bees and poor-quality problems of the queens	16.70	3.60	15.50	38.10	26.10	3.54	1.36
3	The lack of Turkish resources and tools is suitable for beekeepers' training on bee breeding and diseases	7.10	1.20	13.20	33.30	45.20	4.08	1.13
4	Insufficient knowledge of beekeepers in organic beekeeping issues	8.30	2.40	21.40	23.80	44.10	3.93	1.23
5	Inadequate understanding of beekeepers on other current topics such as apitherapy	0.00	2.40	17.90	26.20	53.50	4.31	0.85
6	Short-quality training opportunities for beekeeping	3.60	2.40	11.90	32.10	50.00	4.23	0.99
7	Difficulties in communicating and cooperating with universities	2.40	0.00	10.60	31.00	56.00	4.38	0.86

Table 5: The descriptive statistics of migratory beekeepers' opinion on the problems of the bee product marketing.

	Items	Agreement Level (%)						
		1	**2**	**3**	**4**	**5**	$\overline{X}$	**SD**
1	Difficulties in establishing quality standards for honey and honey products in the market	3.60	0.00	7.10	29.80	59.50	4.42	0.91
2	Lack of label and price policies based on the honey quality classification	2.40	1.20	14.30	31.00	51.10	4.27	0.92
3	Inspections on honey quality are not widespread enough; the number of testing laboratories is small	3.60	0.00	4.80	22.60	69.00	4.54	0.88
4	The increasing market size of fake or cheap honey	6.00	0.00	3.60	25.00	65.40	4.44	1.02
5	Marketing problems due to undesirable residue problem	6.00	1.20	6.00	26.10	60.70	4.35	1.07
6	Deterioration of the natural structure of honey due to the addition of sugar or starch syrups (fraud in honey quality)	6.00	0.00	9.50	22.60	61.90	4.35	1.07
7	Veterinary drug residues in honey after treating the honeybee	6.00	0.00	3.60	19.00	71.40	4.50	1.02
8	Few large intermediary companies are in the market, so honey prices are low	3.60	0.00	6.00	19.00	71.40	4.55	0.89
9	Packaging and branding problems for honey	3.60	0.00	8.30	15.50	72.60	4.54	0.92
10	Incapacity of beekeepers to market their honey	3.60	3.60	6.00	11.80	75.00	4.51	1.01

A crucial stage of migratory beekeeping is bee colony transport. A Domestic Veterinary Report for Animal transport during the journey is mandatory, but no measure is envisaged to protect bee health and welfare. Since the transportation process is quite costly, beekeepers prefer vehicles that are not very suitable for bee transportation, which leads to the transfer of diseases and pests from one place to another along with the bees. In addition, most participants drove their bee transport vehicles (Akpınar and Bozkurt, 2021), but they stated that they were not professional drivers for these vehicles; they were concerned about the adverse effects of poor driving on bee health and welfare.

According to the participants, support payments are insufficient (10 TL support per hive). Participants said that the cost of mobile beekeeping activities is higher. Kösoğlu et al., (2021) emphasized that beekeeping policies and support payments should be updated by considering the field's realities. Problems related to apiary land (Sandal and Kan, 2013; Tunca and Çimrin, 2012) and beekeepers' accommodation in forest areas along the migration route have also been reported in many parts of the country (Korkmaz et al., 2018; Küçük et al., 2022).

The results show that both migratory beekeepers have sufficient awareness and skills about the official procedures, and Agriculture and Forestry Directorates provide beekeeper-friendly support. Nevertheless, migratory beekeepers stated that providing apiary land is challenging and complained about the problems such as high apiary land cost, insufficient security (theft, animal attacks, etc.), accommodation challenges (shelter, water, communications, electricity, etc.), and added the conflicts between the beekeepers that were located very close to each other in the same region. Similar results were reported by other researchers (Güneşdoğdu and Akyol 2019; Korkmaz et al., 2018; Küçük et al., 2022; Sandal and Kan 2013).

The beekeepers said they could not raise the queen they needed and had difficulty obtaining quality queen bees. So, it was thought that the queen bee enterprises could not meet the queen bee needs of the sector. Karaca and Karaman (2018) reported that although queen bee enterprises have low capacity, they raise queen bees with only half of the operating capacity due to high production costs and produce live bees and honey with the other half. Difficulties in obtaining queen bees were also detected in beekeeping enterprises in Trabzon (Küçük et al. 2022), Malatya (Kutlu and Kılıç 2020), and Diyarbakır (Demen, 2015).

In this study, migratory beekeepers said they need training on beekeeping and diseases. They reported difficulty accessing the required training (courses, Turkish books, online education tools, etc.). In general, it has been well-recognized that the educational status of beekeepers in Turkey is low (Küçük et al., 2022). However, studies on vocational training needs in beekeeping are scarce. In this study, migratory beekeepers reported their training needs for bee diseases, monitoring of honey quality, marketing, and some issues such as Apitherapy or organic beekeeping. It was thought that the migratory beekeepers were highly aware of their professional problems, so their training demands were high. Erkan and Aşkın (2001) also determined that migratory beekeepers feel more lack of knowledge and demand more training than stationary beekeepers.

For the participants, the most crucial problem of the beekeeping industry in Turkey is marketing. Beekeepers in Elazığ (Seven and Akkılıç, 2005), İzmir (Onuç et al., 2019), and Malatya (Kutlu and Kılıç, 2020) also emphasized the importance of marketing. They produce high-quality honey but have to market their products at a lower price than their quality, so they have difficulty competing with fake or low-quality honey in the same market. Onuç et al. (2019) reported that by producing residue-free and additive-free bee products beekeepers could market their products at a worthwhile price so businesses can gain a competitive and sustainable structure. The respondents said they do not know where and how to get these services and the cost of quality, residue, or fraud analysis. These results showed that migratory beekeepers demanded that the deficiencies in the beekeeping sector's production, quality, and organization axis be eliminated. Karacaoğlu et al. (2020) said that the herbal origin of honey (single-plant honey, multi-floral honey, etc.) or the labeling of it using geographical indications could reflect the quality of honey and increase the sales price. Küçük et al. (2022) reported that three-quarters of the beekeepers in Trabzon did not have residue analysis in honey, and those who did apply to institutions hundreds of kilometers away through the Rize Beekeepers Association. The migratory beekeepers in this research said they could not make enough progress in product packaging and branding. Bayramoğlu et al., (2016) also stated that the marketing of Bayburt honey by the producer increases informality. Migratory beekeepers argued that a few intermediary companies have an essential role in the lower wholesale price of honey, and they complain that honey quality inspections on honey quality are not widespread enough. There are not enough laboratories to test their honey's quality. Similar beekeeper complaints were reported from other provinces (Karahan et al., 2021; Küçük et al., 2022; Seven and Akkılıç, 2005). As a result, according to the migratory beekeepers in Afyonkarahisar, the most critical problems of the Turkish beekeeping

sector are that honey and other beekeeping products are not priced based on quality standards, unannounced agricultural pesticide spraying, the declining steadily of honey plant flora due to global climate change, apiary location, and accommodation problems, inability to obtain quality queen bees quickly, insufficient consultancy and training opportunities on bee diseases and beekeeping and high production costs. Increasing public economic support to improve the production performance and job satisfaction of migratory beekeepers who dominate honey production in Turkey are beneficial to increase the adaptability of migrating beekeeping to innovative breeding and competitive marketing strategies by supporting public regulations facilitating migration and beekeeper accommodation, determining quality standards in honey and other beekeeping products, and supporting the association of beekeepers.

Acknowledgements

This article was summarized from the first author's Master's thesis.

Conflict of Interest

We did not have any real, potential or perceived conflict of interest.

Ethical Approval

Permission was obtained for this study with the number AKUHADYEK-140-18. In addition, the authors declared that they comply with the Research and Publication Ethics.

Funding

This study received the support of the Afyon Kocatepe University Scientific Research Projects Coordination Unit with Project number 19.SAĞ.BİL.12.

Similarity Rate

We declare that the similarity rate of the article is 5% as stated in the report uploaded to the system.

Author Contributions

Motivation / Concept: ZB
Design: ZB
Control/Supervision: ZB
Data Collection and / or Processing: AA
Analysis and / or Interpretation: AA, ZB
Literature Review: AA
Writing the Article: ZB, AA
Critical Review: ZB

References

Akpınar A, Bozkurt Z, 2021: An analysis on migratory beekeeping in Inner-West Anatolia Region, Afyonkarahisar, Turkey: production, practice, marketing, and challenges. *Harran Üniv Vet Fak Derg*, 10 (2), 153-160.

Bayramoğlu T, Ari YO, Durmaz A, 2016: Bölgesel kalkınmada kümelenme yaklaşımı; Bayburt ili'ndeki arıcılık sektörü üzerine bir uygulama. *ODÜ Sosyal Bilimler Araştırmaları Dergisi*, 6(3), 903-916.

Borum AE, 2017: Güney Marmara Bölgesi'nde arıcılık anket çalışması. *U. Bee J*,*17*(1), 24-34.

Burucu V, 2021: Ürün Raporu. Arıcılık 2021.Tarımsal Ekonomi ve Politika geliştirme Enstitüsü Müdürlüğü. Tepge Yayın No: 330 ISBN: 978-605-7599-63-6.

Cengiz MM, Dülger C, 2018: Gezginci ve sabit arıcılık işletmelerinde kontrollü şartlarda yetiştirilen ana arılarla oluşturulan balarısı (Apis mellifera L.) kolonilerinin bazı fizyolojik özelliklerinin belirlenmesi. *Atatürk Üniv Vet. Bil. Derg*, *13* (1), 19-27.

Çakmak İ, Aydın L, Seven S, Korkut M, 2003: Güney Marmara Bölgesi'nde arıcılık anket sonuçları. *U. Bee J*, *3* (1), 31-36.

Demen H, 2015: Diyarbakır ilinde arıcılığın yapısı ve sorunların belirlenmesi üzerine bir araştırma. Yüksek Lisans Tezi, Adnan Menderes Üniversitesi Fen Bilimleri Enstitüsü, Aydın.

Ergün H, Altıntaş L, 2022: Pestisitlerin Arı Yetiştiriciliğine Etkisi. *Veteriner Farmakoloji ve Toksikoloji Derneği Bülteni*, *13* (1), 26-46.

Erkan C, Aşkın Y, 2001: Van ili Bahçesaray İlçesi'nde arıcılığın yapısı ve arıcılık faaliyetleri. *YYÜ Tar Bil Derg*, *11*(1), 19-28.

Günbey VS, 2007: Van ili gezginci arıcılık hareketlerinin belirlenmesi. Yüksek Lisans Tezi, Yüzüncü Yıl Üniversitesi Fen Bilimleri Enstitüsü, Van.

Güneşdoğdu M, Akyol E, 2019: A survey study to determine the structure of beekeeping in Adana province. *Turkish Journal of Agriculture-Food Science and Technology*, *7* (12), 2030-2037.

Karaca Ü, Karaman S, 2018: Türkiye Ana Arı Üretim Maliyeti ve Karlılık Analizi. *Anadolu J of AARI, 28* (2), 17-28.

Karacaoğlu M, Gençer HV, Uçak Koç A, Kahya Y, 2020: Arıcılık sektöründe mevcut durum kısıtlar ve fırsatlar. Türkiye Ziraat Mühendisliği IX. Teknik Kongresi Bildiriler Kitabı-2, 159.

Karahan A, Kutlu MA, Karaca İ, 2021: Muğla ve Afyonkarahisar ili arıcılık faaliyetleri, sorunları ve çözüm önerileri. *ADYUTAYAM Dergisi*,*9* (2), 112-128.

Kekeçoğlu M, Göç Rasgele P, Acar F, Kaya ST, 2014: Düzce ilinde arıcılığın yapısı ve arıcılık faaliyetleri üzerine bir araştırma. *Düzce Üniversitesi Bilim ve Teknoloji Dergisi*, *2* (1), 1-15.

Korkmaz M, Avcı M, Özçelik R, 2018: Kızılçam ormanlarında çam balı üretimi kapsamında göçer arıcılığın sorunları. *ISNOS-MED, 22-24 October, Isparta*.

Kösoglu M, Topal E, Takma Ç, Özkırım A, Özsoy N, Karaca Ü, 2019: Perspective of Izmir Province beekeepers on bee diseases and pests. *Ege Univ. Ziraat Fak. Derg.,* 56 (2),187-193.

Kösoğlu M, Tunca Rİ, Yücel B, Balkanska R, Yıldırır ZT, 2021: Arıcılıkta sürdürülebilirlik mümkün mü?. *MAS J Appl Sci*, *6* (3), 610-623.

Kutlu MA, Kılıç Ö, 2020: Malatya arıcılık faaliyetlerinin genel durum tespiti çalışması. *Düzce Üniversitesi Bilim ve Teknoloji Dergisi*, *8* (1), 737-745.

Kuvancı A, Yılmaz F, Öztürk SH, Konak F, Buldağ M, 2017: Doğu Karadeniz bölgesi arıcılığına genel bakış. *Bee Studies*, *9* (2), 47-55.

Küçük A, Saylam A, Al A, Şahinoğlu OY, 2022: Orman köylerinde arıcılık sorunları ve çözüm önerileri (Trabzon Orman Bölge Müdürlüğü örneği). *Ormancılık Araştırma Dergisi*, *9* (2), 122-134.

Onuç, Z., Yanar, A., Saner, G., Güler, D. 2019. An Analysis on Economical Aspect of the Beekeeping Enterprise: A Case of Kemalpaşa District-Izmir/Turkey, *Ege Univ Ziraat Fak Derg,* 56 (1):7-14.

Özbilgin N, Alataş İ, Balkan C, Öztürk Aİ, Karaca Ü, 1999: Ege bölgesi arıcılık faaliyetlerinin teknik ve ekonomik başlıca karakteristiklerinin belirlenmesi. *Anadolu J of AARI, 9* (1), 149-170.

Sandal EK, Kan C, 2013: Bingöl İlinde arıcılık faaliyetleri. *Türk Coğrafya Dergisi*, 60, 1-12.

Sekaran U, 2003: Research Methods for Business. John Wiley Hing Education, New York.

Seven İ, Akkılıç ME, 2005: Elazığ'daki arıcılık işletmelerinin üretim ve pazarlama problemlerinin tespiti ve çözüm önerileri. *Livestock Studies, 45* (2), 41-52

Tabur Z, Aziz G, 2019: Uşak ilinde arı yetiştiricilerinin sosyo-ekonomik durumu ve arıcılığın teknik özelliklerinin belirlenmesi. *MKU. Tar. Bil. Derg.,* 24 (2), 146-152.

Takma Ç, Kösoğlu M, Topal E, Özkırım A, Taşkıran NÖ, Karaca Ü, 2019: İzmir İli arıcısının arı hastalık ve zararlılarına bakışı. *Ege Univ. Ziraat Fak. Derg, 56* (2), 187-193.

TKDK, 2016: IPARD Program değerlendirmeleri arıcılık sektör toplantısı sonuç raporu (https://www.tkdk.gov.tr/Content/File/Yayin/Rapor/Aricilikv2.pdf,; 16.05.2022).

Topal E, Özsoy N, Şahinler N, 2016: Global warming and the future of beekeeping. *MKU Tar Bil Derg, 21* (1), 112-120.

Tunca Rİ, Çimrin T, 2012: Kırşehir ilinde bal arısı yetiştiricilik aktiviteleri üzerine anket çalışması. *Iğdır Üni Fen Bilimleri Enst Derg,* 2 (2), 99-108.

Ural A, Kılıç İ, 2013: Bilimsel Araştırma Süreci ve SPSS ile Veri Analizi. Detay Yayıncılık, 4.baskı, Ankara.

*__Correspondence__ Zehra Bozkurt

Afyon Kocatepe University, Faculty of Veterinary Medicine, Department of Animal Husbandry, Afyonkarahisar, Turkiye.

e-mail: *zhra.bozkurt@gmail.com*