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Historical Development and Current Status of Beekeeping in Turkey and the World

Türkiye ve Dünyada Arıcılığın Tarihsel Gelişimi ve Mevcut Durumu

Uzm.Bio. Özgür EROĞLU
Istanbul Kartal Lütfi Kırdar Training and Research Hospital, Istanbul/Turkey
ORCID: 0000-0003-0438-688X

Dr. Serdar YÜKSEL
Ministry of National Education KMTAL Kiraz-İzmir/Turkey
ORCID: 0000-0002-7885-5426

ABSTRACT

Beekeeping history is as old as human history. In the cave paintings of 15000 BC, drawings related to beekeeping were found. There are Sumerians and Hittites in Anatolia, in China and India in Asia, in Egypt civilization in Africa and in Europe, there are beekeeping information on tablets, hieroglyphs. Primitive hives are used in beekeeping before and in the Middle Ages, and even in some regions, honey bees produced by bees are not taken and bee care is not performed. Beekeeping, which was carried out under primitive conditions until the 17th century, gained a scientific quality during these dates. The biology of bee and bee colony has been understood and modern bee hives have started to be used. Our country is more fortunate than other countries in terms of variety of flowering plants and richness of bee breeds. However, it lags behind the World ranking in the production of honey per hive. As a result of the development of beekeeping in our country and in the world, contribution will be made to the fields of economy and health. Because, besides honey, bees contribute to health as well as nutrition by producing pollen, propolis and royal jelly.

Key words: history of beekeeping, beekeeping in Turkey, honey production

ÖZET

Arıcılık tarihi, insanlık tarihi kadar eskidir. Milattan önce 15000 yıllarına ait mağara resimlerinde arıcılık ile ilgili çizimlere rastlanmıştır. Anadolu'da Sümerler ve Hititler, Asya'da Çin ve Hindistan'da, Afrika'da Mısır medeniyetinde ve Avrupa'da binlerce yıl öncesine ait resimler, tabletler, hiyerogliflerde arıcılık ile bilgiler mevcuttur. Milattan önce ve Orta çağda arıcılıkta ilkel kovanlar kullanılmakta, hatta bazı bölgelerde sadece arıların ürettikleri ballar alınarak arı bakımı yapılmamaktadır. 17. yüzyıla kadar iptidai şartlarda yapılan arıcılık bu tarihlerde bilimsel bir nitelik kazanmıştır. Arı ve arı kolonisinin biyolojisi anlaşılmış ve modern arı kovanları kullanılmaya başlanmıştır. Ülkemiz hem çiçekli bitkilerin çeşitliliği hemde arı ırklarının zenginliği bakımından diğer ülkelere nazaran daha şanslıdır. Fakat kovan başına bal üretiminde Dünya sıralamasında gerilerdedir. Arıcılığın ülkemizde ve dünyada gelişmesi sonucunda ekonomi ve sağlık alanlarına katkı sağlanacaktır. Zira arılar balın yanında polen, propolis ve arı sütü üretimi ile beslenmenin yanında sağlığa da katkı sağlamaktadır.

Anahtar kelimeler: Arıcılık tarihi, Türkiye'de arıcılık, bal üretimi

1. HISTORY OF BEEKEEPING

The history of beekeeping goes back to tens of thousands of years when people lived in cave life. B.C. Paintings drawn in caves dating back to 7000 years, bee fossils dating back to ancient times and similar historical finds confirm this view. The history of beekeeping is as old as human history. A depiction of a beekeeper was found in the murals in 1919 in a cave in Valencia, Spain. (Teknik Arıcılık, 2020)

Fig 1. Honey seeker depicted on 8,000-year-old cave painting near Valencia, Spain

These depictions show that beekeeping has a history of approximately 15,000 years. In recent years, 3.200 years of dried honey was found in the researches made in the pharaoh tombs in Egypt. The tablets read show that the ancient Egyptians have used honey for food, medicine and religious purposes since 4,000 years ago.

Fig. 2. Beekeeping in ancient Egyptians

It is known that Sumerians living in Mesopotamia accepted the honey as a medicine in 3000 BC. The first humans naturally took advantage of their honey by killing bees nesting in tree hollows and rock cavities (Bakan, 2009).

Fig 3. Stele showing Shamash-resh-uṣur praying to the gods Adad and Ishtar with an inscription about beekeeping in Babylonian cuneiform

Honey also has protective and healing properties. Before Christ Vl. The Greek philosopher Pythagoras, wrote articles stating the vital strength of honey. People have long sought remedy from honey in the treatment of heart, liver, stomach diseases and asthma, and used honey as an ointment to heal skin wounds and burns.

From the stone age in the historical development; First, mushrooms and tree stumps, and then containers made of earth and clay were used as hives, and the hives used today were developed over time. The real beekeeping started with people taking some honey and killing some honey to the bees without killing the bees nested in tree burrows. Since the gene centers of bees are Middle-Eastern countries, the emergence of beekeeping occurred in these countries. However, BC. The mention of bees in the stone inscriptions in Boğazköy, which is believed to belong to the 1300s and remained from the Hittites period, shows that beekeeping dates back to very old times in Anatolia (Anonymous, 2007).

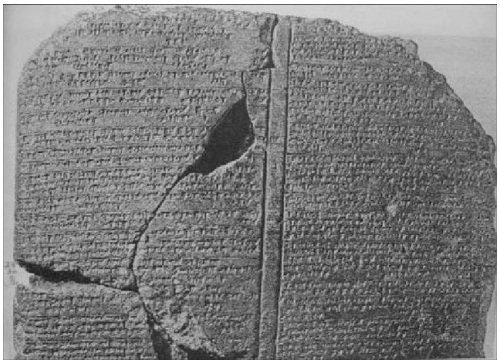
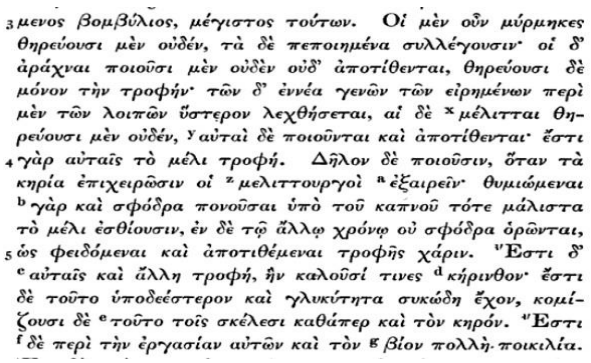


Fig 4. Laws relating bee keeping in Hittites

The first mobile beekeeping started in 3000 BC in ancient Egypt. Beekeepers increased their honey production by carrying their bees on the Nile River between the upper and lower corn. Many inscriptions from the ancient Egyptian civilization have pictures that reveal how important beekeeping was in those times. Besides honey; Other bee products such as beeswax, royal jelly, bee venom have served people throughout history. In addition, some important information about the use of bees in plant fertilization has been known since ancient times. The best example of this; It is the signs seen in the writings in the Pyramids that it has increased bee transplants, honey and other agricultural products and has been taken with rafts on the Nile for 4000 years. The ancient Greeks used to hide their dead from rotting in the honey pond. It is stated that the philosopher Democrit and Alexander the Great were preserved in this way by being buried in honey. B.C. The Greek Philosopher Aristotle, who lived between 384-322, brought scientific explanations to some subjects with his observations on bees (tarimkutuphanesi, 2020).



3 μενος βομβύλιος, μέγιστος τούτων. Οἱ μὲν οὖν μύρμηκες
θηρεύουσι μὲν οὐδέν, τὰ δὲ πεποιημένα συλλέγουσιν· οἱ δ'
ἀράχναι ποιοῦσι μὲν οὐδὲν οὐδ' ἀποτίθενται, θηρεύουσι δὲ
μόνον τὴν τροφήν· τῶν δ' ἐννέα γενῶν τῶν εἰρημένων περὶ
μὲν τῶν λοιπῶν ὕστερον λεχθήσεται, αἱ δὲ [x] μέλιτται θη-
ρεύουσι μὲν οὐδέν, [y] αὗται δὲ ποιοῦνται καὶ ἀποτίθενται· ἔστι
4 γὰρ αὗταῖς τὸ μέλι τροφή. Δῆλον δὲ ποιοῦσιν, ὅταν τὰ
κηρία ἐπιχειρῶσιν οἱ [z] μελιττουργοὶ [a] ἐξαιρεῖν· θυμιώμεναι
[b] γὰρ καὶ σφόδρα πονοῦσαι ὑπὸ τοῦ καπνοῦ τότε μάλιστα
τὸ μέλι ἐσθίουσιν, ἐν δὲ τῷ ἄλλῳ χρόνῳ οὐ σφόδρα ὁρῶνται,
5 ὡς φειδόμεναι καὶ ἀποτιθέμεναι τροφῆς χάριν. [v] Ἔστι δ'
[c] αὗταῖς καὶ ἄλλη τροφή, ἣν καλοῦσί τινες [d] κήρινθον· ἔστι
δὲ τοῦτο ὑποδεέστερον καὶ γλυκύτητα συκώδη ἔχον, κομί-
ζουσι δὲ [e] τοῦτο τοῖς σκέλεσι καθάπερ καὶ τὸν κηρόν. [v] Ἔστι
[f] δὲ περὶ τὴν ἐργασίαν αὐτῶν καὶ τὸν [g] βίον πολλὴ ποικιλία.

Fig 5. passage 38 in Aristotle as ἐργατικώτατον – "most industrious.". Historia Animalium. Book IX. 38 and 40

He explained broadly the development of larvae and their becoming mature in honeycomb eyes. He stated that the bees carry nectar in the stomach and pollen on their feet, remain dependent on the type of plant they collect nectar and pollen, that is, they always visit the same plant as long as nectar

and pollen are found. In a law issued for bees in Rome in the years of 100 BC, it was stated that the bees that escaped were unattended, and whoever seized the bee son or placed it in a hive would be his property (Balcı, 1988).

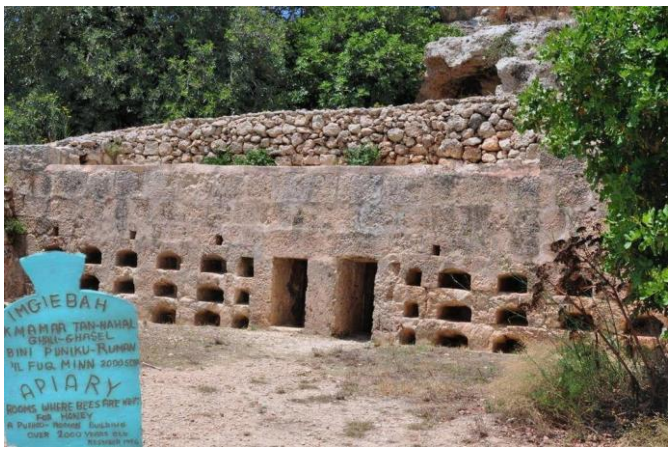


Fig 6. Apiary in Malta

Again in ancient times, pictures of people collecting honey drawn on rocks were found in India. The real beekeeping activity started when people took a part of the honey and left the honey they needed without destroying the bee colonies in the tree holes. In time, when the amount of honey produced by bees in natural tree hollows started to be insufficient, artificial bee nests were created from carved tree stumps. In the historical process, people began to make various types of bee hives by taking advantage of the opportunities that the geography they live in. Large pots were used as beehives in the warm and forestless regions of the Middle East. In other regions, many different types of primitive bee hives made of straw, straw, cane or tree were made. Beekeeping has been a sacred profession since human history. Bee and bee products are respected in all religions. Those engaged in this business were granted privileges similar to clergy in various societies (Apivital, 2020).

From the stone age in the historical development; First, mushrooms and tree stumps, and then containers made of earth and clay were used as hives, and the hives used today were developed over time.

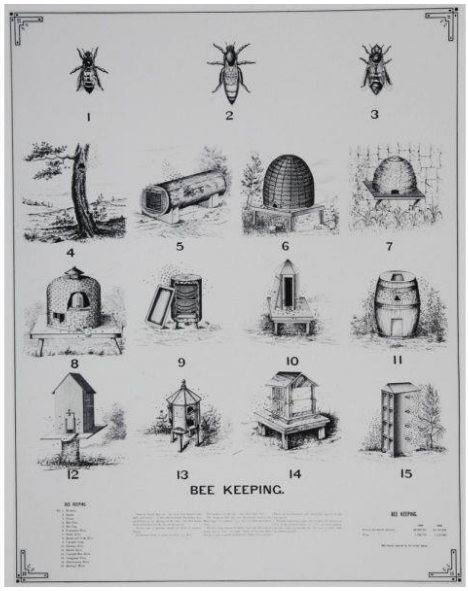


Fig 7. Different type of hives

Again in ancient times, pictures of people collecting honey drawn on rocks were found in India (Kaftanoğlu 2001).

Fig 8. Brahmi, the Bee Goddess

The real beekeeping activity started when people took a part of the honey and left the honey they needed without destroying the bee colonies in the tree holes. In time, when the amount of honey produced by bees in natural tree hollows started to be insufficient, artificial bee nests were created from carved tree stumps. In the historical process, people began to make various types of bee hives by taking advantage of the opportunities that the geography they live in. Large pots were used as beehives in the warm and forestless regions of the Middle East. (Kafkasdanısmanlık, 2020).

Fig 9. Beekeeping in 1772 as illustrated in "L'Encyclopédie ou Dictionaire Raisonné Des Sciences et Arts et des Métiers"

From the stone age in the historical development; First, mushrooms and tree stumps, and then containers made of earth and clay were used as hives, and the hives used today were developed over time. Beekeeping, which has been made primitive for a very long time until the last few centuries, has lived up to today's beekeeping in the light of many scientific discoveries and developments. Until the 16th century, there was no major development in beekeeping knowledge, and beekeeping continued as a traditional pursuit passed down from generation to generation. Along with the developments in science and technology in the 16th century, important developments started to occur in beekeeping knowledge. The main purpose of beekeepers in this period was to try to find methods of harvesting honey without harming bees. For this, many attempts have been made to develop equipment (Genç 1993).

Despite all these observations and developments, there has been no development in beekeeping technology until the 16th century. All the beekeeping work done up to that time is to catch the son in early spring and place it in a hive, to kill honey bees in some hives towards summer, to harvest honey and beeswax, to protect the remaining colonies, to feed them in the autumn and to spend the winter. However, there is no information about what the beekeepers do in the hive and how the works are carried out (Wikipedia 2020).

The Ottomans were able to evaluate the healing properties of honey very well. A significant amount of fresh flower honey was kept with the army each time, and this honey was used primarily in the treatment of wounds and burns and other diseases, and honey and beeswax were treated as a medicinal medicine. With this feature, if it has not been able to heal people for its health, it has been used as a medium used for long-term preservation or transplantation. Practices such as combining colonies to try to steer the colonies in order to increase the yield for winter, and trying to direct the colonies to increase productivity have been tried. With the presence of a microscope in 1550, microorganisms and organs that could not be seen until then were enlarged and seen. In 1609, British Charles Butter found that the queen bee was female, and stated that it should be named as queen bee, not declaration. In today's beekeeping; The detection of the queen bee mating in the air in 1787, the explanation of the bee reproduction biology in 1845, the discovery of the framed science hive in 1851, the discovery of the basic honeycomb molds in 1857, the invention of the honey strainer machine in 1865, the discovery of the queen bee technique by the larvae transfer method in 1882 and the mother in 1926 Inventions such as the presence of artificial insemination in bees contributed. In 1771, it was discovered that queen bees mated with drones outside the hive and while flying in the air. Between 1600-1800, many researches and developments on beekeeping have been carried out and new techniques have been found. Framed hives that can be opened from the top have been used, but hive types that will solve all problems of beekeeping have not been developed. Since bees stick the honeycombs or frames in the hive to the hive side walls, a fully usable frame system, where colony control was done without damaging the honeycomb, could not be created. During these years, different types of basket casings have been used in Greece. Unlike conventional baskets, these hives are built with a narrow top and a wide top. 3 cm wide laths are lined up next to the top of the hive and bees started to knit honeycomb. It was observed that the bees did not stick the honeycombs to the side walls due to the sloping of the hive walls. In this way, beekeepers had the opportunity to easily remove the honeycombs from the hive. This system is still widely used today. In 1851, American Lorenzo Langstroth discovered the bee cavity and realized that the bee did not knit honeycombs in the spaces between 6-9 mm (Langstroth, 1853).

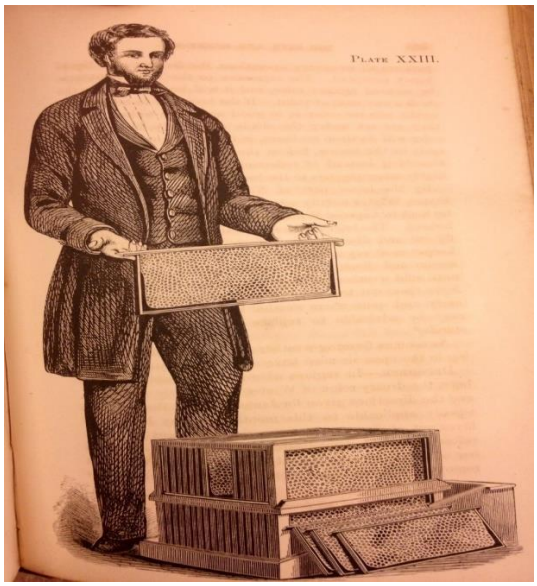


Fig 10. An illustration of a man using the movable frame hive from Langstroth's book

Hive systems have been developed in which the frames can move easily within the hive when Lorenzo Langstroth discovers that the bees do not join them when they leave these gaps between the top of the frame and the cover, between the frame side moldings and the hive wall. In 1858, the first artificial honeycomb was introduced to beekeepers. In 1865, Major Hruschka discovered the honey filter machine. With the introduction of artificial insemination technique in the 1940s, significant improvements were made in terms of breeding and conservation of genetic resources.

2. BEEKEEPING IN THE WORLD

Today, beekeeping is one of the most common agricultural activities in the world. Today, there are around 56 million beehives in the world and 1.2 million tons of honey is produced from them. Approximately 1/4 of the honey produced is traded and 90% of the export is made from around 20 honey producer countries. China is the country with the most beehive assets and producing honey (211 thousand tons). These countries are also the world's top honey exporting countries. The countries that import the most honey in the world are; Germany, USA, Japan, UK, Italy, Switzerland, France, Austria and other European countries. This country's honey production from Germany alone from Turkey imports more honey (Talu, 2004). These countries are also the world's top honey exporting countries. On the other hand, beekeeping is carried out in developed countries in order to increase the quantity and quality in herbal production besides bee production. For example, producers in plant production in the USA pay beekeepers $ 41 million in bee rent to ensure pollination of the plants they produce, while they earn $ 3.2 billion from the contribution of bees to their production (Yaşar 2009).

In another study conducted in the USA; It was found that 10 billion dollars, which is approximately one third of the total product value of 30 billion dollars obtained from about 40 plant species, was provided due to honey bees.

Besides honey; Bee products such as propolis, royal jelly, pollen and wax are also included in world trade. On the other hand, beekeeping is carried out in developed countries in order to increase the quantity and quality in herbal production besides bee production. For example, producers in plant production in the U.S. pay bees $ 41 million for beekeepers to ensure pollination of the plants they produce, whereas they earn $ 3.2 billion from the contribution of bees to their production. In another study conducted in the USA; It was found that $ 10 billion, which is approximately 1/3 of the total product value of $ 30 billion obtained from about 40 plant species, is provided due to honey bees.

On the other hand, bee products such as honey, propolis, bee venom, royal jelly are used in many countries as "Apitherapy", which means "Treatment with Bee Products". However, beekeeping is one of the rare agricultural activities that can be done without harming nature and the environment. In this respect, beekeeping will be one of the most important sustainable agricultural activities of the future. Due to the reasons explained above, beekeeping is maintained as an indispensable agricultural activity all over the World (Gegez 1999).

3. BEEKEEPING IN THE TURKEY

Turkey in beekeeping, which is a socio-economic activities to do as a tradition since ancient years. The gene centers of bees are considered to be Middle Eastern countries. However, BC. The mention of bees in the stone inscriptions in Boğazköy, which is believed to have belonged to the 1300s and remained from the Hittites period, shows that beekeeping also dates back to very old times in Anatolia. The fact that beekeeping is very common in our country and that there are many and different types of domestic hives shows that the history of beekeeping in the Anatolian Peninsula dates back to very old times. The existence of provisions related to beekeeping in the “Kanunname” of the periods of Fatih Sultan Mehmet, Yavuz Sultan Selim and Kanuni Sultan Süleyman, and the fact that honey was used as a healing source in Turkish societies is evidence that bee and

beekeeping have been known in Anatolia since ancient times. Anatolian beekeeping, which dates back to a very old past, was carried out with very advanced methods in those times compared to other countries. Accordingly, the production of honey and beeswax and their usage area were very advanced in Anatolia. However, due to the development of the sugar industry with the development of the sugar industry over time, there has been a great decrease in honey production and consumption in Anatolia as well as all the world countries. Many of our regions, which are famous for their honey production and the delicacy of honey, remain plain today. The presence of both sleeves is taking place in Turkey with 4 million due to the presence of hives and honey production in the world with 63 thousand tons due to row 3 and 4 are among the most important countries in the world in terms of production honey. However, despite this important development, the average honey production per hive in our country is around 16 kg and below the world average of 20 kg. However, Turkey is the world honey hives owned a share of 10th place in the presence of 1.87% in trading with buying and honey is adapting its production (Doğaroğlu 1999). In time, when the real nutritional value of honey is scientifically understood, there have been great leaps in beekeeping in foreign countries. With the new methods developed after the 18th century and framed hives, the production average per hive has reached up to 40-80 kg. However, only a yield of 3-8 kg could be obtained from the primitive hive. But, unfortunately, our country has been away from these developments. However, with the establishment of the Republic and the organization of the Ministry of Agriculture, the introduction of movable-frame hive, beekeeping knowledge and methods of supplementation through Turkey, which maintains the traditional habit of slow-slow recovery it has been studied for many years. According to official records, in 1935, a total of 4,338,000 kg of honey was obtained from 1,095,000 primitive and 8,000 framed hives. This means an average of 3.92 kg of honey per hive (Doğaroğlu 2003). The movements in post-war agriculture in 1946 brought new searches, and the increase in the number of science hives started in this period. Considering both our share in the world honey trade and our honey production per colony, it turns out that we have not been able to sufficiently benefit from the existing beekeeping potential of our country. On the other hand, it is not common in our country to produce honey bee products other than honey and to use honey bees in order to ensure sufficient pollination in herbal production. It is clear that if we increase honey production per hive, produce other bee products besides honey production and use honey bees more widely in herbal production, we will better evaluate our current potential. However, the fact that the transition from primitive and passage hives to modern hives has been completed to a great extent can be counted as positive developments for our beekeeping, providing some increase in average honey production per colony. In 1950, human migration from the Balkan countries brought home to modern technologies such as the latest care and production methods used in beekeeping. Immigrant families, with their limited possibilities, reproduced several science hives over time and spread all over the country, thus taking the first steps in the nomadic beekeeping made with mobile frame hives. Our country has rich resources that are extremely suitable for beekeeping in terms of climate and vegetation. People who have lived on this land for thousands of years have been widely engaged in beekeeping. In this sector, which is tightly dependent on the climate factor, it was possible to achieve a minimum yield, even in the worst climate years, by applying nomadic beekeeping. The absence of a nationwide stalemate in beekeeping makes beekeeping a stable branch of production (Kayral 1999). When the year 2000, with assets of around 4 million colonies in Turkey next 70-75 thousand tons of honey production, wax, queen bee, royal jelly, pollen and propolis production also shows that there are important improvements. Turkey's ecological and socio-economic nature of our country, beekeeping can be made anywhere, respectively, Aegean, Black Sea and Mediterranean regions need the presence of both sleeves are our most important regions in terms of production share for beekeeping. Almost half of Turkey's honey production are performed in these three regions. In terms of honey production, our first ten provinces are; Muğla, Ordu, Adana, Aydın, Sivas, Antalya, İzmir, İçel, Erzincan and Samsun are about half of our country's honey production is produced in these

provinces. There are 256 honey forest in 8 thousand 100 hectares of forest area in Turkey (Ören 2010).

4. RESULTS

Technical beekeeping today is more troublesome than in the past. The main reason for this is the increase in bee diseases, the development of hybrid bee species, environmental pollution and pesticides with mobile beekeeping. Beekeeping is one of the rare agricultural activities that can be done without harming nature and the environment. Most importantly, it is a rural development project. In this respect, beekeeping will be one of the most important sustainable agricultural activities of the future. I looked for Turkey beekeeping ecosystem; We have a richer flora than Europe with 3 thousand 649 endemic and 11 466 natural plant varieties. Flora richness should be evaluated with the fact that 85 percent of the pollination of plants is done by bees. In Turkey, the world has 500 endemic flower honey is not no other place. 22 percent of the world's honey bees live in the territory of Turkey. This genetic diversity is one of our greatest guarantees against mass bee deaths in different parts of the world. New supports should be provided for breeder production. When the conditions, possibilities and advantages of our country are evaluated together, beekeeping can reach very advanced stages in the future.

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