



**T.C. TARIM VE  
ORMAN BAKANLIĐI**



# **Türkiye BEEKEEPING SECTOR**

**Prof. Dr. Nevzat ARTIK**

**ISO TC 34 /SC 19 Mirror Committee Member**

**TSE(Turkish Standard Institute) MTC 172 Bee and Bee Products Mirror Committee President**



# SUSTAINABILITY

**Sustainability** is the use of resources that exist in nature without harming the ability of future generations to meet their needs.

Sustainability, which has three dimensions: **sociocultural, economic** and **ecological**, is a production method that does not pollute soil and water resources and protects nature, natural resources and biodiversity in all processes from cultural processes in agriculture to the processing of agricultural raw materials and final consumption (from raw material supply to energy and water use, from resource use to waste management, from packaging to distribution channels and the end user consumer)

# FOOD SAFETY, FOOD SECURITY

**Food safety**; is the state of physical and economic access to sufficient, healthy, safe and nutritious food for all people at all times to meet their food needs and food priorities for an active and healthy life.

**Food security** is a phenomenon related to the quantity of food

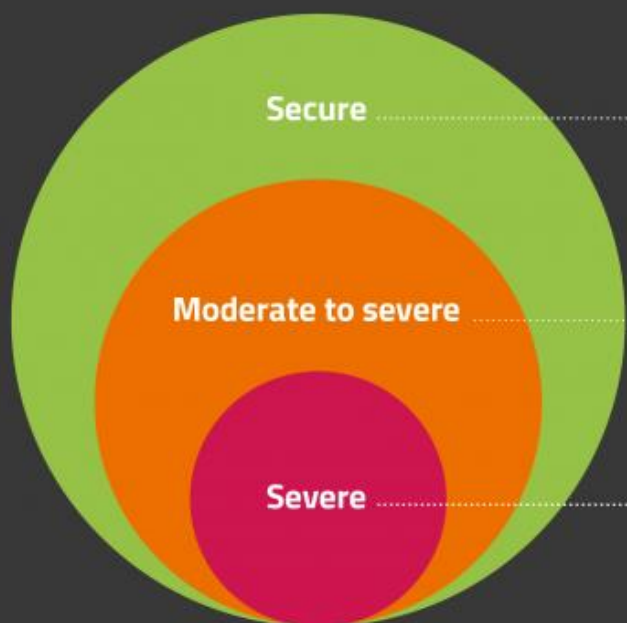
# What is food insecurity



- **Food insecurity is defined as living without safe access to affordable, nutritious food.**
- **Many problems, including overweight and obesity, are caused by the types of food people have access to and the quality of their diets .**
- **For example, lack of financial or geographical means to eat regularly and healthily can make a person or family food insecure. Social exclusion, which means lack of participation in society, for example through education, politics or the economy, can also affect food security.**
- **One in four Europeans is at risk of poverty or social exclusion, and around 10% of the EU population only consumes a sufficient amount of good quality food every other day .**



# Food insecurity severity levels...



## Food security

Adequate access to food in both quality and quantity



**5.7 BILLION**  
PEOPLE GLOBALLY  
ARE FOOD SECURE



## Moderate to severe food insecurity

Uncertainties about the ability to obtain sufficient, safe and nutritious food



**2 BILLION**  
PEOPLE GLOBALLY  
FACE MODERATE  
TO SEVERE LEVELS  
OF FOOD INSECURITY



## Severe food insecurity

Inadequate access to food, with some people going days without food



**750 MILLION**  
PEOPLE GLOBALLY  
ARE SEVERELY  
FOOD INSECURE



# GENERAL INFORMATION ABOUT BEEKEEPING IN TÜRKİYE

Beekeeping is the activity of producing products such as **honey, beeswax, pollen, propolis, royal jelly, bee venom, bee bread** and living materials such as **queen bees**, swarm bees and package bees by using bees, plant resources and labor. Bees make significant contributions to human health and nutrition with the products they produce.

In addition to the bee products they produce; honey bees have been prominent as pollinators in agriculture and animal husbandry for centuries.

The contribution of beekeeping activities to the country's economy due to pollination is 10-15 times the contribution created by bee products. 1/3 of the foods used in human nutrition consist of plants that directly or indirectly require bee pollination. For this reason, bee colonies are needed during flowering periods to ensure adequate pollination.



# **TURKISH FLORA IN TERMS OF BEEPING**

**Türkiye is one of the countries with a say in beekeeping with its suitable ecology and rich flora.**

**There are 13414 plant taxa in our country, 500 of which are nectar and poel sources and 4319 of which are endemic.**

**75% of the identified honey plant species in the world are found in our country.**

**There are 4319 endemic plants in our country.**

# THE IMPORTANCE OF BEES IN TODAY'S AGRICULTURE

- **Since the number of wild pollinators has decreased significantly due to intensive cultural practices, especially the use of pesticides in today's agriculture, the most important pollinators that will eliminate this deficiency are honeybees. With the pollination they perform, bees;**
- **• Increase the quantity and quality of the product,**
- **• Increase and spread of plants,**
- **• Development of wildlife,**
- **• Continuation of plant species and the survival of thousands of different creatures that use these plants as food or for nesting, and**
- **• It is a natural precaution against the food crisis that is increasing in the world every day.**





# **THE IMPORTANCE OF BEES IN TODAY'S AGRICULTURE**

**All over the world and in our country, which is an agricultural and livestock country; the sustainability of these activities depends on the diversity of pastures and agricultural areas.**

**This diversity is provided by honey bee pollination. Since beekeeping is not a soil-dependent activity, it can be a sole source of income for farmers with little or no land.**

# Advantages of Beekeeping in Türkiye

- **Our floral resources and colony existence are quite rich.**
- **There are different climates and geographical regions suitable for mobile and fixed beekeeping.**
- **There are many uncultivated areas for agricultural purposes.**
- **The use of agricultural pesticides is very low. It is rich in bee genetic resources.**
- **It is a suitable profession for landless or small landed villagers.**
- **Bees and bee products are always in a rising value position in the World and in our country.**
- **As a result of the supports and organizations provided by the Ministry, beekeeping is becoming an income-generating profession.**
- **The bee products sector is gaining a structure with a variety of products that provide economic income every day.**



# TYPES OF BEEKEEPING IN TÜRKİYE

The type of beekeeping is determined by whether the beekeeper does it as a hobby, additional/main source of income, market conditions of the product produced and the beekeeper's preference.

Beekeeping is generally done in two ways, **Fixed** and **Nomadic**, according to the displacement criterion.

## 1.1. **Fixed Beekeeping ;**

Beekeeping is done without moving the bee colonies during the year.

- It is done with traditional methods and the yield is low.
- It is not an economic activity that is the main source of income.
- It is done as a hobby or to meet the family's honey needs and sometimes for additional income.



# TYPES OF BEEKEEPING IN TÜRKİYE

## **Migratory Beekeeping**

- **Beekeeping is carried out by moving bee colonies to areas with suitable nectar and pollen sources throughout the year. It is done with scientific methods.**
- **The yield is high and the product variety is high.**
- **It is an economic activity that is the main source of income.**
- **In order for migratory beekeeping to be carried out economically, there must be at least 50 colonies in our country's conditions or the beekeeper must have a goal of developing his beekeeping.**
- **In our country, migratory beekeeping is carried out as **Short-Distance Migratory Beekeeping**, which is carried out in the regional highlands around 50 km, and **Long-Distance Migratory Beekeeping**, which is carried out throughout the country.**
- **In our country, 12,000 beekeepers carry out long-distance migratory beekeeping with approximately 1.5 million bee colonies.**



## **Türkiye BEEKEEPING SECTOR STATISTICS**

**From an economic perspective; products produced in beekeeping are value-added products that can be used in many sectors from food to health , apiteraphy and cosmetics, and the production of these products contributes to both the welfare of our beekeepers and our country's economy.**

**Although our country's beekeeping potential is not currently fully utilized; 7,400,805 tons of extracted honey; 1,989,017 tons of comb honey were exported in 2023, and approximately 32 million dollars of income was obtained as a result of these exports. This income was obtained only from honey; if other products could be exported, much more income could be obtained.**

**The beekeeping potential of our country is known to the whole world; our strength in the beekeeping sector makes our country an important source of bee products all over the world.**



## Current Situation of World Beekeeping

- ✓ **According to the World Food Organization (FAO 2022) data, there are 100,996,303 bee colonies in the world and approximately 1,830,768 tons of honey are produced from them. In 2021, approximately 30% of the honey produced in the world was traded, and 66% of the total export was made by approximately 20 honey producing countries.**
- ✓ **India and China are at the top of the list in terms of colony presence in the world.**
- ✓ **China and Ukraine export the most honey, while the USA and EU countries import honey.**



## **APIMONDIA ISTANBUL 2017 CONGRESS**

**The 45th Apimondia Congress held in our country in 2017 has achieved the title of being the most crowded congress in the history of Apimondia. In the congress, scientific presentations from different countries on beekeeping and bee products, speeches by Apimondia Regional Commission representatives, as well as Producer Speaks talks where our producers also took the floor were held. The Honeys of Türkiye stand was created and our honeys produced in different regions of our country were introduced. The Apimondia Congress emphasized the place and importance of Türkiye beekeeping in world beekeeping. 14.000 people joined Apimondia İstanbul**



Istanbul  
2017

Simondia Congress

SIMONDIA CONGRESS



# Current Situation of Beekeeping in Türkiye

- **Our country is the homeland of approximately 70% of the world's honey-producing plants and 22% of bee races.**
- **Our honey production in 2023 is second in the world with 114,889 tons.**
- **Our country is the 3rd country with the highest number of colonies in the world with 9.2 million colonies.**
- **Our country produces approximately**
- **8,000 tons of beeswax,**
- **6 tons of royal jelly,**
- **500 tons of pollen,**
- **10 tons of bee bread,**
- **15 tons of propolis,**
- **and 600,000 queen bees.**

# Current Situation of Beekeeping in Türkiye

- **There is a potential for production in beekeeping for 9 months in our country.**
- **In our country; In addition to the production of many flower and secretion honeys with monofloral and multifloral characteristics, a wide variety and quality of other bee products can be produced.**
- **While the number of colonies in Turkey has increased by 169% in the last 20 years; production areas have not increased at the same rate. For this reason; the yield per colony is decreasing.**
- **The current yield per hive in 2023 has been announced as 12.5 kg.**
- **Türkiye is the leading country in the world in pine honey production and export.**
- **Our country ranks 7th in world honey exports. In 2023, our country exported a total of approximately 9500 tons of honey, including filtered and comb, and 32 million dollars of income was obtained.**

## **Current Situation of Beekeeping in Türkiye**

**Although there have been positive developments in terms of beekeeping in Türkiye in the last 30-35 years, developments aimed at increasing the number of beekeepers and beehives have not had a positive impact on **colony productivity.****

**During this period, production targets have mainly focused on honey production and product diversification has not increased productivity.**

**Production of bee products for apitherapy will increase added value and farmer income.**

# **Turkish Beekeepers Central Union (TAB)**

**Considering the beekeeping potential of our country; in order to pave the way for such an important and developing beekeeping sector, to ensure organization in beekeeping, to create professional awareness and to have an institutional interlocutor,**

**The Turkish Beekeepers Central Union (TAB), which was established in 2003 based on the “Animal Breeding Law” numbered 4631 published in the Official Gazette dated March 10, 2001, is the largest non-governmental organization representing bees and beekeepers in Türkiye and continuing its activities with Provincial Beekeepers Unions located in 77 provinces and approximately 70 thousand beekeeper members.**

**All beekeepers have been registered in the Beekeeping Registration System (BRS), a joint program of TAB and the Ministry of Agriculture and Forestry since 2009, and are monitored with a monitoring system.**



# PROJECTS AND STUDIES WE HAVE CARRIED OUT TO ADDRESS THE PROBLEMS OF THE SECTOR

## **Project on Physical, Chemical and Mineral Matter Profiles of Pine Honey Produced in Turkey: (TAGEM/HSYGYAD/16/A05/P01/108)**

### **Reasons for the Project:**

**The lack of a detailed study on pine honey, which is the homeland of our country and the type of honey we export the most, was causing problems in exports. The presence of C4 sugar is a method that indicates external feeding and is used to determine adulteration all over the world. The fact that pine honey naturally contains C4 sugar in its structure was causing problems in exports and our pine honey was described as adulterated honey. The starting point of our project was to prove that pine honey naturally contains C4 sugar and that the presence of C4 sugar is not an indicator of adulteration in pine honey.**

**The Turkish Pine Honey project, which is produced in 8-10 provinces in Turkey, has regional production areas but national production, is TAB's first honey project and is one of the most meaningful projects carried out jointly by Universities, Ministries and Unions. The project was started in 2015 and concluded in 2020.**



# PROJECTS AND STUDIES WE HAVE CARRIED OUT TO ADDRESS THE PROBLEMS OF THE SECTOR

## **At the end of the project;**

- **The C4 problem, a problem created within ourselves and never dealt with by Europe, has been a “quality criterion” for years for our beekeepers. At the end of the guided project, it has been scientifically proven that C4 is not a quality criterion, that the presence of C4 in pine honey is not an indicator of adulteration, and the fingerprints of pine honey produced in our regions have been removed.**
- **Thanks to the Pine Honey project, our pine honey has taken its place in the Turkish Food Codex as Turkish Pine Honey.**
- **The TSE(Turkish Standat Institute) Pine Honey Standard (TS13910) has been issued based on the project results.**



- TÜRK STANDARDI TASARISI
- TURKISH STANDART DRAFT

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- *Pine honey*
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TK15

Prof. Dr. Behiç MERT

- **Subject Reporter**

- PROF.DR.NEVZAT ARTIK

Chairman of the Board of Experts

- Prof. Dr. Adem ŞAHİN

- Head of Technical Committee

# PROJECTS AND STUDIES WE HAVE CARRIED OUT TO ADDRESS THE PROBLEMS OF THE SECTOR

## **Determination of Fingerprints of Monofloral Honey Produced in Turkey and with Commercial Potential (TAGEM 17 AR\_GE 13)**

### **GENERAL DIRECTORATE OF AGRICULTURAL RESEARCH**

#### **Justifications of the Project:**

**There were almost no scientific studies on the quality, nutritional values, medical activities and chemical content of natural monofloral honeys specific to our country, therefore our honeys could not be standardized. Since there were not enough scientific publications and information about our honeys, the world did not know our valuable honeys, which reduced our country's competitive power in the world market.**

**According to the botanical source of the honeys produced in our country, the quality of some of our honeys was not known enough and they were used as blends with other honeys. Based on these justifications, our project, which started in 2017, covers 22 provinces and 5 types of monofloral honey. The project was successfully completed in 2020.**



# PROJECTS AND STUDIES WE HAVE CARRIED OUT TO ADDRESS THE PROBLEMS OF THE SECTOR

## **Determination of Fingerprints of Monofloral Honey Produced in Turkey and with Commercial Potential (TAGEM 17 AR\_GE 13) GENERAL DIRECTORATE OF AGRICULTURAL RESEARCH**

### **As a result of the project:**

- **By extracting the fingerprints of our chestnut, sunflower, astragalus, cotton and citrus honeys, the national and international awareness of our honeys produced in our country and traded has been increased. □ The effects of our honeys on human health have been revealed, paving the way for their use in apitherapy.**
- **With this project, the definition of monofloral honey has been made in the TFC Honey Communiqué and the pollen values have been specified. The way has been paved for marketing honeys according to their botanical origins.**
- **The quality, chemical components and medical activities of our honeys have been promoted with academic publications in national scientific journals.**
- **While extracting the fingerprint components of our honeys; it has been revealed how they differ geographically. In this way, the way has been paved for honeys specific to regions to receive both national and international geographical indications.**
- **With the project; in addition to routine analyses, analyses that have never been done before in the literature have been conducted, and the unknown features of our honeys have been identified, paving the way for the announcement of the value of our honeys to the whole world.**

# PROJECTS AND STUDIES WE HAVE CARRIED OUT TO ADDRESS THE PROBLEMS OF THE SECTOR

**Project on Morphological and Molecular Characterization of Colonies Representing Some Bee (*Apis mellifera* L.) Races and Genotypes Found in Turkey in Their Original Areas and Their Improvement in Terms of Certain Characters (TAGEM 18 AR-GE 13)**

## **Reasons for the Project:**

Races have lost their purity to a significant extent due to uncontrolled migratory beekeepers (migratory beekeepers), colonies and queen bee entries from domestic and foreign countries to the regions where they are distributed. This situation poses a significant threat in terms of environmental sustainability as well as genetic pollution. The fact that there are a total of 6 breeding centers in our country and that commercial queen bee enterprises focus on a single race causes genetic weaknesses. Genetic pollution, which is a bleeding wound in our country's beekeeping (the loss of our existing races' own genetic characteristics), draws attention to how important and necessary "IMPROVEMENT", which is the founding purpose of us Beekeepers' Associations, is. The unique characteristics of our races and ecotypes spread in our country need to be improved, developed and protected in regional areas, and their breeding needs to be done in line with the demands of regional beekeepers.

For these reasons; The project titled "Morphological and Molecular Characterization of Colonies Representing Some Bee (*Apis mellifera* L.) Races and Genotypes Found in Turkey in Their Original Areas and Their Improvement in Terms of Certain Characters", which was submitted to the General Directorate of Agricultural Research and Policies by the Turkish Beekeepers Central Union in 2018 and deemed worthy of support with the project number "TAGEM-18/AR-GE/07", was completed in 2023.



## PROJECTS AND STUDIES WE HAVE CARRIED OUT TO ADDRESS THE PROBLEMS OF THE SECTOR

### **As a result of the project;**

- **The 5 different ecotype bees (Hatay Bee, Anatolian Bee, Yiğilca Bee, Gökçeada Bee and Kırklareli Bee) that we worked on within the scope of the project were protected in swarms of 200 hives in their original areas.**
- **Current molecular and morphological characterizations of the existing races and ecotypes were made.**
- **Physiological and performance tests were performed on honey yield, hygienic behavior, aggressiveness, swarming tendency, offspring yield, disease, adult bee population, wintering ability and 3 generations were raised. Currently, the breeding program is continued by the Provincial Unions with the coordination of the Central Union.**
- **A breeding registration system called the National Bee Breeding Registration Module was created and the data obtained during the project was uploaded to this system. In the light of the data recorded in the breeding system, each region's breeding program was prepared and a software program was created to be used in the following process.**
- **Queen bees were produced and tested using artificial insemination and natural mating methods, and improvement studies were carried out in the flocks and planned for the future.**
- **For the first time in Turkey, sperm freezing was performed on bees during the project and delivered to the gene bank in Lalahan.**

## **PROJECTS AND STUDIES WE HAVE CARRIED OUT TO ADDRESS THE PROBLEMS OF THE SECTOR**

**Project on Investigation of  $\beta$ - Fructofuranosidase Activities,  $\alpha$ -Amylase and Oligosaccharide Amounts of Monofloral Honey Varieties and Pine Honey Produced in Turkey with High Commercial Potential, Validation and Standardization of Methods (TAGEM /17/AR-GE/13)**

### **Reasons for the Project:**

**Current analysis methods are insufficient to identify adulterated products in the market. Consumer confidence in honey is shaken. Honey produced with appropriate production techniques cannot compete with adulterated products sold below cost in the market. The project titled “Investigation of  $\beta$ -Fructofuranosidase Activities,  $\alpha$ -Amylase and Oligosaccharide Amounts of Monofloral Honey Varieties and Pine Honey with High Commercial Potential Produced in Turkey, Validation and Standardization of Methods”, in partnership with TAB-TAGEM and under the leadership of Muğla Sıtkı Koçman University, was completed in 2023.**

## **PROJECTS AND STUDIES WE HAVE CARRIED OUT TO ADDRESS THE PROBLEMS OF THE SECTOR**

**Project on Investigation of  $\beta$ - Fructofuranosidase Activities,  $\alpha$ -Amylase and Oligosaccharide Amounts of Monofloral Honey Varieties and Pine Honey Produced in Turkey with High Commercial Potential, Validation and Standardization of Methods (TAGEM /17/AR-GE/13)**

### **Results of the Project:**

**With the project, 3 new methods have been developed to detect adulteration with foreign enzymes, adulteration by inverting tea sugar with enzymes, and adulteration with starch-based sugar, which are not currently detected.**

## **TAB – Early Warning System with Cooperation Protocol of General Directorate of Meteorology**

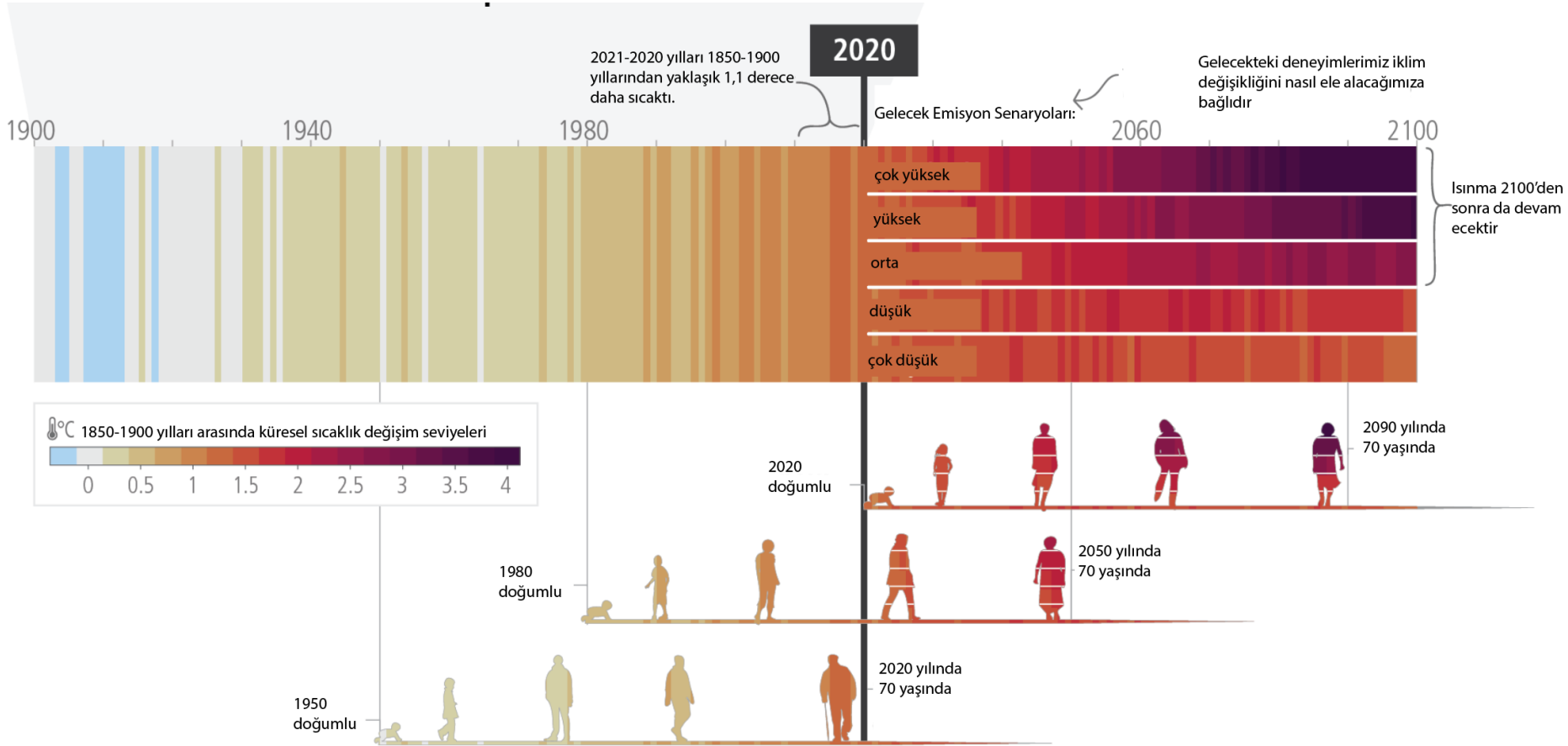
- **All kinds of food that is necessary and essential for the survival of honey bees are flowering plants in nature. For this reason, bees are creatures that are one hundred percent dependent on nature. Any negativity that may occur in nature will first and directly affect bees.**
- **The effects of climate changes experienced until today and possible future scenarios on plants will directly affect the flowering of plants, and bees that have difficulty accessing nectar and pollen will not be able to develop and produce sufficiently.**
- **In order to ensure sustainability in beekeeping, which is the largest natural pollinator in nature, and to enable bees and beekeepers to abandon their old habits and adapt to climate changes in this process, the early and effective use of meteorological data systems is of great importance for agriculture and beekeeping.**

# CLIMATE CHANGE 2023 Synthesis Report

UNITED NATION ENVIRONMENT PROGRAMME; WORLD METEOROLOGICAL ORGANISATION



# OBSERVED WARMING AND ITS REASONS



# **Granting Official Status to the Beekeeping Profession**

- **In our country, which has great potential in beekeeping, the need for qualified bee and bee product producers to carry out beekeeping activities is increasing. In order to produce the desired amount of quality honey as well as value-added bee products such as royal jelly, pollen, propolis and bee venom, professional beekeepers who have received sufficient time and practical training are needed.**
- **All occupational groups have been defined and identified in our country. However; despite the fact that beekeeping has been practiced in our country for centuries and daily courses are provided by the state, unfortunately, beekeeping has not been defined as a profession by the public. Beekeeping was not a profession.**

**In order to close this gap in the sector, as a result of our requests we have conveyed to the Ministry of National Education; beekeeping education has been included in the scope of Vocational Education Center (MEM) programs in accordance with the Vocational Education Law No. 3308, and the beekeeping profession has been included in the scope of apprenticeship training applications. As of 25.10.2020, beekeeping has gained official profession status.**



## **TAB Education-Publication and Social Media Activities**

**We organize trainings to produce safe, quality products and to ensure that beekeeping activities are carried out consciously. We inform our beekeepers and convey possible early warnings to our beekeepers through our press publication activities and social media accounts. We became the voice of our beekeepers by appearing in the national and international press during the forest fires.**

**TAB Beekeeping Magazine has been published digitally every 3 months since 2022.**

**The magazine includes useful articles about the beekeeping sector, information for our beekeepers and the activities of our Central Union and Provincial Unions. In addition to using our own media outlets effectively, up-to-date information is frequently provided on national television channels. The beekeeping agenda in the world and Turkey is closely followed and opinions are presented in accordance with this agenda by participating in workshops, panels and comprehensive congresses.**

# PARTICIPATION IN « ISO TC 34/ SC 19 BEE PRODUCTS»

REFERENCE	TITLE	TYPE
<a href="#">ISO/TC 34/SC 2</a>	Oleaginous seeds and fruits and oilseed meals	Sub committee
<a href="#">ISO/TC 34/SC 3</a>	Fruits and vegetables and their derived products	Sub committee
<a href="#">ISO/TC 34/SC 4</a>	Cereals and pulses	Sub committee
<a href="#">ISO/TC 34/SC 5</a>	Milk and milk products	Sub committee
<a href="#">ISO/TC 34/SC 6</a>	Meat, poultry, fish, eggs and their products	Sub committee
<a href="#">ISO/TC 34/SC 7</a>	Spices, culinary herbs and condiments	Sub committee
<a href="#">ISO/TC 34/SC 8</a>	Tea	Sub committee
<a href="#">ISO/TC 34/SC 9</a>	Microbiology	Sub committee
<a href="#">ISO/TC 34/SC 10</a>	Animal feeding stuffs	Sub committee
<a href="#">ISO/TC 34/SC 11</a>	Animal and vegetable fats and oils	Sub committee
<a href="#">ISO/TC 34/SC 12</a>	Sensory analysis	Sub committee
<a href="#">ISO/TC 34/SC 15</a>	Coffee	Sub committee
<a href="#">ISO/TC 34/SC 16</a>	Horizontal methods for molecular biomarker analysis	Sub committee
<a href="#">ISO/TC 34/SC 17</a>	Management systems for food safety	Sub committee
<a href="#">ISO/TC 34/SC 18</a>	Cocoa	Sub committee
<a href="#">ISO/TC 34/SC 19</a>	<b>Bee products</b>	<b>Sub committee</b>
<a href="#">ISO/TC 34/CAG</a>	Chairmen Advisory group	

**ISO TC 34/SC 19 BEE and BEE PRODUCT  
ISO COMMISSION WORKS**

**868**

**PUBLISHED ISO STANDARDS \***  
related to the TC and its SCs  
of which **25** under the direct responsibility  
of ISO/TC 34

**124**

**ISO STANDARDS UNDER DEVELOPMENT \***  
related to the TC and its SCs  
of which **9** under the direct responsibility  
of ISO/TC 34

**76**

**PARTICIPATING MEMBERS**

**64**

**OBSERVING MEMBERS**



# BEE PRODUCTS

**Bee products and honey; It does not contain any additives as it is a natural food produced by a bee. It is safer in terms of additive residue and contamination levels as well as safer than other foods in terms of pesticide residues and microbiological criteria.**

**However, continuous monitoring and inspection of bee and bee products is required for pesticide and metallic contamination. This situation is very important for the sustainability of beekeeping activities .**



## **RISK ELEMENTS THAT CAUSE FOOD SAFETY HAZARD IN BEE PRODUCTS**

**There are 3 different risks that negatively affect food safety in the production of bee products.**

1. Microbiological risks and hazards
2. Physical risks and dangers
3. Chemical risks and hazards



# Chemical Contamination Risks of Bee and Bee Products

<b>SOURCE OF CONTAMINATION TO BEE PRODUCTS</b>	<b>CHEMICAL CONTAMINATION RISK</b>
Pollen, honey, perga, royal jelly, propolis	Veterinary drug residues such as Chloramphenicol, Tetracycline, Streptomycin, Sulfanamide, Nitrofurantoin, Erythromycin
Honey, pollen, honeycomb, propolis, royal jelly	Naphthalene
Honey, pollen, honeycomb, propolis, royal jelly	Residues on pesticide residues (10 µg / kg)
Instrumental equipment (machine oil, paint) in royal jelly production	Machine oil used for maintenance and paint contamination
Cleaning and disinfectant residue (caustic in water, detergent)	Contamination to bee products of cleaning and disinfectant
Chemical substances from cleaning water	Contamination of bee and bee products caused by the cleaning of surfaces that come into contact with the product



## Residue Limits for Plant Protection Products and Veterinary Drugs in Bee Products

ACTIVE INGREDIENT	RELEVANT LEGISLATION
Naphthalene	Turkish Food Codex Honey Communiqué (Communiqué No: 2020/7) 22 April 2020 issue: 31107; ECC 2377/90 directive
Total Pesticides	Turkish Food Codex Honey Communiqué (Communiqué No: 2020/7) 22 April 2020 issue: 31107
Coumafos	TFC Veterinary Medicines Maximum Residue Limits Communiqué
Amitraz	TFC Veterinary Medicines Maximum Residue Limits Communiqué
Flumethrin	TFC Veterinary Medicines Maximum Residue Limits Communiqué
Cymiazol	TFC Veterinary Medicines Maximum Residue Limits Communiqué
Aristolochia spp and those prepared from it	TFC Veterinary Medicines Maximum Residue Limits Communiqué
Chloramphenicol	ECC (203 / 181EC) Vet. Medicines EU Legislation
Chloroform	TFC Veterinary Medicines Maximum Residue Limits Communiqué
Chlorpromazin	TFC Veterinary Medicines Maximum Residue Limits Communiqué
Colchin	TFC Veterinary Medicines Maximum Residue Limits Communiqué
Dapson	TFC Veterinary Medicines Maximum Residue Limits Communiqué
Dimetridazol	TFC Veterinary Medicines Maximum Residue Limits Communiqué
Metroaidazol	TFC Veterinary Medicines Maximum Residue Limits Communiqué
Nitrofurane and furazolidone	TFC Veterinary Medicines Maximum Residue Limits Communiqué



## Risks That May Occur During Production of Bee Products and HACCP Measures

BEE PRODUCT	RISK TO BE	HACCP PRECAUTIONS
<b>All types of honey</b>	Piece of bee, piece of metal and wood	Training the beekeeper, filtering the honey
<b>Honey, pollen, propolis, perga (bee bread)</b>	Fermentation due to osmophilic yeast in honey	With the completion of the glazing of the combs, the harvest is preserved in a suitable condition.
<b>Honey, pollen, propolis, perga</b>	Increasing change with chemical reaction rate	Bee products should be stored in the appropriate warehouse, the temperature should not exceed 45° C.
<b>Honey, pollen, propolis, perga</b>	Metallic contamination Pb, Hg, Cd, Cu residue	Keeping hives away from residential areas
<b>Pollen, perga</b>	Foreign matter in pollen	Daily pollen collection and equipment cleaning
<b>Pollen, perga, propolis</b>	Yeast and mold growth and parasite eggs	After the pollen harvest, it should be kept at -18 oC for at least 3-4 days, it can be kept fresh at +4 oC for 15 days, others at -18 oC for 1 year. It is stored in a dry place.
<b>Pollen, perga, royal jelly, propolis</b>	Plant protection residue (pesticide)	Hives should be moved to areas where pesticides are not used and beekeepers should be trained.
<b>Royal jelly, pollen, perga, propolis</b>	The presence of foreign matter and larva in the product	A 0.2 mm filter should be used and the foreign matter should be separated by sensory examination.
<b>Royal jelly, pollen, perga, propolis</b>	Veterinary drug residue in royal jelly	No medication should be applied to the hive during the production phase, and royal jelly should not be taken from the sick beehive.
<b>Royal jelly, pollen, perga</b>	Fermentation in royal jelly	It should be stored at +4 ° C and stored at -18 °C.
<b>Royal jelly, pollen, perga, propolis</b>	Metal and wood parts paint, machine oil and so on.	Using hygienic plastics, placing traps on top and side

Quality Criteria	Codex HONEY	EC HONEY	TFC (TURKISH FOOD CODEX) HONEY
<b>Moisture</b> general heather, clover Industrial or bake-honey	≤ 21 g/100g ≤ 23 g/100g ≤ 25 g/100g	≤ 21 g/100g ≤ 23 g/100g ≤ 25 g/100g	En çok %20-23
<b>Apparent Reducing Sugars Content</b> Honeys not listed below honeydew honey or blends of honeydew honey and blossom honey <i>Xanthorrhoea pr.</i>	≥ 65 g /100 g ≥ 45 g /100 g ≥ 53 g /100 g	≥ 65 g /100 g ≥ 60 g /100 g ≥ 53 g /100 g	60g/100g
<b>Fruktoz/Glukoz F/G</b>	-	-	0.9-1.4
<b>Apparent Sucrose content</b> Honeys not listed below  <i>Robinia , Lavandula, Hedysarum, Trifolium, Citrus, Medicago, Eucalyptus cam., Eucryphia luc. Banksia menz. * Rosemarinus**</i>	≤ 5 g/100 g  ≤ 10 g/100 g	≤ 5 g/100 g  ≤ 10 g/100 g	5g/100g  Lavanta 15g/100g
<b>Water-Insoluble Solids Content</b> general pressed honey	≤ 0.1 g/100 g ≤ 0.5 g/100 g	≤ 0.5 g/100 g	≤ 0.1 g/100 g
<b>Mineral Content (ash)</b> general honeydew or blends of honeydew and blossom honey or chestnut honey	≤ 0.6 g/100 g ≤ 1.2 g/100 g	≤ 0.6 g/100 g ≤ 1.2 g/100 g	-
<b>Acidity</b>	≤ 50 meq/kg	≤ 40 meq/kg	50 meq/kg Fırıncılık balı 80meq/kg
<b>Diastase Activity,</b> after processing and blending (diastase number in Schade scale) general honeys with natural low enzyme content	≥ 8 ≥ 3	≥ 8 ≥ 3	≥ 8
<b>Hydroxymethylfurfural Content</b> after processing and/or blending	≤ 60 mg/kg	≤ 40 mg/kg	40 mg/kg

**Table 1 Honey Quality Standard according to the draft CL 1998/12-S of the Codex Alimentarius and to the Draft 96/0114 (CNS) of the EU**

\* - the European draft refers to honeydew honey and mixtures of honeydew and blossom honey, acacia, *Banksia* and *Citrus* honeys

\*\* - The IHC proposes also that *Rosemarinus* be included in this list (see text)

# PINE HONEY



# PINE HONEY

**Pine honey production starts in the first days of August and continues until the end of April on the coasts and until May 15 in high altitude regions. Intensive pine honey production is carried out in August, September, October and November. Therefore, the flow of honey continues even in the winter season. 92% of the pine honey production in the world takes place in Türkiye.**

**A large portion of the pine honey produced in Turkey with its quality, aroma and nutrients is exported to European Union countries. Approximately 75-80% of pine honey production in Türkiye takes place in the pine-bearing, forested areas in Muğla. 68% of the geography of Muğla is covered with forests, and pine honey production takes place in only 8% of the forested areas. Our annual pine honey production in Muğla province is around 20-40 thousand tons. Pine honey constitutes 17-23% of the honey produced in Turkey.**

# PİNE HONEY FEATURES

PARAMETER	Çerçevesiz i petekli	Tabii petekli	Parça petekli	Bölmeli Petekli	Süzme	Pres	Karışım	Filtre edilmiş	Fırıncılık
<b>Moisture %, max</b>	20	20	20	20	20	20	20	20	23
<b>Reducing Sugar, %, (min)</b>	45	45	45	45	45	45	45	45	45
<b>Fructose/Glucose</b>	1,0-1,4	1,0-1,4	1,0-1,4	1,0-1,4	1,0-1,4	1,0-1,4	1,0-1,4	1,0-1,4	1,0-1,4
<b>Sucrose, %(DM) (max)</b>	5	5	5	5	5	5	5	5	5
<b>Maltose %(DM) (max)</b>	1	1	1	1	1	1	1	1	1
<b>Ash%(DM) (max)</b>	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2
<b>Water insoluble matter%(DM) (max)</b>	0,1	0,1	0,1	0,1	0,1	0,5	0,1	0,1	0,1
<b>Acidity, %(DM) (max) meq/kg, en çok</b>	50	50	50	50	50	50	50	50	80
<b>Electrical conductivity, mS/cm, mi,n</b>	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8
<b>Optical rotation</b>	+	+	+	+	+	+	+	+	+
<b>Diyastase number min</b>	8	8	8	8	8	8	8	8	8
<b>HMF, mg/kg, max</b>	40	40	40	40	40	40	40	40	80
<b>Prolin, mg/kg, Min.</b>	300	300	300	300	300	300	300	300	180
<b>Naftalin, µg/kg, max.</b>	10	10	10	10	10	10	10	10	10
<b>Color</b>	Rhund scale, min. 60								

# PROPOLIS

- **Raw Propolis:**
- **It is an unprocessed product created by honeybees by mixing resinous substances collected from plant parts such as stems, leaves and buds, as well as plant nectar and pollen, with beeswax and enzymes.**
- **It is obtained by beekeepers using traps placed in the hive or by scraping from the hive.**



# PROPOLIS

**1. Temperate, brown, Populus spp. propolis:** Poplar type propolis can be brown yellow, brownish red, brown, yellowish brown, grayish brown or gray black. The main botanical source is *Populus* spp., but several other botanical sources can be found. It appears as a lump shape or broken grain shape at 20-24°C and becomes soft and sticky with increasing temperature above 30°C. It is hard below 0°C. Poplar propolis has a characteristic balsamic and resinous aroma. Its taste is slightly bitter and sharp.

**2. Tropical, green, Baccharis dracunculifolia propolis:** Baccharis propolis is yellowish green, green, greenish, greenish brown and brown. The main botanical source is *Baccharis dracunculifolia*. It appears as a ribbon shape and broken grain shape at 20-24°C and becomes malleable with increasing temperature at about 25°C. It is hard below 0°C. Baccharis propolis has a characteristic resinous, woody and spicy aromatic odor. Its taste is bitter, strong and very spicy [2].

**3. Tropical, red, Dalbergia and Clusia propolis:** Dalbergia and Clusia propolis are red, reddish yellow and reddish brown. The main botanical sources are *Dalbergia ecastophyllum* and *Clusia* spp. It is soft at temperatures above 20°C and hard below 0°C. It has a characteristic resinous and specific balsamic aromatic odor. Its taste is aromatic and slightly bitter.



## **Propolis extract:**

**It is a processed product in the form of a solution that has the characteristic properties of the propolis it is produced from, obtained by extracting the bioactive components found in raw propolis using the specified water, olive oil, vinegar, alcohol and alcohol-derived solvents (ethyl alcohol, propylene glycol, polyethylene glycol, glycerol, etc.) and aqueous solutions of these solvents and removing unwanted compounds (the maximum limits in the food additives regulation are not required for the amount of solvent in the final product). It reflects the characteristic properties of the raw propolis it is obtained from. It should be sediment-free and homogeneous.**

### **Composition of Raw Propolis and Propolis Extract**

<b>COMPUNDS</b>	<b>RAW PROPOLIS</b>	<b>PROPOLIS EXTRACT</b>
Balsam % [3-5]	Min: 45	-
Dry Matter <sup>5, 6</sup>	-	5-50*
Total phenolic [6]	Min: %2.5	Min: 20 mg/mL
Total Flavonoid [6]	Min: %1.5	Min: 15 mg/mL
Total Antioxidant Capacity CUPRAC [4, 6]	Min: 100 mgTE/g	Min: 50 mg/mL
pH Value [3]	-	3-6
Bee wax[4, 5, 8]	Max 50	**
Natural and Synthetic Dyestuff	Should not be found(<1mg/g)	Should not be found (<1µg/mL)
Petroleum and derivative oils-tar	Should not be found(<1mg/g)	Should not be found(<1µg/MI)
Unsoluble Suspended Substance	-	≤% 1

\*\*\* The values in the table belong to 70% ethanol extract.

## PROPOLIS EXTRACT COMPONENTS

**Propolis extracts to be used for apitherapy purposes must contain the following components in the minimum amounts specified below.**

**Caffeic acid** (an important component of propolis): **Minimum 1 mg/mL**

**Caffeic acid phenethyl ester (CAPE):** **Minimum 2 mg/mL**

**Artepillin C (found in green propolis):** **Minimum 14 mg/mL**

**Chrysin:** **Minimum 4 mg/mL**

**Galangin:** **Minimum 3 mg/mL**

**Pinobanksin:** **Minimum 3 mg/mL**

**Pinosembrin:** **Minimum 6 mg/mL**

**Quercetin or Rutin:** **Minimum 0.5 mg/mL**



# POLLEN AND BEE BREAD

**Flower Pollen:** In flowering plants, it is the wrinkled, spiny, oily and sticky pollen that carries male cells in the pollen sacs inside the anthers located on the upper part of the male organs (stamen) of the flowers and is collected by honey bees.

**Fresh Bee Pollen:** Bee product that is collected by worker bees from pollen found in flowering plants and turned into spherical, colored pellets with their own secretions and harvested with the help of traps at the entrance of the hive.

**Dried Bee Pollen:** Product obtained by drying fresh pollen at a suitable temperature (below 45°C),

**Bee Bread (perga):** Bee product formed by fermenting bee pollen stored in the honeycomb.



# **WHAT NEEDS TO BE DONE FOR THE TURKISH BEEKEEPING SECTOR**

**1-Farmers should be trained in all bee products and good agricultural practice(GAP) rules should be followed.**

**2-Good production practices(GMP) should be followed for the use of bee products in apitherapy.**

**3-Imitation and adulteration in bee products should be constantly monitored and food fraudsters who usurp the rights of farmers should be punished.**

**4-Studies on NMR and similar new techniques should be accelerated to prevent adulteration in honey and bee products.**

**5-Supports provided to bee farmers should be increased.**

**6-Legislation should be prepared to prevent the export of comb honey.**



**A bee lives less than 40 days.**

**Visit at least 1000 flowers.**

**Produce less than 1 teaspoon of honey(4 gram).**

**A teaspoon of honey for us, a life for the bee.**

**Thank you bees !!!**



Arı 40 günden az yaşar,  
en az 1000 çiçeği ziyaret eder ve  
bir çay kaşığından daha az bal üretir.  
Bizim için sadece bir çay kaşığı bal,  
arı için ise bir hayat.  
Teşekkürler arılar!

# THANK YOU VERY MUCH

[artik6226@hotmail.com](mailto:artik6226@hotmail.com)

+90 05323637115

