

# ***Greek Honey***



FEDERATION OF GREEK BEEKEEPERS' ASSOCIATIONS









# Apiculture in Greece



## WE ARE PROUD OF OUR PAST....

Apiculture in Greece goes a long way back, to the times when mythology and history are blended. The most ancient personality, related to apiculture, recorded in historical documents, is Aristeos. He is one of the most enigmatic figures of ancient Greek religion and was one of the main characters of Kea's mythical circle.

Aristeos, son of god Apollo and nymph Kyrini, was born in Africa, in the palaces of Libya. As soon as he came into the world, god Hermes took him to Gaia and the Hours in order to raise him. Those nurses dropped nectar and ambrosia on the baby's lips turning Aristeos into an immortal. (The process of immortalisation looks astonishingly familiar to the process of turning a bee to a queen instead of a worker; nutrition makes all the difference!)



When he grew up, the Muses taught Aristeos the divinatory skill and the medical science. By the Nymphs he was taught how to cultivate grapevines and olive trees, but mostly he was taught the skill of apiculture, that from now on, would characterize him more than anything else. Later, Aristeos and the bees would become the basic symbols of Kea Island and would be portrayed on the coins of Toulida, Karthea and Korisia.

The myth of Aristeos testifies the existence of intensive apiculture during antiquity. However more evidence can be found as we advance in history.

In Crete clay beehives of the Minoan era (3.400 B.C.) were found at the excavations in Festus. The golden jewel that depicts a cluster of two bees holding a comb, emerging from a pipe shaped, clay beehive, belongs to the same era. Moreover, another jewel that represents a bee, found during the excavations in Knossos, belongs to the same era.





In the ancient city of Knossos was also discovered a plate with the sign: "Pasi Theis Meli: AMFOREFS 1" which means: "Honey is offered to all gods: 1 amphora". The phrase was written in the "syllabic" alphabet of Linear B writing, during 14th century B.C. and was translated by the British architect Michael Ventris in 1952.

Moreover, "Melikraton" that was a mixture of honey and milk, reported in Odyssey (verse K-519), was an exquisite drink and was only used in special occasions. It is also referred (verse Y-168) that the orphan daughters of Pindaros were nourished by the goddess Venus with cheese, honey and wine. The witch Kirki used the same food in order to seduce the companions of Odysseus (verse, K-213).

The ancient historian Hesiod mentions the word "Simvlos" which was used to describe the beehives of that era. Despite the fact that the exact type of these beehives is not absolutely known, it is certain that they were manufactured for stock farming of honey bees. Moreover, the existence of intensive apiculture is also testified at the period before Aristotle during which, apiculture had already been organized in very big degree:

Solon, (640-558 B.C.) the great legislator of Athens, established various legislative rules for the apiculture of his era. A rule which proves the existence of intensive apiculture and which regulates and determines the distances between apiaries is, in translation, the following: "Apiaries must be at 300 feet distance far, one from another" (Plutarch: Vios Solonos).

Hippocrates (462-352 B.C.), the father of Medicine, recommended honey to everyone but in particular to ill persons.

When Democritus was asked how it is possible to maintain one healthy and long living, he answered: "One must nourish the external part of his body with olive oil and the internal with honey".

Pythagoras and his followers used honey as their main food.



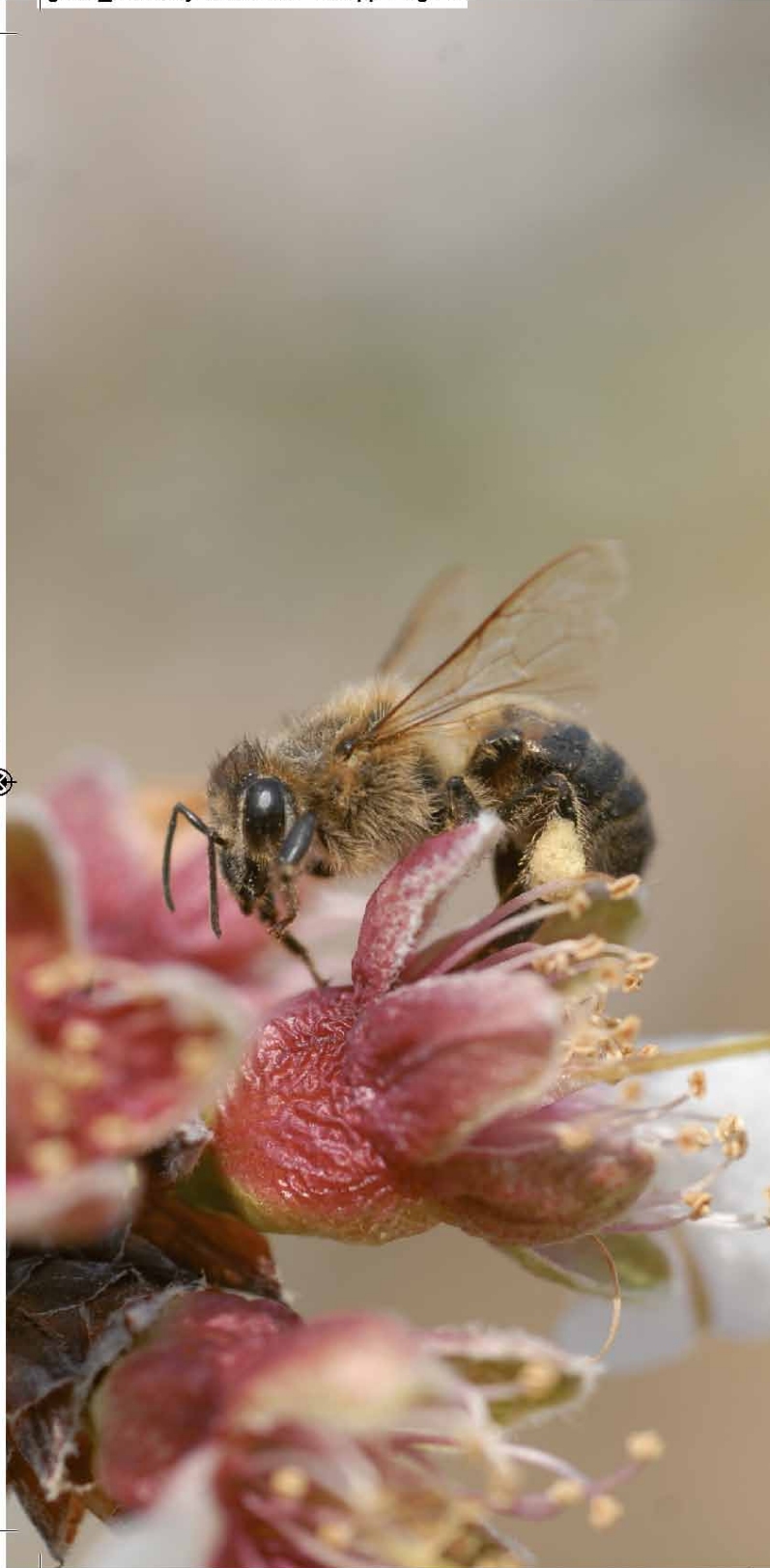
The progress of apiculture was not limited only in Attica but everywhere in Greece: mainland, islands and even colonies. However, the first one who studied bees scientifically was Aristotle. The books of Aristotle (322 B.C.) constitute an important turning point for the apiculture of ancient Greece and of all civilized world too.

The beehive with mobile frames was used in ancient Greece. In Kithira island, ancient apiarists used the so called "adonaki", that is the precursor of modern European beehive with the mobile frame, discovered by the American Lorenzo Lorraine Langstroth.









## ... AND PRESENT

In 1903, according to statistics, there were 201.314 traditional beehives in Greece and only 412 European. The Balkan Wars and two World Wars delayed the development of apiculture considerably. But things are a lot different now!

Nowadays, there are approximately 1.400.000 bee colonies in Langstroth beehives in Greece (a number that represents 10,8% of the total European colonies, second higher after Spain) managed by almost 23.000 apiarists in Greece, with 5.000 being professionals. The majority of them practices migratory apiculture moving the hives on average 5 times annually and only a very small percentage, mainly in the islands, practices stationary apiculture.

Apicultural density is a world record with 11,1 bee colonies per km<sup>2</sup>. Both the bees and the beekeepers have to work hard to produce approximately 20 thousand tons of excellent quality honey annually.

About 40 Beekeeping Cooperative Organisations operate in Greece and one Association of Beekeeping Cooperatives, "MELISSOKOMIKI ELLADAS". About 60 Beekeepers' Associations are represented in O.M.S.E. the Federation of Greek Beekeepers' Associations and recently the National Interprofessional Organisation of Honey and Other Beekeeping Products was established by Honey Manufacturers, Beekeeping Cooperatives and O.M.S.E..





## GREEK HONEY

Greek honey owes its unique aroma and taste to the fact that the better part of Greece is home to forests and wild ecosystems with only 29,32% of the land being allocated to farming.

The Greek floral biodiversity, as is expressed by the relation between the number of species and the country's total area, is among the highest in Europe and the Mediterranean. The Greek flora includes 6.308 taxa (species and subspecies), according to the recent update of the Flora Hellenica data base, while the number of species is calculated between 4.900 and 5.500 (Strid and Tan, 1992).

The number of endemic species of Greece amounts in 742 according to latest published estimates (WWF and IUCN 1994), a 15% of the total flora. The number of endemic taxa had been calculated in 1.225 (Iatrou 1986) and finally is reported that it amounts to 1.275 taxa (Iatrou 1996, unpublished data).

Many of these species are aromatic and medicinal herbs that transfer their properties to the greek honey. Recent scientific studies<sup>1</sup> show that greek honey varieties are rich in chemical compounds such as polyphenols, phenolic acids and monoterpenes, that are powerful antioxidants known for their chemopreventive properties. Chemoprevention is the use of natural, synthetic (made in a laboratory), or biologic (from a living source) substances to reverse, suppress, or prevent the development of cancer.

<sup>1</sup> *Bioactivity of Greek honey extracts on breast cancer (MCF-7), prostate cancer (PC-3) and endometrial cancer (Ishikawa) cells: Profile analysis of extracts*  
Anna V. Tsiapara, Mari Jaakkola, Ioanna Chiriac, Konstadia Gralkou, Tiina Tolonen, Vesa Virtanen and Paraskevi Moutsatsoua.

<sup>a</sup> *Department of Biological Chemistry, Medical School, University of Athens*

<sup>b</sup> *Biotechnology Laboratory, Kajaani University Consortium, University of Oulu*

<sup>c</sup> *Laboratory of Pharmacognosy, Department of Pharmacy, University of Athens*  
*Food Chemistry Volume 116, Issue 3, 1 October 2009, Pages 702-708*

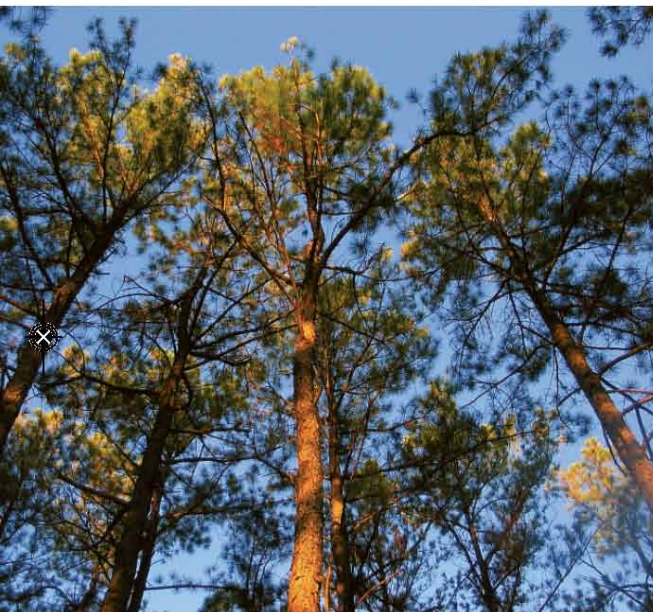
The produced honey is distinguished in two big categories:

Blossom honey or nectar honey, that is produced by the nectar of flowers of (thyme, orange, heather, cotton, sunflower and multifloral blends of the multitude of aromatic herbs and wildflowers of Greece)

Honeydew honey, obtained mainly from excretions of plant sucking insects (Hemiptera) on the living part of plants or secretions of living parts of plants. In this category belongs the honey of pine, fir and other forest plants.

In Greece, honey is produced mainly from pine and fir (60%), while very important is also the production of thyme honey (15%).





## Pine honey

Only Greece and Turkey produce pine honey. The bees feed on the sweet secretions of the tiny insect *Marchalina hellenica*, that populates the pine forests of Greece, and turn them to a not so dark honeydew honey, with a more pleasant aroma than most forest honey varieties, not very sweet and very slow in crystallization, very popular among Greek consumers.

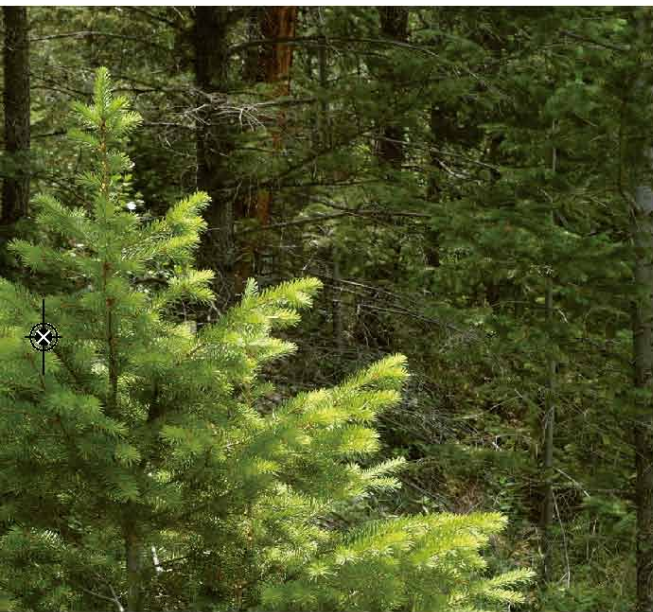
The spring harvest is slightly different from the autumn harvest, as different wild flowers and herbs are in blossom, participating at a small but aromatic percentage in the pine honey composition. It has a high biological and nutritional value due to its high concentration of trace elements up to six times higher than that of floral honey.











## Fir honey

Rich in minerals, B - complex vitamins and amino acids, fir honey is also popular for its aroma and mild taste and its very slow crystallization. It is produced mainly from the secretions of the insect *Physokermes hemi-cryphus* and enriched with nectar from a variety of mountainous herbs.











## Vanilla Fir Tree Honey from Mnt Menalon, Protected Designation of Origin (PDO)

A unique honey, both in appearance with its caramel color shaded with pearly hues, and taste, actually reminding of vanilla and sweet spices. It has a very low water content (14%-15,5%) and an almost creamy viscosity. It is produced only in Mnt Menalon, Peloponnesus.











## Thyme honey

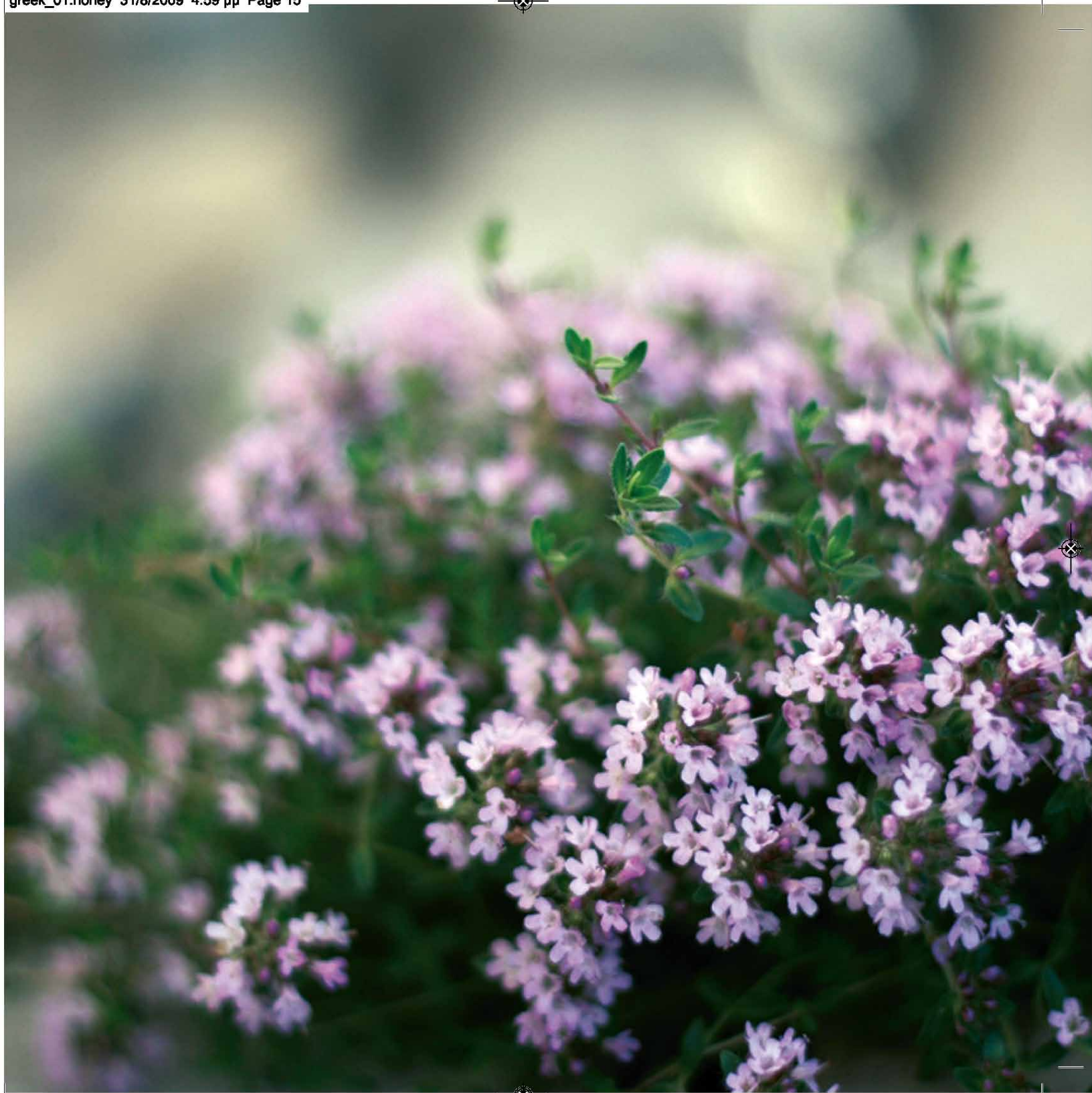
An excellent honey, with a colour ranging from amber to the colour of red wine or cognac, and a unique spicy taste along with a splendid fragrance. It is characterised by its high content of the enzyme diastase and the amino acid proline. It has excellent antiseptic properties that help maintain the health of the upper respiratory system. The high nutritional value of this honey invigorates the body by increasing energy levels.

Recently a scientific study on the biological properties of greek honey varieties (see footnote no 1) has discovered the presence of a chemical compound, a triol, present only in thyme honey that increases its chemopreventive properties, especially against breast, uterus and prostate cancer. It seems that the most popular honey in Greece has considerable anti-oxidative, anti- microbial and chemopreventive properties.

Depending on its purity and water content, it crystallizes between 6-18 months.











## Cretan thyme-pine honey

A natural mixture that is produced when the late thyme harvest is immediately followed by an increased yield of honeydew in the nearby pine forests. The most popular honey in Crete where it is traditionally produced, more popular even than thyme, it combines aromas and tastes from both types of honey, although the stronger thyme somewhat prevails, and is as slow as pine in crystallization. The same stands for its nutritional value and health benefits.

No standards exist yet for cretan thyme-pine honey as to its chemical composition and percentage of pollen grains. Still the taste of it is so characteristic and unforgettable that is easily recognised and picked among pine honey samples.











## Chestnut honey

A dark brown honey, with a distinct heavy aroma and a slightly bitter aftertaste, very nutritious and especially rich in potassium, magnesium, manganese and barium. Its source is a mixture of nectar from *Castanea sativa*, the greek chestnut tree and honeydew from its parasite the aphid *Myzocallis castanicolla*.

It must be reported that there are years when the greek linden tree (*Tilia cordata*) is blooming along and other years when bramble is blooming along with chestnut and linden and the produced honey would be fit for Gods, a taste and a fragrance one never forgets!











## Heather honey

In spring white heather *Erica arborea* and in autumn purple heather *Erica verticillata* are the source of greek heather honey. a dark red, very nutritious honey with a bitter aftertaste especially when nectar of *Arbutus unedo* participates and a distinct, heavy aroma. Spring heather honey is a lighter shade of autumn, has a different taste and a higher glucose concentration.

Although high water content and high glucose concentration along with fast crystallization are not wanted characteristics, heather honey has many fans. Heather honey has a very high biological and nutritional value mainly due to its trace minerals, proteins, amino acids, enzymes and B-complex vitamins. Heather honey has a particularly high protein content (2%) in comparison with other honey varieties. It also has antiseptic and diuretic properties.











**Table 1. Chemical analysis of major types of Greek honey**

Chemical analysis of major types of Greek honey <sup>2</sup>	Pine honey	Fir honey	Heather honey	Chestnut honey	Thyme honey
	Mean value	Mean value	Mean value	Mean value	Mean value
water %	16,7	15,7	18,8	16,4	16,3
ash %	0,6	0,85	0,4	0,8	0,2
pH	4,5	4,75	4,2	4,9	3,5
HMF ppm	2,4	3,62	4,3	3,50	5,6
Glucose %	24,7	24,0	31,2	29,5	26,9
Fructose %	30,4	32,10	36,8	37,6	37,4
Glucose+Fructose	55,1	56,1	68,0	67,1	64,3
reductive sugars	58,8	53,37	74,3	64,1	72,6
sucrose %	0,9	1,2	0,25	1,5	0,5
Free acidity meq/Kg	20,7	25,70	-	13,4	22,5
Total acidity meq/Kg	28,9	31,3	31,6	17,3	28,5
Color 560 nm	0,6	0,285	0,524	0,52	-
conductivity mS.cm <sup>-1</sup>	1,23	1,34	0,67	1,53	0,39
diastase DN	28,4	18,5	27,6	32,5	30,2
invertase IN	25,3	26,5	19,6	20,4	24,1
Proline mg/kg	525	491	536	554	790
Potassium mg/Kg	3,35	3,93	2,38	3,09	1,15
Sodium mg/Kg	0,45	0,28	0,1	0,26	0,19
Calcium mg/Kg	5,3	3,8	5,1	5,3	4,8
Magnesium mg/Kg	3,2	3,9	2,8	4,1	1,6
Manganese mg/Kg	0,005	0,39	0,03	0,005	0,05
Zinc mg/Kg	0,007	0,006	-	0,000	0,007
iron mg/Kg	0,013	0,032	-	0,010	0,11
Copper mg/Kg	0,02	0,003	-	0,000	0,05

## <sup>2</sup> THE IDENTITY OF GREEK HONEY

Proceedings of the 1<sup>st</sup> Scientific Congress on Apiculture –Sericulture, Athens 2002

Thrasivoulou A.<sup>1</sup>, Manlikis I.<sup>2</sup>, Tananaki Ch.<sup>1</sup>, Tsellos D.<sup>3</sup>, Karabournioti S.<sup>4</sup>, Dimou M.<sup>1</sup>

<sup>1</sup> Laboratory of Apiculture-Sericulture Department of Agriculture, Aristotelian University of Thessalonica

<sup>2</sup> Association of Beekeeping Cooperatives, "MELISSOKOMIKI ELLADAS",

<sup>3</sup>Beekeeping Institute, NAGREF - National Agricultural Research Foundation

<sup>4</sup> Attiki, Beeculturing Co







## Other Beekeeping products

The number of Greek beekeepers who produce royal jelly, pollen, wax and propolis is steadily increasing in the last decade. Only a small percentage of these is exported though, mainly pollen. The conditions that make greek honey of superb quality apply to those products as well. So far the internal market absorbs all production.







## About us...

The Federation of Greek Beekeepers' Associations (OMSE) is the ultimate trade-union body of Greek Beekeepers and represents them all in our country, whether they participate at OMSE's member Associations or not. OMSE was founded on December 28<sup>th</sup>, 1996 in Larissa, and it is a non profitable organisation. There are approximately 60 Beekeeping member – Associations of OMSE in Greece.

**OMSE** is a member of the International Federation of Beekeepers' Associations "APIMONDIA", member of the European Professional Beekeepers' Association "EPBA", member of the the Federation of European Beekeeping Organisations "APISLAVIA", and member of the Balkan Federation of Apicultural Associations. Moreover, the President of OMSE is the apiculture representative at the Copa-Cogeca Working Party on Honey, in Brussels.

The Federation's general aim is the assertion, promotion and guarantee of beekeepers' financial, social and professional interests. Some of the Organisation's responsibilities are: the supervision and protection of the genuineness of beekeeping products, the support and distribution of the trade-union spirit among the beekeepers, the systematic and scientific study, research, follow-up, promotion and solution of every issue concerning the beekeeping sector.

OMSE publishes a beekeeping journal every two months called MELISSOKOMIKO VEEMA (THE BEEKEEPER'S STAND). Through our journal beekeepers are promptly informed on every aspect concerning the beekeeping sector in Greece and worldwide. MELISSOKOMIKO VEEMA is open to every beekeeper or beekeeping organisation who wishes to communicate their ideas, problems or proposals.

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### FEDERATION OF GREEK BEEKEEPERS' ASSOCIATION

4, KOUMA str 41222 LARISSA,

TEL: 00302410-549724 & 00302410-533366

FAX: 2410-549725

E-mail: [omse@otenet.gr](mailto:omse@otenet.gr) , [info@omse.gr](mailto:info@omse.gr) , Web: [www.omse.gr](http://www.omse.gr)