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"St. Kliment Ohridski" University – Bitola

"APICULTURE AND HONEY TECHNOLOGY SEMINAR"

IAgrE Engineering for Food & Drink Seminar – Honey (21.04.2021)

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University "St. Kliment Ohridski",
MACEDONIA

REPUBLIC OF N. MACEDONIA


SERBIA
KOSOVO
BULGARIA
ALBANIA
GREECE
REPUBLIC OF NORTH MACEDONIA
Bajram Curri
Gjakova
Orahovac
Ferizaj
Presevo
Pelinci
Kyustendil
Dupnitsa
Gyueshevo
Kriva Palanka
Kacanik
Prizren
Fierza Reservoir
Vratnica
Kumanovo
Beljakovce
Kratovo
Kukes
Tetovo
Skopje
Probistip
Kalimansko Lake
Delcevo
Blagoevgrad
Kocani
Vinica
Sveti Nikole
Gostivar
Veles
Stip
Berovo
Peshkopi
Radovis
Klos
Debar
Sandanski
Strumica
Petrich
Valandovo
Struga
Demir Hisar
Nov Dojran
Dojran Lake
Librazhd
Ohrid
Gevgelija
Lake Kerkini
Elbasan
Prrenjas
Lake Ohrid
Resen
Bitola
Lake Prespa
Crna
Medzitlija
Pogradec
Gramsh
Edessa
Florina
Devoll
Lake Vegoritida
Maliq
Small Prespa Lake
Korce
White Drin
Morava
Vardar
Bregalnica
Struma
Black Drin
Shkumbin
Republic of North Macedonia
International Boundary
Road
River
National Capital
City or Town
0 10 20 30 KM
0 10 20 30 Miles
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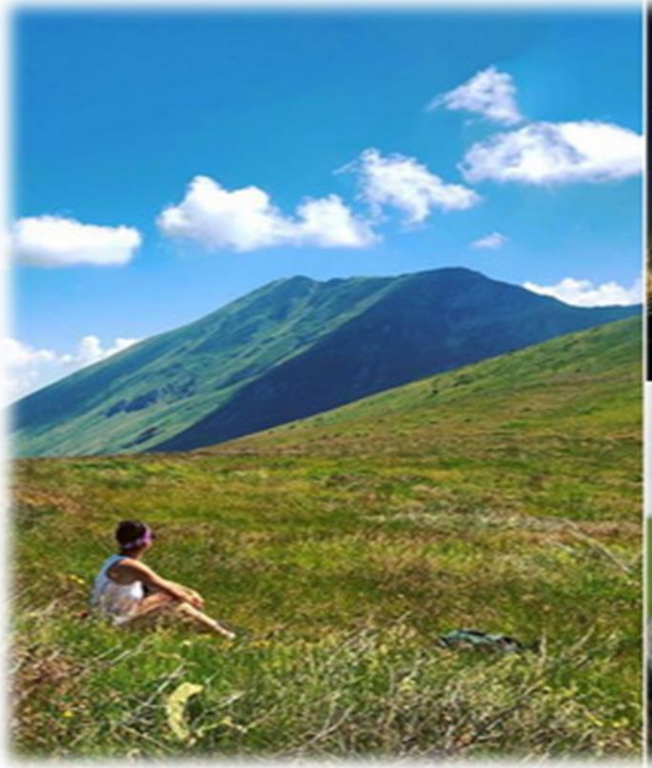
Naturals Lakes and Rivers



Beekeeping in Macedonia

“If the bee disappeared off the face of the Earth, man would only have four years left to live”

Albert Einstein

- Beekeeping has several roles:
- production of honey,
- pollen (perga)
- royal jelly,
- propolis,
- wax and bee venom.
- pollinators of nature,
- treatment of various diseases and use in the cosmetics industry.
- ecological animals - insects.

- Beekeeping holds a special place in BALKAN culture, and the wealth of forests and unspoiled land have made honey production a precious asset for many mountain communities.
- In Macedonia, specifically, this tradition has an unique aspect: the presence of a native bee subspecies,

Apis mellifera macedonica

(found throughout the historic Macedonia region, from Eastern Albania across to Bulgaria)

Climatic characteristics and beekeeping in Macedonia

- The climate is partly Mediterranean and continental, and on certain mountains with peaks above 2000 meters above sea level. There is also a mountain climate.
- Mostly in the lowlands, summers reach over 30 ^{0}C and sometimes over 40^0 C and with minimal rainfall in the driest regions of just over 250 mm.
- Winters are mostly mild with occasional cold waves carrying low temperatures of up to -20^{0}C. In mountainous areas the snow can reach a height of over 1 meter.
- As a result of climate change, great droughts and hot winds in the early spring and summer, cause the honey bee flora to dry up, so that weaker bee colonies, without the intervention of the beekeepers, are already regularly starving.

Flora - forage for bees

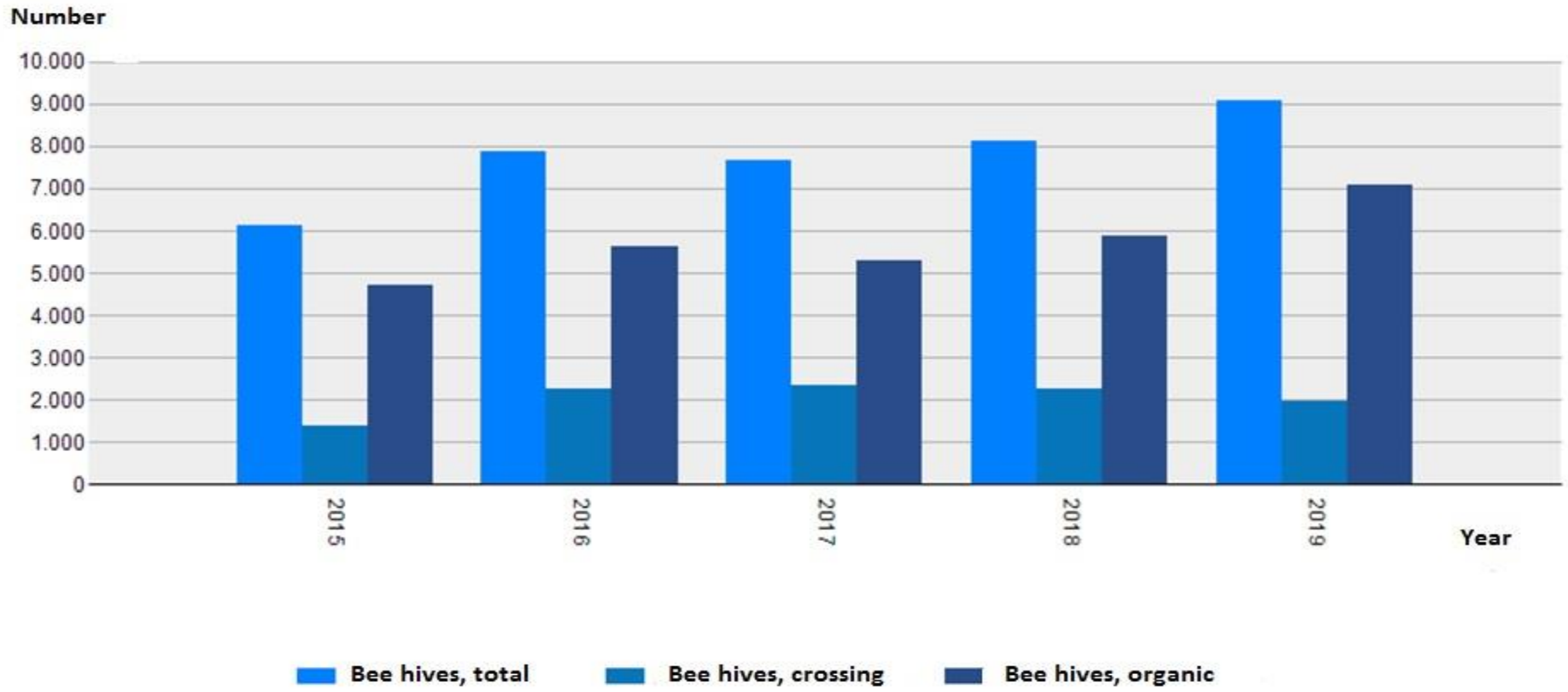
- The main pasture (forage) is provided by species such as Clover (Trifolium spp.), Hawthorn, Thyme, Blackberry (Rubus fructicosus).
- Also, one of the most important woody species is the White acacia (Robinia pseudoacacia), and in drier parts as a thermophilic herb that gives honey with high - quality properties is the Dracaena (Palirus spinosa).
- In the mountainous parts, Quercus oak is present, from which the bees produce black honey, which, like the light one, is highly appreciated by the consumers.
- In some parts, oil beets and sunflower are grown, but the honey from them is not valued as mentioned above.



Flora - forage for bees

- 98% of honey is polyfloric.
- It is important to note that due to the strongly developed biodiversity of honey bee flora in the country.
- only 2% of honey is monofloral obtained from the White acacia.
- This honey is quite bright and has a pleasant taste and smell, it is easy to consume, which makes it quite popular by consumers.

Figure 1. State of the Organic production -(EU Regulation 2009 1/92, as well as 834/2007).



(MakStat database, 2020)

Traditional – Ecolocigal Beekeeping

(*to protect our indigenous breed*
“Apis melifera macedonica”)

Traditional beekeeping in Macedonia

- Traditional keeping in skeps - baskets,
- Keeping of bees in rocks, characteristic of the mountain Mariovo area),
- Keeping bees in the cavities of forest trees.

Material and methods

- **Types of skeps:**

  bell shape,

  conical shape, (in R. M. the most common is the conical skep).

  Dimension

  - height 60 -70 cm and

  - diameter of the base 40- 50 cm.

  Material for construction

  - young hazel branches as supports

  - fold as a wall covering (it is possible that the whole covering is made of young hazel branches)

  - insulation by coating with a mixture of cattle dung (manure) with finely chopped hay.

- ✓ There are areas in the Balkans where a mixture of clay and chopped hay is used as insulation material.
- ✓ Small bundles of wild rye stems are also used as additional insulation.

Knitting technique

- The knitting technique consists of several sequential procedures:
-

1. Making the base of the skeps

- a piece of wood (pinewood) which is previously made in the shape of a circle and at the ends at least five (5) holes are drilled and there should always be an odd number of holes.

Knitting technique

2. Placing hazelnut branches on previously peeled bark (to prevent the development of worms in the bark that destroy the wood) in the previously prepared holes in the base.

3. Knitting procedure with ivy twist around the placed branches (rods).

For every 10 cm of knitted twist, five more hazelnut branches are added and the procedure is repeated 2 more times.

Knitting technique

- At the end of the knitting, the last three wrapped rows are tied with wire or strong thread, to achieve stability from the breaking of the knitted string.

4. For more practical manipulation, two planks or branches are placed crosswise in the middle, which would serve as reinforcement to improve the stability of the honeycomb.

5. Is carried out by coating the prepared mixture manually with gloves twice (immediately after knitting and 2-3 days after the first layer will be dry)

* layer thickness is about 0.5 - 1 cm.

Settlement (moving) of the bee family in the skep

- Just before settling, the mulch is sprayed with a pre-prepared solution of sucrose: water (ratio 1:1) and then the walls are coated with rubbed green lemon balm (Melissa officinalis)

- The skep is placed just above the swarm so that the bees can enter the skep attracted by the coating inside. The bees are smoked from below to force them to climb up the skep (duration of the procedure 20-30 min).

- Once the bees have entered, the skep is lowered and placed on a pre-prepared floor.

- The bee family (swarm) consists of queen, drones and young worker bees. Those bees that are 12-18 days old start building the honeycomb as a result of the activity of the wax glands.

Techniques for extracting honey from the skep

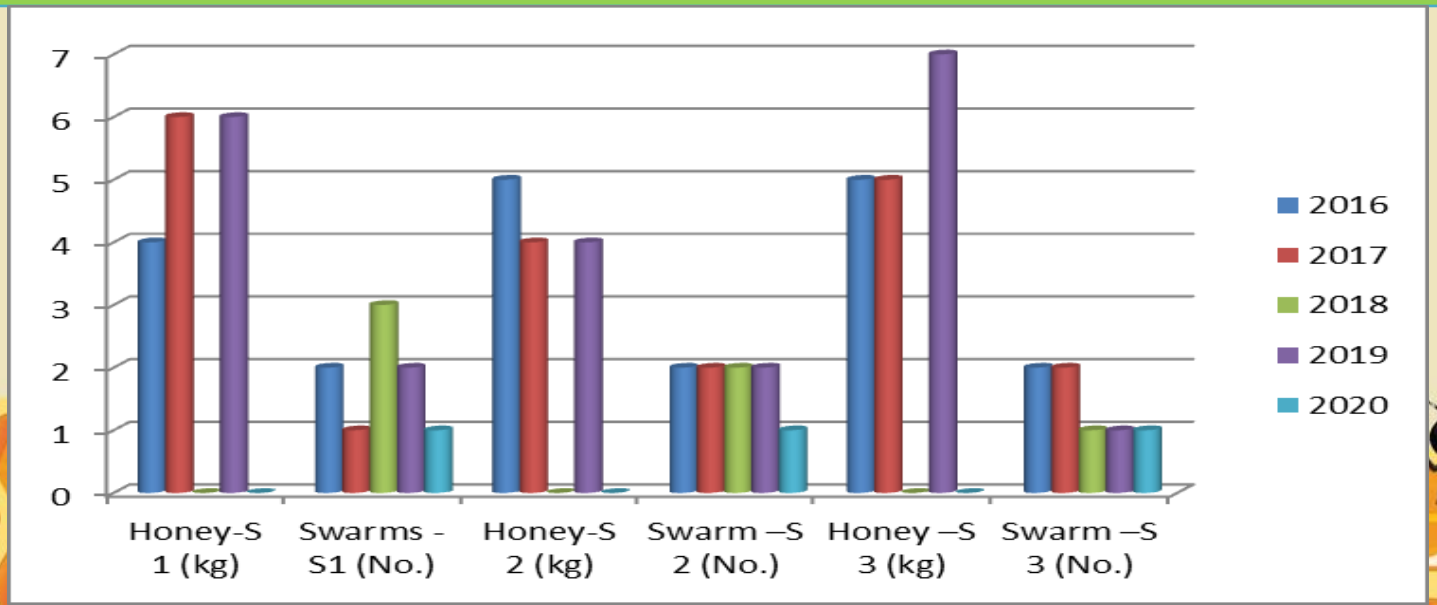
- The following method is known as:
-
- 1. Cut off the honeycomb hanging from the skep in the empty space and cut off the final honeycomb in the skep in the months of June and July.
-
- The cutting is done with a special knife, they are cut from two to four pieces after they are sealed with wax caps, more precisely then the honey is ripened.

- This technique gives honey in honeycomb, which is attractive for apitourism and visitors, especially for foreign tourists.

- If we want to remove the honey from the honeycomb, it is done first by pressing the honeycomb wrapped in gauze and filtering it.

Table 1 and Figure2. Obtained parameters for keeping bees in the skeps (2016 - 2020)

Parameters	2016	2017	2018	2019	2020
Honey-S 1 (kg)	4	6	0	6	0
Swarms -S1 (No.)	2	1	3	2	1
Honey-S 2 (kg)	5	4	0	4	0
Swarm –S 2 (No.)	2	2	2	2	1
Honey –S 3 (kg)	5	5	0	7	0
Swarm –S 3 (No.)	2	2	1	1	1



Advantages and disadvantages:

- **1. Advantages:**
- Due to the limited space in the skep, the bee family in a short period of time reaches the maximum of its development, while the bee family enters the swarming and gets 2-3 swarms (an advantage in traditional beekeeping).
- Bees overwinter better. As the number of bees decreases in winter, they move from the bottom of the skep upwards and always have honey and perga within reach.
- The cone shape allows the bee family to move easily towards the food - honey and maintain the optimal temperature.
- Obtaining high quality organic honey and wax.
- Attractive for lovers of traditional beekeeping.
- **2. Disadvantages:**
- Obtaining low honey yield and non-economic profitability.
- Severe manipulation during the routine check of the bee family, especially during the treatment against the Varoa destructor tick (Acari).

Conclusion

- The production of honey in the skeps is a traditional way that was practiced in the past. Tradition that has a great impact on the development of beekeeping and is a rich heritage of every nation and country.

- Nowadays, this valuable technology of beekeeping is gradually disappearing, less often young people start engaging in beekeeping.

"Apitourism" in Macedonia

- Attraction for the tourists,
- Beekeepers get to know visitors about life and working style of honey bees, followed by photographing tourists with an open hive of bees,
- Tasting honey directly from the frame of the hive,
- Dressing in beekeeping equipment and many other things.

Apiculture - Apitherapy

- Already in 2016, the first API CHAMBERS are opened, (Apitherapy), where guests inhale the aromatic air from the hives, which bees swirl with their wings, and contains propolis, royal jelly, perga, plant hormones, wax and nectar in evaporation.

- Air from the hive is useful as an aid in diseases of the respiratory system, migraine, to raise the body's immunity and improve general condition.

- Api-inhalations are especially recommended for athletes due to the increase in lung volume and relaxation of the organism.

Thank you for the Attention!!!