

*Original paper*

## Urban beekeeping in Antiquity

## Grádsko pčelarstvo v antičnosti

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### ABSTRACT

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The practice of apiculture inside ancient cities and smaller fortified settlements was known but not common during the first millennium BC and the first centuries AD. This conclusion is drawn by recent archaeological data from sites around the Mediterranean. When the security of the beekeepers and the bees, the control of the apicultural production, the protection of the hives from robbery or even the reinforcement of the defence during sieges was one of the main concerns, the beehives were placed inside the city walls. Possible problems deriving from the large number of bees within the urban environment were solved either by the construction of walls around the apiaries or the placement of hives at locations that would keep the bees away from the population.

### ABSTRAKCIJNY

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Pčelarstvo v antičnych gráдах i menših, fortifikovanych oselenjah bylo znano(ale ne obyčno) v době prvogo stolěťja před Hristosom i prvych stolěťjah poslé Hristosa. Ta konkluzija jest stvorjena na osnově nedavnych arheologičskych danyh iz měst okolo Srědzemskogo Morja. Kògda glávnom problemom byli bezopasnost' pčelarev i pčel, kontrola pčelarskoj produkcije, ohrána ulj od kradže ili daže podkrěpjenje obrány v časě obsady - ulje byli městovjene vnútri kruga grádskyh stěň. Problemy svězane s mnogymi pčelami u grádskoj okoliny byli rázvězyvane: 1. ili tvorjenjem stěň vokrug pčelnikov 2. ili rázměšćanjem ulj v městah ktore odděljali pčely od naseljenja.

**Keywords:** urban beekeeping, ancient beekeeping, ancient Near East, ancient Greece, ancient Athens

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Urban beekeeping is a well-known phenomenon, which nowadays experiences a rise in popularity. Many beekeepers act in great cities; beehives are often installed at the rooftops of hotels or even operas, such as the operas of Paris and Toronto, while the honey produced is offered to their visitors<sup>1</sup>. This practice seems to be quite common nowadays; however, the archaeological investigations have brought to light new evidence indicating that apiculture within town limits was practiced already since ancient times, at least in the Mediterranean *milieu*.

The excavations that were carried out between 1997 and 2012 at Tel Rehov (Tell es-Sarem in Arabic) in the Jordan Valley, under direction of Prof. Amihai Mazar (Jerusalem University), revealed one of the greatest settlements of Biblical Israel. At the nucleus of a plot situated at the centre of the settlement, a large apiary was discovered (Figs. 1 & 2) dated to the period between the mid-10<sup>th</sup> century BC until the early 9<sup>th</sup> century BC. This apiary consisted in horizontal, cylindrical beehives made of four centimetres thick coarse, unfired clay that contained a large amount of straw and animal dung. The beehives are eighty centimetres long, while their diameter is forty centimetres and their volume may be estimated at fifty-six litres. A lid with a handle was made of the same material with the beehives; it was put at the back side of the

object, while the front side was closed and was only centrally pierced by a round hole about two to four centimetres in diameter, which allowed the bees to enter. These beehives were arranged in three parallel lines, each line consisting of at least three rows of beehives; 1.85 and 1.20 m. wide corridors were left between the lines to facilitate the apicultural activities. The beehives of the lower rows are almost sixty and the excavators concluded that the apiary included about 180 beehives. According to the archaeological evidence, the apiary was destroyed brutally and abruptly; it never functioned ever since<sup>2,3,4</sup>.

The apiary was located in an area that was about 1.5m. lower than the floor of the surrounding structures<sup>2,4</sup>. Situating the beehives in such a lower place may be explained as an effort to find coolness and protect the bees from the high temperatures during summer. The Jordan Valley is one of the warmest areas of the Near East. Furthermore, according to the archaeologists, it is quite probable that the apiary had a sort of roof made of wood, reeds, or cloth; this roof would probably cover merely the rows of beehives, leaving the spaces between them unroofed<sup>2</sup>. In Iran, traditional roofs<sup>5</sup> protecting beehives of a similar shape to those discovered at Tel Rehov are registered.



**Fig. 1:** The three rows of the hives at Tel Rehov.  
**Obr. 1:** Tri ređy ulj v Tel Rehov.



**Fig. 2:** The hives of the Tel Rehov's apiary.  
**Obr. 2:** Ulje iz pčelnika Tel Rehov.

An about one metre thick destruction layer containing fallen mud-bricks and charred wood beams covered the beehives and crushed their upper parts<sup>2,3,4</sup>. The excavators assert that this layer probably indicates that the entire area was surrounded by high brick walls, which helped in isolating the apiary from its surroundings<sup>2</sup>. If this is true, it becomes clear that the walls surrounding the apiary somehow obliged the bees to fly higher avoiding interference with the humans that acted in the adjacent areas. Hence, the large number of bees would annoy humans less and it would be possible to co-exist with them without any problem. The erection of walls is a common practice even nowadays, when beekeepers maintain beehives near houses. For instance, the respective Greek legislation allows the placement of beehives near inhabited houses when there is an at least two metres high impenetrable barrier (built wall, wooden wall, natural hedge or fence). In any other case, the distance between the apiary and the domiciles should exceed thirty metres<sup>6</sup>.

The archaeologists investigating Tel Rehov were puzzled by the fact that the apiary functioned at the centre of such a great city – one of the greatest cities in Biblical Israel. They concluded that only a central (royal) government<sup>2</sup> or a municipal governing body, even a powerful local family<sup>4</sup> could establish and administrate a large scale, well-planned apiary at the centre of a thickly populated town.

The archaeological investigations at Tel Rehov were followed by a number of natural sciences' studies' one of them focused on certain lumps of a dark coloured material, which were found inside two beehives. The electron microscope examination showed that these lumps were composed of charred honeycombs remains and parts of bees. Further investigation revealed that the bee parts did not belong to *Apis mellifera syriaca*, the native subspecies, but to *Apis mellifera anatoliaca*, the Anatolian subspecies<sup>7</sup>. The existence of the Anatolian bee in Tel Rehov is explained as a result of human intervention; it seems that this subspecies was transferred

from an area in the north lying at a distance of some 500 kilometres. One of the reasons to choose *Apis mellifera anatoliaca* was its significantly milder behaviour<sup>7,4</sup>, which is an important element for a great urban apiary.

The excavators of Tel Rehov searched for *comparanda* in an effort to provide further evidence concerning urban beekeeping. They found parallels in the traditional Arabic villages of Israel, Egypt and generally Africa, focusing on cases of apiaries located inside settlements<sup>2</sup>. Besides these ethnographical parallels, which refer to rural, environments, there are examples of urban beekeeping since the Antiquity.

A considerable number of clay beehives (Figs. 3 & 4) were discovered in Athens, even in the actual centre of the city; the most ancient among them are dated to the end of the 5<sup>th</sup> century BC<sup>8,9</sup>. Based on the large number of these beehives and the importance of honey as a sweetener in Antiquity, Susan Rotroff<sup>10,9</sup> suggested that ancient Athenians practiced beekeeping within the city walls. As the oldest beehives date to the last quarter of the 5<sup>th</sup> century BC, Rotroff assumed that beekeeping began during the Peloponnesian War. She presumed that before that time, access to the hinterland was unimpeded and it was not necessary that the Athenians produced honey in the city itself. Only after the invasion of the Spartans, free access to the hinterland became impossible, while the population of the rural areas moved inside the city walls for protection; hence, apicultural activities were carried out in Athens and continued well after the end of the Peloponnesian War<sup>10,9</sup>.

Rotroff's view is plausible; it could be added that honey was a valuable good in Antiquity. It was not merely a sweetener; it was also used in medicine<sup>11,12,13</sup>, in textile dyeing<sup>14</sup>, as a food preservative, even in cosmetics<sup>13</sup>, as well as in the preparation of alcoholic beverages. Furthermore, honey was used as an offering to the dead and a libation to the gods<sup>11,13,15,16</sup>; these two rituals were rather important for a besieged city. Wax was another valuable substance used in

medicine, shipbuilding, hair care, toy manufacture and so on<sup>12,13,17</sup>.

Certain doubts concerning the practice of apiculture inside the city of Athens are based on the inability to define whether the discovered beehives were in use or they were just stored<sup>18</sup>. In fact, not all of these beehives were actually used; some of them were kept so as to be used by the Athenian beekeepers during the swarming season. Even though Columella did not seem to know much about apiculture in ancient Greece<sup>19,20</sup>, he mentions that “the store-house should be chiefly occupied by hives ready for the use of new swarms ...” (*De Re Rustica*, IX, V, 3)<sup>21</sup>. Apparently, this referred to Athenian beekeepers as well. However, the number of beehives that would be used in the occasion described above would not be significant. Unlike the practice of the traditional central and western European beekeepers that survived well into the nineteenth century, the ancient beekeepers, who acted around the Mediterranean, did not kill the bees prior

to harvesting; for that reason, there was no need to store a large number of hives.

Furthermore, it seems that some of the beehives were not used exclusively in beekeeping; these large recipients could have served for different purposes. In Kerameikos, six hives were found in burials – children were buried in two of them<sup>8</sup>. Burials in beehives were probably not rare in Athens and the Attica region, judging by certain cases from Marathon<sup>22</sup> and Oropos<sup>23</sup> dating to the Early Roman Period. Beehives were also probably used as water jars<sup>24,25</sup>. Others might have been sitting in an urban potter’s shop, awaiting sale, when they were broken<sup>9</sup>. It seems though that all these cases were rare exceptions and most of the hives were used in apicultural activities.

Given that beekeeping was practiced inside the city walls, one wonders about the exact location of the hives. Rotroff suggested that they “could be placed in courtyards, built into house walls, or hung beneath eaves,



**Fig. 3:** Clay beehive from Attica (4<sup>th</sup> cent. BC). “Exhibition of Archaeological Findings”, Athens International Airport.

**Obr. 3:** Gliněna ulja iz Attiky (4 stolětje před Hristosom), “Exhibition of Arhaeological Findings”, Atheny, Medžunarodny Aeroport.

as they are in order parts of the world today”<sup>10</sup>. She later added the roofs of the Athenian houses<sup>9</sup>, an option that she finally rejected. In spring 2006, I claimed that the most appropriate place to put hives were in fact the roofs<sup>26</sup> and this is an opinion that I fully support until now.

Let us continue by examining all possibilities. Placing hives in courtyards seems logic and likely. Nevertheless, a considerable number of hives placed in the ground, or slightly higher, would bring problems to the inhabitants of the city, who would be annoyed by the large number of bees flying around them. It should be taken into consideration that the Attic bee (*Apis mellifera cecropia*) is a rather aggressive species; this attribute must have seriously affected the choice of the site, where the hives would be placed, especially when dealing with an urban environment.

The assumption that the hives were “embedded in the house wall, as they are, for instance in modern Kashmir”<sup>9</sup> is weak. The Kashmir samples relate to the smaller Asian bee, *Apis cerana*. Clay hives with western honey bees, *Apis mellifera*, embedded in house walls, were used in settlements of Cyprus (Fig. 5) since at least the 16<sup>th</sup> century until the 20<sup>th</sup> century<sup>28,29,30</sup>; similarly embedded hives occur in Iran as well<sup>13</sup>. These hives were open at both ends; the bees entered from the outside of the wall, while harvesting took place through the back opening of the hive, which was inside the house. The traditional Kashmir hives with *Apis cerana* bees functioned like the open at both end hives; the holes through which the bees entered were at the front closed edge; harvesting or any other activity of the beekeeper would be carried out from the other edge, which was inside the house<sup>31,13</sup>.

However, in ancient Athens, the discovered hives were open at one end, so that the apicultural activities took place through the front opening. A single exception is represented by a hive pierced at the centre of its closed edge<sup>32</sup> and this central hole probably served as the entrance of the bees. No clay hive, open at one end is recorded



**Fig. 4:** Horizontal clay beehive (erroneously placed vertically) at the Syntagma metro station, Athens (1<sup>st</sup> cent. BC – 1<sup>st</sup> cent. AD).

**Obr. 4:** Horizontalna gliněna ulja (nedobro postavljena vertikalno) v metrě v Syntagmě, Atheny (1 stolětje před Hristosom – prvo stolětje posle Hristosa).

embedded in a house wall. Furthermore, it does not seem rational to pierce the wall of an existing house in order to embed a clay hive, open at one end, while there existed more appropriate locations.

Placing hives in special cavities (alcoves or bee boles) in the wall of a courtyard or in walls constructed for this particular reason is a different case. In Thorikos (Attica), a late 4<sup>th</sup>–3<sup>rd</sup> century BC wall is discovered; it includes cavities interpreted as structures where horizontal hives would be placed<sup>33</sup>. It is considered that hives open at one end were placed in a similar wall of an Early Hellenistic rural settlement in Vari (Attica)<sup>22,34</sup>. Ethnographic parallels may be traced in the Cyclades (Fig. 6) and the Dodecanese (Fig. 7), where horizontal hives, which were common until the 1960s, were placed inside cavities in rubble walls, especially in terrace walls<sup>35</sup>. However, in the case of ancient Athens, such a practice would cause trouble to the people.

Beehives hung beneath eaves, is an option that should be rejected. The parallel cited by Rotroff<sup>9</sup> refers to Bali and the *Apis cerana* bee. Generally, this practice involves the *Apis cerana* or the stingless bees (*Meliponinae*); as these two species need less space, their hives were small and light, usually woven or made of tree trunk<sup>36,13</sup>. There is no evidence regarding hives hanging from roofs in relation with *Apis mellifera*. Besides, it would



**Fig. 5:** Traditional horizontal, open at both ends, clay beehives embedded in a house wall in the village of Agros, Cyprus (Photo: L. Eleftheriou).

**Obr. 5:** Tradicijne glinene ulje horizontalne, otvorene na jednom konci, iz sela Agros, Kipr (foto: L. Eleftheriou).

be difficult to visualise the large and heavy Athenian clay hives hanging beneath eaves.

Rotroff is against the idea of placing hives on the roofs of the houses, based on the high temperatures that would be developed during summer; such weather conditions impede the installation of clay beehives, whose insulating qualities were weak, according certain Latin authors<sup>9</sup>. However, traditional apiculture in Greece used hives that were rarely left uncovered, exposed to the natural elements. Especially the horizontal clay hives, similar to the ancient ones, were always covered with various materials<sup>37,38,39</sup>, placed inside bee boles<sup>35</sup> or even inside thick bushes<sup>40</sup>. Columella, the only ancient writer, who dealt with the placement of hives mentioned that the hives “should be overshadowed by green foliage daubed over with Carthaginian clay, forming a covering which keeps off both the cold and rain and also the heat” (*De Re Rustica*, IX, VII, 4)<sup>21</sup>. Such a covering would be probably

applied to the hives of ancient Athens.

Experimental investigations, with the use of modern technology, on copies of ancient hives, showed that the bees did not suffer any problem inside clay hives, compared to the modern Langstroth beehive. Hence, the attitude of Latin writers towards the insulating qualities of the clay hives was not right<sup>41</sup>. It seems that even if the hives were placed on the mainly flat roofs of the Athenian houses<sup>42</sup> without any covering the bees would have no problem. In 19<sup>th</sup> century Cyprus, horizontal hives were placed on the roofs without any cover; the respective image (Fig. 8) is published<sup>43,44</sup>. Besides Cyprus, there are numerous Mediterranean sites, where hives were placed on the roofs. In the Aurés villages (Algeria), every family keeps four to eight hives installed at the flat roofs of their houses; only until some decades ago, the local horizontal hives were



**Fig. 6:** Wall with bee boles for horizontal, open at one end, clay beehives on the island of Sikinos (photo: Th. Bikos).

**Obr. 6:** Stěna s uljevými místami, sloužící horizontálním, gliněným uljám otvoreným na jednom konci iz ostrova Sikinos.



**Fig. 7:** Wall with boles for horizontal clay hives on the island of Astypalaia (photo: Th. Bikos).

**Obr. 7:** Stěna s uljevými místami na horizontalne gliněné ulje na ostrově Astypalaia (foto: Th. Bikos).

regularly placed on the flat roofs of houses on the island of Ibiza in Spain<sup>45,46</sup>.

There is a significant advantage of placing hives on the roofs of the ancient Athenian houses: the bees would fly higher than the area, where people moved and interacted. It is not a mere coincidence the fact that nowadays, in great urban centres, such as Paris, New York and London, the hives are also placed on the roofs of buildings<sup>1</sup>. In addition, beehives on the roofs of the ancient Athenian houses would be better protected against thieves.

In the ancient settlement of Salamina island, situated in the modern village called Ampelaki, 4<sup>th</sup> century BC beehives and their lids were discovered. The excavator, Ioannis Chairetakis, considers the possibility that apiaries were installed at certain spots; however, he thinks that most likely the clay hives were used for different purposes, such as the transportation and storing of honey and so on<sup>47</sup>. In my opinion, it is very probable that apiculture was practiced inside the settlement, just like in the case of Athens. The houses in Salamina had either flat terrace roofs or gently sloping tiled roofs<sup>47</sup>. In other words, they were the ideal place to install hives for urban beekeeping.

During Antiquity, placing hives on the roofs of the houses was a common practice in other areas as well. In Spain, in the region of Valencia, all the beehives found in excavations come from the interior of roofed rooms, among the ruins of the walls along with other types of material. This fact next to ethnographic parallels from Algeria and Ibiza led the archaeologists Helena Bonet and Consuelo Mata<sup>45,46</sup> to the conclusion that since the 3<sup>rd</sup> century BC, in pre-Roman Iberia, the clay horizontal, open at both ends hives were placed on the flat roofs of the houses.

In Rachi, a settlement of Isthmia (near Corinth) founded in the second half of the 4<sup>th</sup> century BC, one more case of apiculture practiced inside an inhabited area is recorded. Some complete clay beehives and a considerable number of sherds were found among the debris of the houses; they were probably placed on the roofs or in courtyards. It is considered that apiculture in Rachi started at a later phase, after the foundation date of the settlement. This happened probably when populations from the surrounding areas decided to install in the site for security reasons<sup>48</sup>.

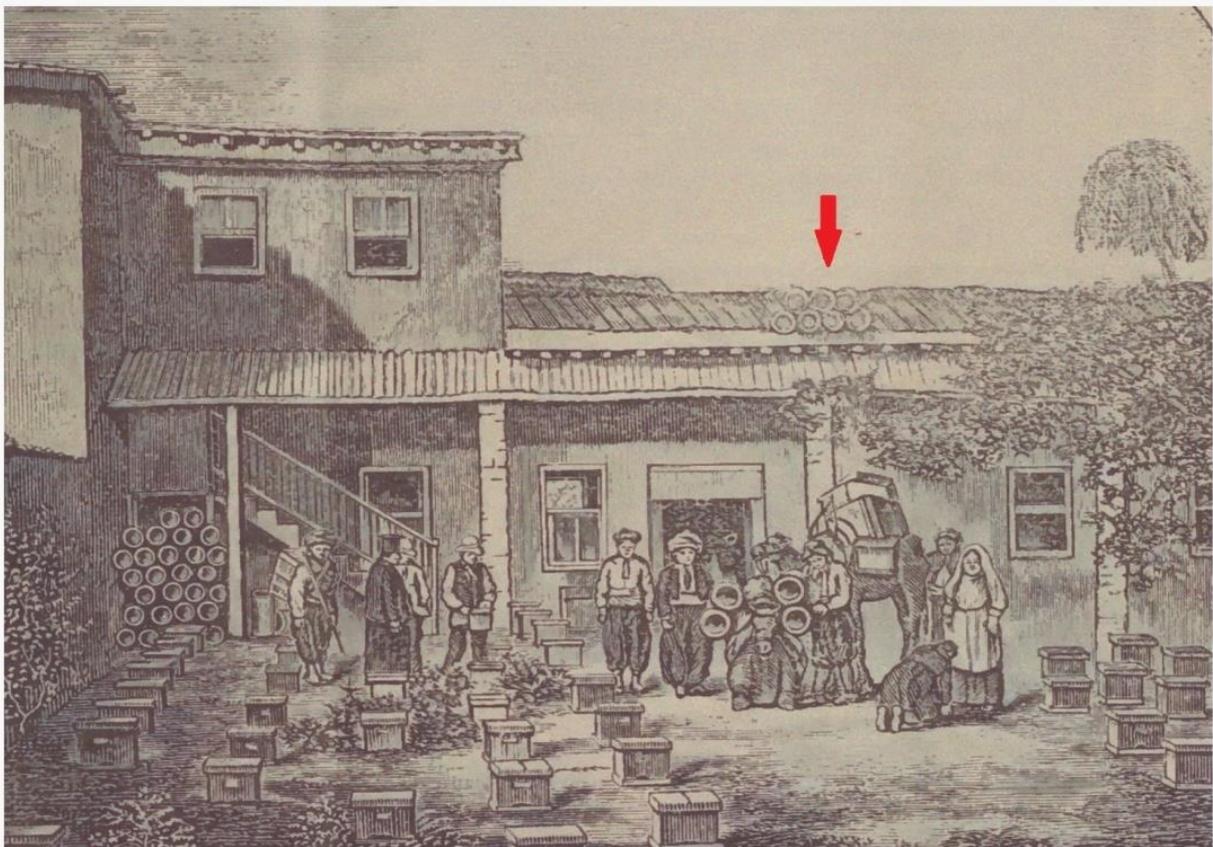
In the Hexamilion fortress, also in the region of Corinth, some complete clay hives and a large number of hive sherds were discovered; they date from the Hellenistic

until the Late Roman period<sup>48</sup>. It is estimated that about 1,700 soldiers lived in the fortress; besides agriculture and livestock breeding, these soldiers would probably practice beekeeping<sup>49</sup>. There is a new interpretation concerning the presence of beehives in a fortress, which relates the hives with military practices, besides beekeeping itself<sup>50</sup>. According to this interpretation, the hives could be used potentially as weapons, when thrown against the enemy.

Urban beekeeping continued well after the end of Antiquity. A 6<sup>th</sup>–7<sup>th</sup> century papyrus contract of lease (CPR VIII 69) from Herakleopolis in Egypt records that a “platform” (ἐξέδρα) situated at the first floor of a house was rented by a beekeeper; the word platform probably signifies a sort of terrace or porch, a structure that is open at one side. It is supposed that the lease, costing two carats of gold per year, was arranged for the placement of the beekeeper’s hives<sup>12</sup>. It is mentioned in the document that the

“platform” for rent was south-facing; such an orientation is the most appropriate for the hives’ placement and most beekeepers prefer it. Furthermore, the “platform” was situated at the first floor, so that any apicultural activity would not disturb the neighbours.

Based on what is cited in this article, it becomes clear that urban beekeeping was not unknown in Antiquity; it was practiced under different circumstances and for various purposes, such as: the protection of the humans and the bees; the control of the apicultural production; the protection of the beehives against robberies; the reinforcement of the defence in cases of siege. In great cities, beekeeping could cause certain serious problems; for this reason, measures were taken, such as: the building of walls around the apiaries, or the placement of hives on the roofs of the buildings, so that the bees would fly high, without annoying the population.



**Fig. 8:** Horizontal clay beehives on a house roof in Larnaca, Cyprus, 1882 (F. Benton, 1882a & 1882b).

**Obr. 8:** Horizontálne gliněne ulje na domovej strěhě v Larnacě, Kipr, 1882 (F. Benton, 1882a & 1882b).

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