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Beekeeping structures on terraces for agriculture on Andros Island, Cyclades, Greece

Summary :

Terraces on Andros Island were very important in the past for the local agriculture and apiculture. In the drystone walls of terraces, there were created bee boles, in which horizontal open-at-one-end hives were placed for protection. This practice dates back to antiquity and was held until some decades ago in most of the Cycladic islands. Andros was the only Cycladic island where upright open-at-bottom hives and stone-built types of hives were used. The use of upright hives from the 14th-15th century onwards led to transformations in the shape and size of the bee boles in order to accommodate this, for Andros new, type of hives. This led to the generation of bee boles with small depth and various shapes, as well as bee boles of triangular shape recorded only on Andros.



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Built hives, the so-called “cupboards”, were used at the northern part of Andros, usually in house walls and other buildings of agricultural use. From the nineteenth century onwards, the construction of special beekeeping establishments with cupboard hives commences, viz. the bee walls and the bee houses. Bee walls were simple constructions that bore two horizontal rows of cupboard hives. The bee houses were usually rectangular, their structure being similar to that of other buildings of the area. Bee houses had masonry walls with mortars and the roof was constructed with wooden or stone beams with covering of stone slabs with a thick layer of clay mortar. Some of the bee houses had supplementary uses. During our onsite research four bee walls were encountered and recorded, as well as 45 bee houses. For most of the bee houses measured drawings were executed and 3D models were constructed (with the use of a UAV, aka drone).

The gradual switch of the beekeepers of Andros from traditional to modern apiculture, which was completed in the late 70s and early 80s, led to the abandonment of all those constructions that have been used for traditional apiculture.

Keywords *bee boles, bee walls, bee houses, terraces, traditional hives*

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INDRODUCTION

Terraces for agriculture always constituted a very important and functional element on the island of Andros. In addition to agricultural activity, these terraces were broadly used on this island for apiculture which was well developed in the past few centuries. Based on existing data, like Ottoman tax registries and testaments of the island's inhabitants (Polemis, 1995; 1999; Kolovos, 2006; 2017), it appears that large scale beekeeping was ongoing on the island from the sixteenth century onwards.

Traditional beekeeping on Andros differed from beekeeping on the other Cycladic islands and more generally on the islands of central and southern Aegean. A large variety of traditional hives was used on the island, which is unique for a place of such a small scale.

In the central part of the island horizontal ceramic, open-at-one-end hives are to be found, continuing the long Cycladic beekeeping tradition. This type of hives was used on the Cyclades since antiquity. Archaeological research revealed similar types of hives in many Cycladic islands (Rotroff, 2006: 125-127), including Andros (Bibliodetis, 2017). Along with this horizontal type of hive, the use of upright open-at-bottom (conical or bell-shaped) skeps was also in use throughout the whole island, while on the central and northern part of Andros upright open-at-bottom hives made by alternate material (clay, wood planks and hollow tree trunks) were also used. On the northern part of the island the use of built hives in a variety of types is noted. Those built hives were known as cupboard hives ("cupboards").

Beekeeping structures on terraces for agriculture on Andros

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Georgios Mavrofridis, Evrythiki Tsilingiri, Georgios Tataris, Theodora Petanidou

Upright and built hives derive from the southern Balkan mainland and evidently were imported with the advent of Arvanites (i.e. Christians of Albanian tongue) on the northern and central part of the island and of Greeks around the village of Korthi (south). The population of Arvanites inhabited the island of Andros probably during the first half of the fifteenth century (Polemis, 1981: 102; Giohalas, 2010: 17-18), whilst inhabitants of the southern part of Andros speak a dialect similar to the one spoken by Greeks of northern Greece and neighboring regions (Bogiatzidis, 1951: 51-56; Mpasea-Mpezantakou, 2001), where they most probably come from.

The use of upright and built hives influenced the existing stone-built structures and beekeeping practices on Andros, both of which were, to a large extent, different from those found on the other Cycladic islands.

BEE BOLES

On Andros, portable hives were placed inside special constructions, the so-called bee boles, where they were protected from the weather. In most of the cases those bee boles were incorporated in the drystone retaining walls of terraces. On the southern and central part of the island bee boles were commonly called “thourides”, whereas on the rest of the island “melissotrypia”, “kalouses” or “parathoures”.

The shape of the bee boles depended on the shape and size of the hives that were to be placed inside them. On the central part of the island, along with other types of hives, horizontal ceramic, open-at-one-end hives were used, the so called “kanonia”. Bee boles constructed for

Beekeeping structures on terraces for agriculture on Andros

Island, Cyclades, Greece Cavtat, Croatia, October 1-2 2021

Georgios Mavrofridis, Evrythiki Tsilingiri, Georgios Tataris, Theodora Petanidou

kanonia hives had square or rectangular opening and a large depth in order to accommodate these hives being up to 80 cm long. These bee boles were similar to those found on other Cycladic islands. At the region of Katakoilos there are still bee boles that still bear ceramic horizontal open-at-one-end hives, albeit empty today (Fig. 1).



Fig. 1 Bee bole with horizontal ceramic, open-at-one-end hive with a stone lid, Katakoilos.

At the southern part of Andros bee boles were constructed to accommodate wicker skeps and for that reason had a reduced depth. Their shape is rectangular and their threshold often projects from the wall as a landing area for the bees. In several cases the lintel of the bee bole was also projecting from the wall in order to protect from the rain and the sun (Fig. 2). In southern Andros, a stone slab of a special shape was often placed, which followed the shape of the skep and rested on it.

Beekeeping structures on terraces for agriculture on Andros

Island, Cyclades, Greece Cavtat, Croatia, October 1-2 2021

Georgios Mavrofridis, Evrythiki Tsilingiri, Georgios Tataris, Theodora Petanidou

At the base of this slab a comb-shaped stone, named “polemistra”, was placed for a certain period, i.e. end of August until early winter. At the same time polemistra was installed, the base of the skep was sealed with mud. These measures aimed at impeding hornets (viz. *Vespa orientalis*, *V. crabro*), the worst enemies of the honeybees on Andros, from entering the hive easily, thus enabling honeybees to defend themselves effectively.



Fig. 2 Bee hole with upright wicker skep, protection stone slab, and “polemistra” at the bee entrance.

Bee boles constructed for wicker skeps in the central and northern part of Andros came in a variety of shapes (Fig. 3). In some cases the upper part of the boles with rectangle bottom was semi circular or triangular

Beekeeping structures on terraces for agriculture on Andros

Island, Cyclades, Greece Cavtat, Croatia, October 1-2 2021

Georgios Mavrofridis, Evrythiki Tsilingiri, Georgios Tataris, Theodora Petanidou

(Fig. 4). Entirely triangular bee boles were also used (Fig. 5). These triangular boles were constructed with the use of large stone slabs and were common on this part of the island. Regarding studies on the subject of bee boles, we found no record of boles with entirely triangular shape in other parts of Europe (Duruz and Crane, 1953; Verhagen, 1977; Foster, 1988: 11-18; Walker and Crane, 1991; 2004; Crane and Walker, 2000; Corbineau, 2000; Masetti, 2000; Roussel, 2000; Kritsky, 2010a; 2010b: 52-63); except for one testimony for “3 probable bee boles, triangular in shape” at the North Yorkshire of the U.K. (Crane, 1983: 140). We conclude that the triangular bee boles of Andros seem to be unique.



Fig. 3 Bee boles, two of them with ceramic bell-shaped hives at Mermighies village.

The exact period of construction and use of the oldest bee boles accommodating upright hives on Andros, can be placed after the

Beekeeping structures on terraces for agriculture on Andros

Island, Cyclades, Greece Cavtat, Croatia, October 1-2 2021

Georgios Mavrofridis, Evrythiki Tsilingiri, Georgios Tataris, Theodora Petanidou

installation of the inhabitants that brought these hives on the island, i.e. after the fourteenth century. The use of bee boles for horizontal hives was probably earlier.



Fig. 4 Bee boles with a triangular upper part.



Fig. 5 Triangular bee bole with a skep, at Katakoilos village (photo F. Hatjina).

Beekeeping structures on terraces for agriculture on Andros

Island, Cyclades, Greece Cavtat, Croatia, October 1-2 2021

Georgios Mavrofridis, Evrythiki Tsilingiri, Georgios Tataris, Theodora Petanidou

The earliest written evidence for the use of bee boles in western Europe dates from 1623 (Crane and Walker, 2000), while the construction of the earliest walls with bee boles dates back to the twelfth century (Crane, 1983: 264; Crane & Walker, 2000). In Greece there is no written evidence on the use of boles for the protection of the hives. At Thorikos archaeological site Attica, however, a wall dating from the late fourth or third century B.C. was discovered, which bore partitions that according to the excavator these were boles for hive installation (Oikonomakou, 1995). At Vari, also in Attica, a farmhouse dated between 350 and 275 B.C. has been excavated, and finds suggest that apiculture was vastly practiced in it. The farm hives were probably placed inside boles of masonry wall (Jones, 1976). It seems that in ancient Greece, boles inside masonry walls were places to install the horizontal ceramic, open-at-one-end hives, as it was the case of the ethnographic parallels on Andros and the other Cycladic islands (Mavrofridis, 2018b; 2021).

BEE WALLS

In addition to portable hives, in the northern part of Andros non-portable stone-built type of hives were also in use; they were called “cupboards” and occurred at the bottom of rocky masses, inside masonry walls of houses (inhabited or not), inside masonry mill walls and other buildings of agricultural use. In a few cases cupboard hives were found within the terrace retaining walls (Speis, 2016: 74). Two types of cupboard hives are distinguished: a) a rare and simplest type with opening only from the

Beekeeping structures on terraces for agriculture on Andros

Island, Cyclades, Greece Cavtat, Croatia, October 1-2 2021

Georgios Mavrofridis, Evrythiki Tsilingiri, Georgios Tataris, Theodora Petanidou

front side where bees entered, and b) a second one with one side serving the entrance of bees and the other side, usually closing with a wooden or stone lid, serving the harvesting and other beekeeping works.

In addition to alone cupboard hives built in different walls on Andros, special stone-built structures bearing rows of cupboard hives are to be noted for this island. The simplest form of that type is the bee walls consisted of two horizontal rows of cupboard hives. It appears that such constructions were not particularly common on the island. Until today only four bee walls have been found and studied. One is found at Ano Vitali village bearing 24 cupboard hives (Fig. 6), another at the area of Kambanos with 19 cupboard hives, a third one in the area of eastern Ano Gavrio with 16 cupboard hives (Fig. 7), and the fourth one near the village of Mermighies with 12 cupboard hives of a simpler type having opening from the front side. The bee walls are masonry walls of stone and mortar and two of them are found on terraces.

According to testimonies, the oldest bee wall is the one at Ano Vitali whose construction dates back to the first half of nineteenth century. Similar bee walls were used in other parts of Greece: in Mani, with the oldest wall dating from the eighteenth century (Mavrofridis, 2020), and on Kefalonia, where the oldest ones are also dating from the eighteenth century (Bikos, 2005). Similar constructions were used in Puglia, Italy (Masetti, 2006), as well as in southern France (Bouet, 2000; Masetti 2000).

Beekeeping structures on terraces for agriculture on Andros

Island, Cyclades, Greece Cavtat, Croatia, October 1-2 2021

Georgios Mavrofridis, Evrythiki Tsilingiri, Georgios Tataris, Theodora Petanidou



Fig. 6 Bee wall at Ano Vitali.



Fig. 7 Bee wall between Ano Gavrio and Ano Aghios Petros.

Beekeeping structures on terraces for agriculture on Andros

Island, Cyclades, Greece Cavtat, Croatia, October 1-2 2021

Georgios Mavrofridis, Evrythiki Tsilingiri, Georgios Tataris, Theodora Petanidou

BEE HOUSES

Bee houses usually were oblong constructions (Figs. 8, 9) with other forms, e.g. rectangular, occasionally appearing. More often they were constructed on terraces with four or three free standing sides, the fourth one adjoined to a rock or the terrace retaining wall. We note three cases with bee houses built inside rock cavities. At most cases, bee houses were single-spaced. However we noted two cases of double spaced constructions.

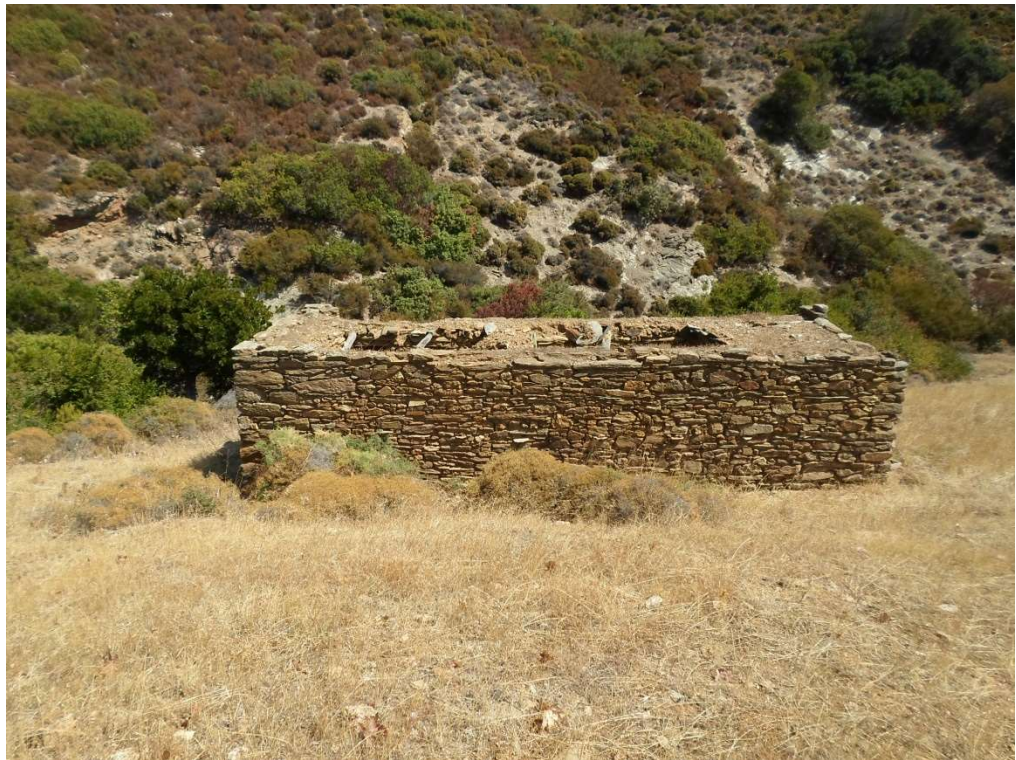


Fig. 8 Bee house at Zorkos.

Beekeeping structures on terraces for agriculture on Andros

Island, Cyclades, Greece Cavtat, Croatia, October 1-2 2021

Georgios Mavrofridis, Evrythiki Tsilingiri, Georgios Tataris, Theodora Petanidou



Fig. 9 Bee house at Tzortzi.

For the construction of the bee houses local stone and mortars were utilized for the masonry walls. The roof was constructed with wooden, and more rarely stone beams, with covering of stone slabs with a thick layer of clay mortar. This layer of clay mortar was maintained every year by compression with the use of a cylindrical marble block (Fig. 10). In some cases the bee houses' walls were plastered on one or both sides and more rarely they were whitewashed with lime.

Beekeeping structures on terraces for agriculture on Andros

Island, Cyclades, Greece Cavtat, Croatia, October 1-2 2021

Georgios Mavrofridis, Evrythiki Tsilingiri, Georgios Tataris, Theodora Petanidou



Fig. 10 Rehabilitated bee house at Kipri, which is now used as office. On the roof a cylindrical marble block that is used for the maintenance of the roof.

Bee houses provided better working conditions for the beekeepers (Fig. 11) who were protected from the weather conditions and especially from the sun and heat of the summer. In some of those houses beekeeping wasn't the only use. Some bee houses contained a rectangular masonry structure (Fig. 12) used to press grapes. Others contained fireplaces or chimneys on the roof (Fig. 13) in order to facilitate a possible sojourn of the owners.

Beekeeping structures on terraces for agriculture on Andros

Island, Cyclades, Greece Cavtat, Croatia, October 1-2 2021

Georgios Mavrofridis, Evrythiki Tsilingiri, Georgios Tataris, Theodora Petanidou



Fig. 11 The inside of the bee house at Tzortzi.



Fig. 12 Bee house with a structure used to press grapes at Kipri.

Beekeeping structures on terraces for agriculture on Andros

Island, Cyclades, Greece Cavtat, Croatia, October 1-2 2021

Georgios Mavrofridis, Evrythiki Tsilingiri, Georgios Tataris, Theodora Petanidou



Fig. 13 Chimneys on the roof of a bee house at Varfa

We find bee houses of a vast range of sizes: big bee houses with several dozens of cupboard hives on their walls and small ones with much fewer cupboard hives. The largest one has 51 cupboard hives (Fig. 14) and the smallest only 6 (Fig. 15). The cupboard hives at the bee houses were usually placed at the long side or at one long side and at one of the short sides. Nevertheless there are bee houses with cupboard hives at three sides, even at all four sides of the house. The entrance of the bees into the cupboard hives usually was oriented to south, in order to keep the bee colonies unaffected from the cold north winds. In those few cases that the bee entrance faced north there was some natural barrier protecting from the north winds.

Beekeeping structures on terraces for agriculture on Andros

Island, Cyclades, Greece Cavtat, Croatia, October 1-2 2021

Georgios Mavrofridis, Evrythiki Tsilingiri, Georgios Tataris, Theodora Petanidou



Fig. 14 The largest bee house of Andros with 51 cupboard hives at Zacharias.



Fig. 15 The smallest bee house of Andros with 6 cupboard hives at Kalivari.

Beekeeping structures on terraces for agriculture on Andros

Island, Cyclades, Greece Cavtat, Croatia, October 1-2 2021

Georgios Mavrofridis, Evrythiki Tsilingiri, Georgios Tataris, Theodora Petanidou

Local variations in the architecture of the bee houses are to be found in some places. For example, at the area of Aghios Petros the entrances of the bees were protected by a shed from stone or piece of ceramic roof tile. In the vicinity of the bee houses there should be water and at least one of the main blossoms of the island – that of thyme (dominated by *Thymbra capitata*) or the autumn heather (*Erica manipuliflora*). Besides the rich forage encountered in the vicinity, the bee colonies overwintered better in the cupboard hives of these bee houses, as they did in other constructions, resulting in a higher productivity in bee products as compared to bee colonies using other types of hives.

During our onsite research on Andros, 45 bee houses were recorded (Fig. 16) and documented, the ethnographic information obtained mainly from elderly beekeepers. For a big part of the bee houses measured drawings were executed (Fig. 17, 18) and 3D models were created with the use of Unmanned Aerial Vehicles (Fig. 19, 20).

Beekeeping structures on terraces for agriculture on Andros

Island, Cyclades, Greece Cavtat, Croatia, October 1-2 2021

Georgios Mavrofridis, Evrythiki Tsilingiri, Georgios Tataris, Theodora Petanidou

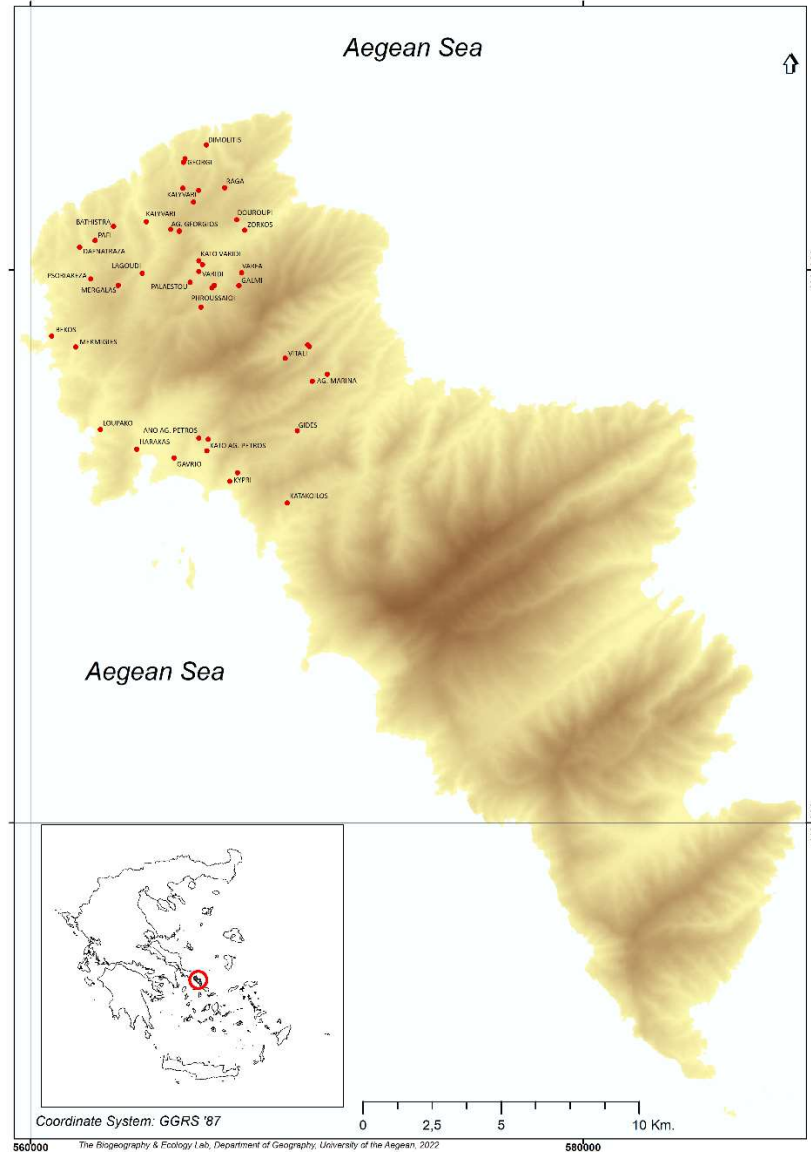


Fig. 16 Map of Andros Island with the locations of the bee houses in the north.

Beekeeping structures on terraces for agriculture on Andros

Island, Cyclades, Greece Cavtat, Croatia, October 1-2 2021

Georgios Mavrofridis, Evrythiki Tsilingiri, Georgios Tataris, Theodora Petanidou

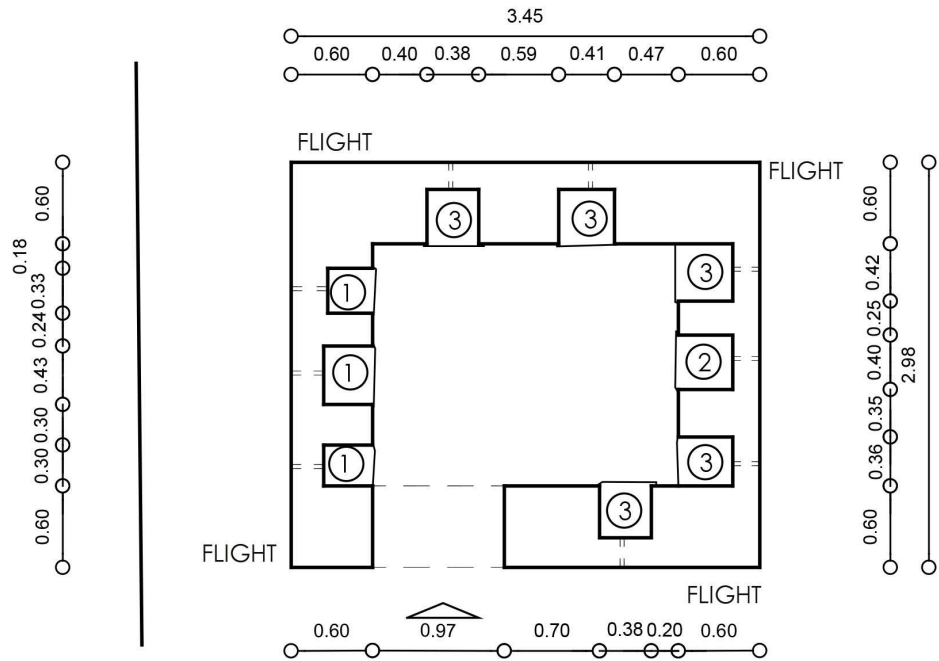


Fig. 1 Measured drawing of rectangle bee house at Kalivari with cupboards in all four sides.

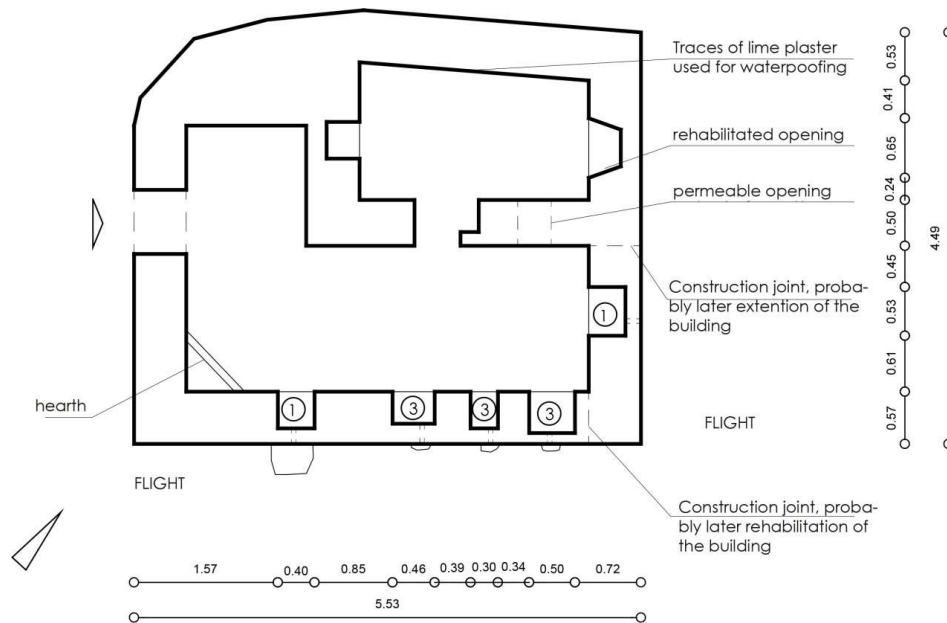


Fig. 18 Measured drawing of double spaced bee house at Raga.

Beekeeping structures on terraces for agriculture on Andros

Island, Cyclades, Greece Cavtat, Croatia, October 1-2 2021

Georgios Mavrofridis, Evrythiki Tsilingiri, Georgios Tataris, Theodora Petanidou



Fig. 19 Bee house at Kato Aghios Petros, photographed with the use of drone.



Fig. 20 Top view of a bee house at Mermighies (drone photo).

Beekeeping structures on terraces for agriculture on Andros

Island, Cyclades, Greece Cavtat, Croatia, October 1-2 2021

Georgios Mavrofridis, Evrythiki Tsilingiri, Georgios Tataris, Theodora Petanidou

According to our informants, the total number of bee houses on the northern part of Andros was at least 51. Six of them, located in areas with big residential and tourist development, appear to have been destroyed. Some of those destroyed bee houses are contained in a prior study on the subject (Speis, 2016: 93-102), in which some of their characteristics have been recorded with measured drawings and photographs.

According to oral testimonies, the oldest bee houses were constructed at the last quarter of the nineteenth century. In some bee houses there are engraved dates of the twentieth century. The use of bee houses was abandoned in the late 70s due to the arrival of varroa, a bee parasite that could not be effectively treated in traditional beekeeping establishments. The last bee house in use was abandoned in the late 80s.

Bee houses like the ones found in Andros were not used anywhere else in Greece or the Balkans. Similar constructions, however, have been recorded in Cyprus (Mavrofridis, 2018a), in northwestern Italy (Cauda, 2000), in southern France (Bouet, 2000; Masetti, 2000; Roussel, 2000), as well as in the region of Guadalajara in Spain (Martínez, 2022).

CONCLUSIONS

The terraces and their retaining walls of Andros had an important role in the island's beekeeping which was much different from the beekeeping practices in other Cycladic islands. In the drystone retaining walls, boles were constructed for the placement of horizontal open-at-one-end hives. After the fourteenth century, inhabitants originating from the mainland brought to Andros the use of portable upright hives. As a result, the boles

Beekeeping structures on terraces for agriculture on Andros

Island, Cyclades, Greece Cavtat, Croatia, October 1-2 2021

Georgios Mavrofridis, Evrythiki Tsilingiri, Georgios Tataris, Theodora Petanidou

on many retaining walls started being constructed with different shape and size in order to be appropriate for the new type of hives. The use of boles as a placement of horizontal open-at-one-end hives was not abandoned, however, but was restricted mainly to the central part of Andros.

The use of stone-built bee hives by the inhabitants of northern Andros, both in the countryside and in buildings of different main use, seems to have led since the nineteenth century to stone-built constructions for beekeeping: the bee walls and the bee houses. Those constructions were in use until the eighth decade of the twentieth century, when, as the knowhow progress in apiculture rendered them gradually redundant, they were abandoned and the beekeepers using them switched to modern beekeeping practices. At the same time, the use of portable traditional hives and bee boles was abandoned as well.

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Beekeeping structures on terraces for agriculture on Andros

Island, Cyclades, Greece Cavtat, Croatia, October 1-2 2021

Georgios Maurofridis, Evrythiki Tsilingiri, Georgios Tataris, Theodora Petanidou

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Beekeeping structures on terraces for agriculture on Andros

Island, Cyclades, Greece Cavtat, Croatia, October 1-2 2021

Georgios Maurofridis, Evrythiki Tsilingiri, Georgios Tataris, Theodora Petanidou

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Beekeeping structures on terraces for agriculture on Andros

Island, Cyclades, Greece Cavtat, Croatia, October 1-2 2021

Georgios Mavrofridis, Evrythiki Tsilingiri, Georgios Tataris, Theodora Petanidou

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