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The Archaeology of Beekeeping in Pre-Roman Ibèria

Helena Bonet Rosado[1] and Consuelo Mata Parreño[2]

[1]Servei d'Investigació Prehistòrica, Diputació Provincial de València, Carrer Corona 36, 46003 València, Spain

[2]Departament de Prehistòria i Arqueologia, Universitat de València, Av. Blasco Ibáñez 28, 46010 València, Spain

Abstract

This paper presents a set of pottery beehives from the pre-Roman Iberian peninsula, dating from the third century BC, *and all coming from a single region known in antiquity as* Edetania. *These beehives are closely related to similar examples from Greece and to a type described by Roman authors such as Columella. It is the first such archaeological material that can be associated with apiculture in this area.*

Introduction

The ancient Greeks and Romans must have known of sugar-cane, which originated in southern Asia and India, although it was only in the Middle Ages that it spread with the Arabs to the West (Saglio 1900: 931). In practice, however, honey was the only product used to sweeten food and drink in the ancient world. It has important nutritional, energy-giving and antiseptic properties; curative properties have also been claimed, though not always proved, and in many cases these in fact derive from the plants from which the honey originated (Mateu *et al.* 1993: 45-46). Honey was also employed in magico-religious rituals, and it is related to gods and kings (Vázquez Hoys 1991: 64-70). Justin (44.4) attributed the invention of honey-collecting to the mythical Tartessic king Gargoris.

Already in prehistoric times honey was widely collected, as exemplified in the rupestrian painting in the rock-shelter at La Araña in Bicorp (València, Spain). The most ancient evidence of beekeeping in hives—i.e., the production of honey as an activity on the agricultural calendar—comes from ancient Egypt (Crane 1983: 35-39). It is not, however, until we come to the classical authors that there exists documentation about the processes involved in beekeeping, the calendar of harvesting, beehives, and honey's uses and prices. Honey, of course, is the principal product extracted via beekeeping activities, but one must not forget pollen, royal jelly and beeswax too.

The production of honey must have occupied a significant place in the domestic economy, given the space devoted by Roman authors to bees and their care. Book IX of Columella's *De re rustica* collects those aspects of farming that relate to beekeeping, while Virgil, in his *Georgica*, dedicates no less than one line in every four to apiculture and points out that an apiary can succeed in producing as much as a vineyard.

The beehive is precisely the artifact that makes it possible to distinguish apiculture from wild honey-collecting. Various types of

beehives existed, depending on the material of which they were made, and almost all of them have continued in use until today (Crane 1983). Beehives of cork were the most widely accepted; those of sun-dried mud or pottery were very common in Egypt; those of brick had the disadvantage that they could not be moved; those of wood, with drawers, were very similar to present-day examples; beehives made from cow manure were inadvisable, as they were inflammable; and, finally, pottery beehives—clay pipes about 1 m in length and 20 cm in diameter and open at both ends—were piled horizontally one on top of another (Saglio 1900: 1701). Although the classical authors point out that beehives must be built according to the conditions of each region, they think that pottery beehives—the ones studied in this paper—are the worst of all, as 'they get sunburnt with the heat of the summer and they freeze with the cold of the winter' (Columella, *De re rustica* IX.vi). This advice was no obstacle to their use in antiquity, and they continued to be used until a few years ago in Andalucía (Martín Morales 1981: 55, fig. 97) and Mallorca (Rosselló 1966: 34, 74 [room VI]); even today, they continue to be used in Greece, Cyprus, Egypt and Jordan (Crane 1983: 71-72). This is probably because the thermal disadvantages just mentioned can easily be solved by protecting the beehives with branches, mad-weed or manure, and they have other advantages besides, in that they last longer and can be transported easily. The advice of the classical authors, in any case, seems to be contradicted by the good quality of the honey from Attica, the very region in which pottery beehives have been best documented archaeologically.

Although there are many references to apiculture in the ancient literature, there have not been many archaeological finds that relate to them. Some exceptions in Greece where beehives have been found include the excavations of the Greek house at the Cave of Pan at Vari, the Agora of Athens, the tower of Sounion, Marathon, Corinth, Trachones, and the survey of northwest Keos (Jones *et al.* 1973; Crane 1983: 45, fig. 26; Cherry *et al.* 1991: 260-63).

Beekeeping and Honey in Iberian Culture

The Iberian Civilization is an Iron Age culture that developed throughout an area extending from the Guadalquivir river (in Spain) to the Hérault river (in France). The Iberians (so named in the ancient sources) developed an individual culture—with a writing system, coinage, wheel-made pottery, sculpture, cremation, etc.—which was nonetheless broadly similar to other contemporaneous Mediterranean civilizations (Greek, Etruscan, Punic and Roman). They lived in autonomous territories with a hierarchical settlement pattern. Through the study of material culture and settlement patterns, it is possible to follow the evolution of Iberian society from chiefdom to early state in the course of three phases: Early Iberian (6th–5th centuries BC), Middle Iberian (4th–3rd centuries BC), and Late Iberian (2nd–1st centuries BC).

The name *Edetani* refers to an Iberian ethnic group (again, one named by the classical writers), which lived in an area located in the central part of the Mediterranean coast of Spain. Their settlement pattern reveals a pyramidal structure with four types of settlement: the city itself, *Edeta*, identified with the site of Tossal de Sant Miquel (Fig. 3, no. 27); some villages and hamlets, located near cultivable land; and a network of hill-forts comprising a frontier line established for purposes of defence of the landscape.

Literary references to apiculture in the Iberian peninsula (Pliny XXI.74; Strabo III.6) are limited to citing the good quality of the honey and beeswax from *Hispania*, above all

the products from *Baetica* which were already being exported in republican Roman times (Blázquez 1968: 249). For pre-Roman times, we can be sure that apiculture was practised, but not about long-distance trade in its products; however, the difficulty of finding either organic or inorganic archaeological remains, indicating the use of beehives in the production of honey in the Iberian Culture, makes this difficult to confirm. Nonetheless, the few visual representations and the written descriptions of the practice of apiculture in antiquity in fact show many similarities throughout the Mediterranean region, despite chronological and geographical differences (e.g., Cherry *et al.* 1991: 260-63; Crane 1983; Gregori *et al.* 1985: 51-61; Molina García 1989). So it is not difficult to reconstruct this activity for the Iberian Culture also.

Here we present a set of pottery beehives of the 3rd and 2nd centuries BC, identified by us on the basis of archaeological and ethno-

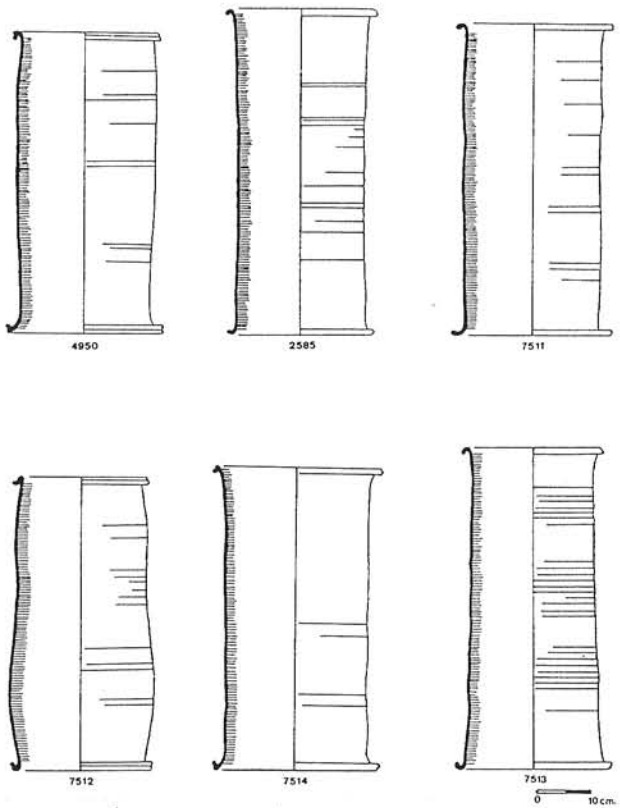

Fig. 1 Complete beehives of the end of the 3rd and the beginning of the 2nd centuries BC (4950—La Monravana, site 14; 2585—Tossal de Sant Miquel, site 27; 7511, 7512, 7513, 7514—Puntal dels Llops, site 16).

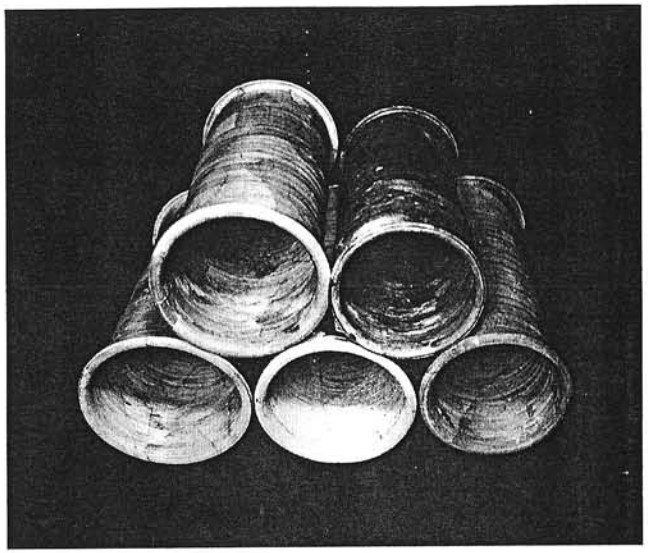

Fig. 2 Beehives from Puntal dels Llops, Tossal de Sant Miquel and La Monravana (Museo de Prehistoria de València).

graphic comparisons (Mata and Bonet 1992: 136). The complete examples come from the excavations of Puntal dels Llops (Olocau, València), La Monravana (Llíria, València) and Tossal de Sant Miquel (Llíria, València), and are currently on display in the Museo de Prehistoria in València (Spain) (Figs. 1 and 2). In addition, we consider here fragments collected during preliminary explorations undertaken before the survey project that studied the territory of the Iberian city of *Edeta*/Tossal de Sant Miquel, as well as other unpublished pieces from the Plana de Utiel (València), and from the district of Alcublas (València) (Fernández Aragón 1992; 1994) (Fig. 3).

Typology

According to the typology of Iberian pottery we proposed several years ago, these beehives are cylindrical, open at both ends, between 24 and 29 cm in diameter and between 53 and 58 cm long, with differentiated rims and a grooved interior surface; the fabric is local (Mata and Bonet 1992: 136) (Figs. 1 and 2; Table 1). A beehive with the average dimensions of all complete beehives has a capacity

Site	*Inv. no.*	*Upper Diam.*	*Lower Diam.*	*Height*
Tossal de St. Miquel (Room 61)	2585	27.5	26	59
La Monravana	4950	28	26	55.5
Puntal dels Llops (Room 2)	7511	27.7	29.5	57.2
Puntal dels Llops (Room 2)	7512	25	24	53.8
Puntal dels Llops (Room 2)	7513	26.5	26.5	58
Puntal dels Llops (Room 2)	7514	29	29	54.5

Table 1 Dimensions (in cm) of complete examples of beehives

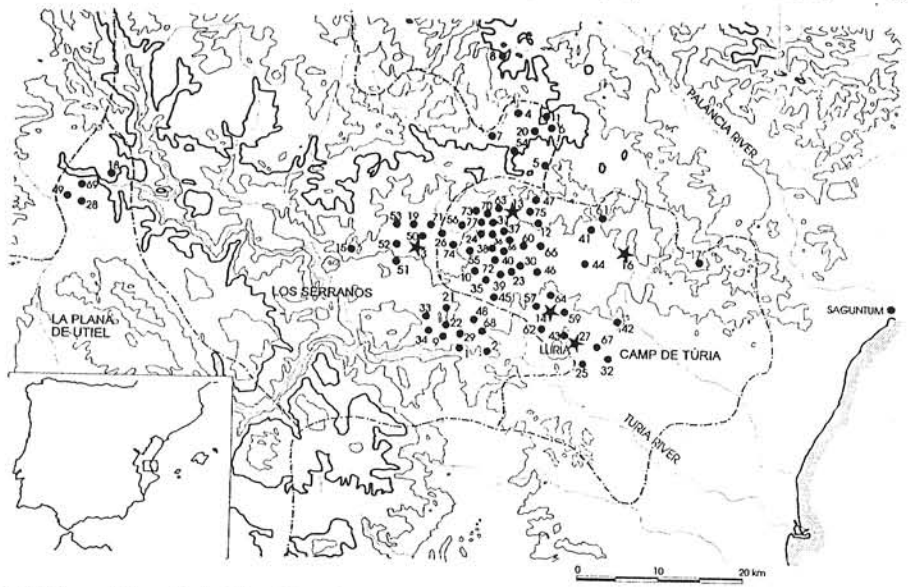

Figure 3 Sites with Beehives (Dot = Survey site; Star = Excavated site): 1, Yesar de Masero; 2, El Remolino; 3, La Seña; 4, Masía de las Dueñas; 5, Collado de Gabarda; 6, La Torrecilla I; 7, Peña Ramiro; 8, La Hoyata; 9, Loma de la tía Soldá; 10, La Cúa; 11, Herbasana I; 12, El Bardinal; 13, Castellet de Bernabé and its lower part, or Tabaira; 14, La Monravana and its southeast slope; 15, El Castellar; 16, Puntal dels Llops; 17, Aqüeducte de Portacoeli; 18, Casilla Gatell; 19, Monteolivé; 20, Navajo Puerta; 21, Corral Quemado I; 22, El Castillejo; 23, Ermita de Sant Roc; 24, Torre Seca; 25, El Cabèçol; 26, Corral de Pomer; 27, Tossal de Sant Miquel; 28, Cerro de San Cristóbal; 29, La Marjuela; 30, Els Clots/ Ermita de Sant Roc; 31, Lastras del tío Perico; 32, La Creu; 33, Corral de Ajau; 34, La Torzuela; 35, Calvo; 36, Casa de Camp, lower part; 37, La Concordia; 38, El Terç; 39, Marugán; 40, La Foia; 41, Cabeç Roig; 42, Corral d'Albert; 43, La Foia II; 44, Masía Castell/ Edeta; 45, Mas de Torres; 46, Tacons/ Corral Roig; 47, Umbría Negra or Casita de Elías; 48, El Quemado; 49, Pozo Viejo; 50, Corral de la Huerta or El Borreguillo II; 51, Corral de la Pieza Roya; 52, Corral de Mateu or La Balsilla; 53, Suertes; 54, Los Casales I; 55, Aljub Nou o Corral de la Costera; 56, Petillo I; 57, Bassa dels Pasquals; 58, El Castellet de Bernabé´s lower part, or Tabaira (see 13); 59, La Lloma del Manoll´s lower part; 60, L'Ametllar; 61, Mas de Moya I; 62, Moncatí; 63, Santa; 64, Casa Palau; 65, Sant Josep; 66, Partida de Diago; 67, Rascanya; 68, Torralba; 69, El Carrascal; 70, Corral del Sec; 71, Cañada Baile; 72, Casinos North; 73, El Orán; 74, Pla de los Collados; 75 and 76, La Castela and La Castela 2; 77, Mas d'Agustí; 78, La Monravana´s southeastern slope (see 14).

of 47.8 litres, which is consistent with the calculated capacity of Roman and of some other traditional beehives (Crane 1983: 17, table 2). All the complete beehives were found in excavated sites, which were destroyed between the end of the third and the beginning of the second century BC.

The grooves are deep incisions made before firing with an instrument that produced very pronounced, almost sharp, ridges (Figs. 4 and

5). This characteristic is essential in order to differentiate the beehives from the cylindrical supports, which do not have this interior finish, known from this same region (Ballester *et al.* 1954: pl. XI, 13; Bonet 1995: fig. 211) and from Murcia (Lillo 1981: 373, 375). In fact, until we published our Iberian pottery typology (Mata and Bonet 1992), this shape was classified as a cylindrical support.

In this type of beehive, the combs are fixed (Mateu *et al.* 1993: 14). These beehives are placed horizontally, either separately or in stacks, on the ground or on a small platform. The two ends are closed with covers of cork, wood, pottery or dried mud, and a small opening is made so the bees can enter. The joints are sealed either with mud or with dung to prevent insects or other animals entering. The fact that such beehives are open at both ends is a very important advantage for the beekeeper, since he can take out some combs without destroying the others, or join two cylinders together to make a larger hive (Crane 1983: 48).

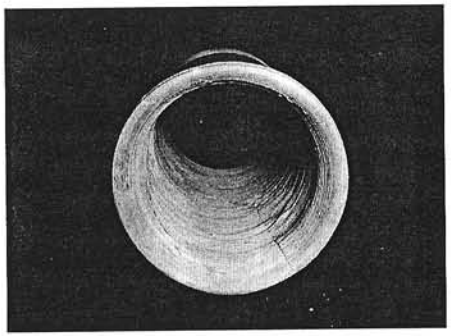

Fig. 4 Beehive with internal incisions, from Puntal dels Llops (site 16).

No variants have been found that would allow a meaningful division into sub-types, but there is great variety in the form of the rims (Fig. 6). Despite the large number of classified pieces, it is not possible to establish

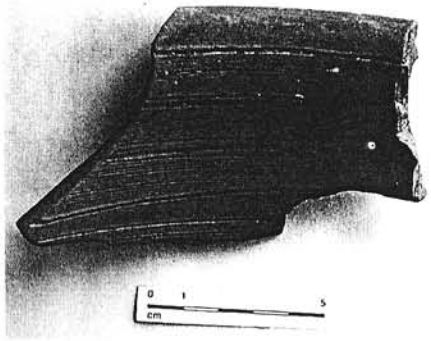

Fig. 5 Beehive sherd with internal incisions, from a survey site (Aqüeducte de Portacoeli, site 17).

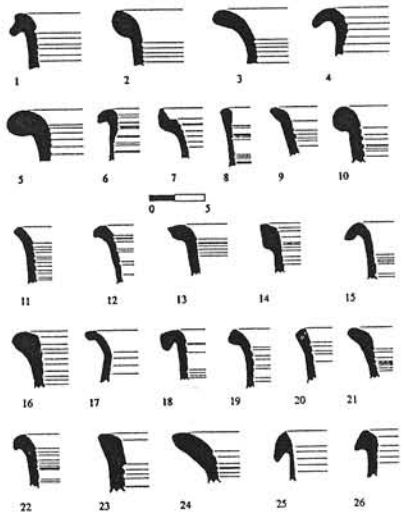

Fig. 6 Different beehive rim-types from excavated and survey sites.

any relationship between different rim-forms and chronology: in the same site various types can be found (Table 3). At Middle Iberian sites (4th–3rd centuries BC), such as Tossal de Sant Miquel (no. 27), Castellet de Bernabé (no. 13), La Monravana (no. 14) or Puntal dels Llops (no. 16), only moulded and raised rims were found (Figs. 1 and 3; Table 3); all of

SITES \ CHRONOLOGY	Early Iberian VIth–Vth	Middle Iberian IVth–IIIrd	Late Iberian IInd–Ist	Roman Imperial
1, Yesar de Masero (Bugarra)				
2, El Remolino (Pedralba)				
3, La Seña (Villar del Arzobispo)				
4, Masía de las Dueñas (Alcublas)				
5, Collado de Gabarda (Altura)				
6, La Torrecilla I (Altura)				
7, Peña Ramiro (Andilla)				
8, La Hoyata (Begís)				
9, Loma de la tía Soldá (Bugarra)				
10, La Cúa (Casinos)				
11, Herbasana I (Jérica)				
12, Bardinal (Llíria)				
13, Castellet de Bernabé (Llíria)				
14, La Monravana and La Monravana SE (Llíria)				
15, El Castellar (Losa del Obispo)				
16, Puntal dels Llops (Olocau)				
17, Aqüeducte de Portacoeli (Serra)				
18, Casilla Gatell (Sinarcas)				
19, Monteolivé (Villar del Arzobispo)				
20, Navajo Puerta (Alcublas)				
21, Corral Quemado I (Bugarra)				
22, El Castillejo (Bugarra)				
23, Ermita de Sant Roc (Casinos)				
24, Torre Seca (Casinos)				
25, Cabèçol (Llíria)				
26, Corral de Pomer (Casinos)				
27, Tossal de Sant Miquel (Llíria)				
28, Cerro de San Cristóbal (Sinarcas)				
29, La Marjuela (Bugarra)				
30, Ermita de St. Roc/Els Clots (Casinos)				
31, Lastras del tío Perico (Casinos)				
32, La Creu (Benissanó)				
33, Corral de Ajau (Bugarra)				
34, La Torzuela (Bugarra)				
35, Calvo (Casinos)				
36, Casa de Camp, lower part (Casinos)				
37, Concordia (Casinos)				
38, El Terç (Casinos)				
39, El Marugán (Casinos)				
40, La Foia (Casinos)				
41, Cabeç Roig (Llíria)				
42, Corral d'Albert (Llíria)				
43, La Foia II (Llíria)				
44, Masía Castell/Edeta (Llíria)				
45, Mas de Torres (Llíria)				
46, Tacons/Corral Roig (Llíria)				
47, Umbría Negra o C. de Elías (Llíria)				
48, El Quemado (Bugarra)				
49, Pozo Viejo (Sinarcas)				
50, C. Huerta/ Borreguillo (V. Arzobispo)				
51, C. Pieza Roya (Villar del Arzobispo)				
52, C. de Mateu o Balsilla (V. Arzobispo)				
53, Suertes (Villar del Arzobispo)				
54, Los Casales I (Alcublas)				
55, Aljub Nou o C. Costera (Casinos)				
56, El Petillo I (Casinos)				
57, Bassa dels Pasquals(Llíria)				
58, C. Bernabé's lower part/Tabaira (Llíria)				
59, El Manoll's lower part (Llíria)				
60, L'Ametllar (Llíria)				
61, Mas de Moya (Llíria)				
62, Moncatí (Llíria)				
63, Santa (Llíria)				
64, Casa Palau (Llíria)				
65, Sant Josep (Casinos)				
66, Partida de Diago (Llíria)				
67, Rascanya (Llíria)				
68, Torralba (Pedralba)				
69, El Carrascal (Sinarcas)				
70, Corral del Sec (Llíria)				
71, Cañada Baile (Casinos)				
72, Casinos N (Casinos)				
73, El Orán (Casinos)				
74, Pla de los Collados (Casinos)				
75, La Castela (Llíria)				
76, La Castela 2 (Llíria)				
77, Mas d'Agustí (Casinos)				

Table 2 Chronology of sites with beehives.

Sites	Rim Forms	Sites	Rim Forms
1	2	40	incised sherds
2	1 and 2	41	1, 2, 3, 9, 10, 11, 17 and 26
3	1, 2, 3 and 16	42	1, 2, 3, 4, 5, 9, 10, 11, 13, 16,18, 23, 24 and 26
4	2	43	4
5	12	44	1
6	24	45	1, 2, 3, 4, 5, 6, 8, 9, 11, 12, 14, 15, 19, 20, 21, 22, 25 and 26
7	3	46	26
8	3	47	1, 2, 3, 4, 20 and 26
9	2 and 25	48	3, 7 and 26
10	2	49	1
11	1	50	1, 2, 3, 4, 24 and 26
12	incised sherds	51	9 and 11
13	1, 4 and 5	52	1 and 4
14	1	53	incised sherds
15	3	54	1, 2 and 4
16	1 and 2	55	1, 2, 3, 4 and 26
17	1	56	incised sherds
18	22	57	1 and 3
19	2 and 3	58	1, 2, 3 and 4
20	4	59	1, 2 and 5
21	2, 3 and 4	60	2 and 4
22	2	61	2 and 9
23	1 and 3	62	1, 2, 4 and 8
24	1, 2, 3 and 4	63	2, 3, 4, 6 and 14
25	25	64	1 and 2
26	2	65	3
27	1, 4 and 5	66	1, 4, 5, 12 and 26
28	incised sherds	67	14
29	26	68	3 and 15
30	1, 3 and 10	69	1
31	1, 2 and 3	70	1
32	2, 3 and 4	71	1, 1 and 14
33	1, 2, 3 and 4	72	1, 2 and 3
34	incised sherds	73	26
35	incised sherds	74	2
36	1, 2, 5, 9, 17 and 26	75	1 and 4
37	1, 2, 4 and 20	76	13
38	3, 5, 9 and 23	77	22
39	2, 3 and 22	78	2 and 26

Table 3 Rim forms occurring at excavated and survey sites (listed in Table 2 and plotted in Fig. 3).

these come from excavated contexts. In Late Iberian sites (2nd and 1st centuries BC), on the other hand, there is much greater variety, but these are only survey sites, none of which has been excavated (Figs. 3 and 6; Tables 2 and 3).

Very similar examples, although closed at one side, were used in Attica in the 4th century BC. These too have a grooved interior which enables the honeycombs to adhere more securely. The Attic examples are scored only for about half of their circumference, whereas the Iberian beehives have incisions all around the interior of the vessels. Chemical studies have revealed the presence of beeswax in the examples from Vari in Attica, conclusively confirming the use of this shape for beekeeping (Jones *et al.* 1973: 397-414, figs. 79d, 80a); no analyses are yet available for any of the Iberian beehives.

Find-contexts and Probable Location of the Beehives

According to the Roman sources, the apiary should be near the house, both to facilitate access and for protection. Historical and ethnographic examples from various regions show apiaries built as an annex to the rural house, as well as being hung from, or embedded in, the walls of the house (Crane 1983: 49-50, 69-70), or placed on a flat roof (Jemma-Gouzon 1989: 132); one also finds apiaries situated in areas further away from the dwelling places.

All the Iberian beehives found in excavations come from the interior of roofed rooms, among the ruins of the walls along with other types of material (Fig. 7.2). There are various alternative interpretations and none of them is, at present, exclusive. Although they can be found placed in the walls of the modern

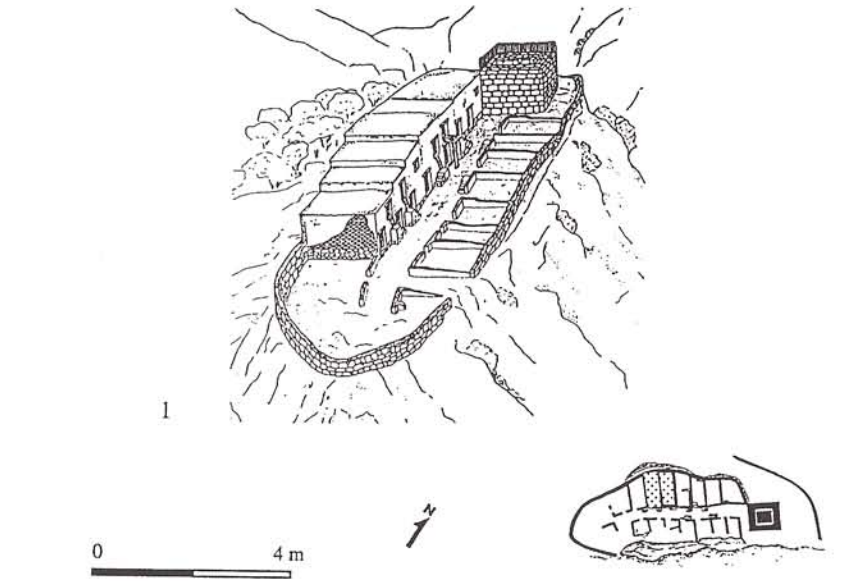

Figure 7 Puntal dels Llops (site 16): (1) Hypothetical Reconstruction; (2) Plan of two rooms, showing the distribution of complete beehives and other domestic artifacts.

houses, as for instance in Kashmir (Crane 1983: fig. 34), examples of beehives situated on flat roofs are much more frequent. Thus, in the villages of Aurés in Algeria, each family nowadays has between four and eight beehives for domestic use installed on the upper, less-used flat roofs of the buildings (Jemma-Gouzon 1989: 132). Similarly, until just a few years ago, log beehives were regularly placed on the flat roofs of houses on the island of Ibiza in Spain. The flat roofs which we proposed for the Iberian construction (Bonet *et al.* 1994: 122, fig. 2) (Fig. 7.1) are compatible with these ethnographic parallels, and could explain the presence of so many beehives found inside these Iberian settlements. Moreover, in Iberian architecture walls range in width between 40 and 50 cm, so it might have been impossible to embed beehives 53–58 cm in length completely within the thickness of the wall. On the other hand, the household furnishings of some rooms at Puntal dels Llops reveal an association of beehives, amphoras, mortars, mortar handles, dishes, jars with an underspout, etc., and these are interpreted as being for storage (Fig. 7.2). We propose that the beehives were stored in the rooms when not in use.

With regard to the beehive sherds collected during the field survey, it is not possible to specify the locational context. Of all the sites studied, only one is not a habitation site. The collection made on the southeastern slope of La Monravana is composed exclusively of fragments of beehives with fluted bodies and rims; although the material is very scanty, it could represent an apiary for La Monravana, given that the spot is isolated but also near the village (Fig. 3, nos. 14 and 78).

Distribution and Chronology

At present, we have catalogued 78 sites where pottery beehives have been collected, the majority being found in the territory of *Edeta* and its surroundings (the regions now called Camp de Túria and Los Serranos) (Fig. 3). On the island of Keos in Greece, it is possible to see a similarly dense spatial distribution (Cherry *et al.* 1991: Fig. 11.19).

One hundred sites have been surveyed in the territory (now called La Plana de Utiel) of another Iberian city, *Kelin*; but pottery beehives have been found at only four of them (Fig. 3, nos. 18, 28, 49 and 69)—and these are almost on the border of the area of Los Serranos.[1] It seems, therefore, that the type we have found is peculiar to the territory of *Edeta* and nearby areas. More extensive and systematic survey of the bordering areas, and the proper identification of these pieces as beehives by other investigators, would no doubt considerably increase the number of sites. Nonetheless, they have not been documented in *Arse/Saguntum* (Sagunt, València), El Solaig (Betxí, Castellón), Puig de la Nau (Benicarló, Castellón), Puig de la Misericòrdia (Vinarós, Castellón), La Bastida de les Alcuses (Moixent, València), Los Villares/*Kelin* (Caudete de las Fuentes, València), La Serreta (Alcoi-Cocentaina-Penàguila, Alicante), or El Oral (San Fulgencio, Alicante). Nor have they yet been identified in other parts of the Iberian peninsula. The most likely explanation for this lacuna is that beehives (whether of cylindrical form or not) were indeed used, but that they were made of organic materials—e.g. wood, cork, or woven wicker—which would not survive archaeologically.

Significant chronological data have been obtained from these sites (Table 2). The fragments from excavations (Castellet de Bernabé, La Monravana, Puntal dels Llops and Tossal de Sant Miquel) (Fig. 3, nos. 13, 14, 16 and 27) confirm the presence of pottery beehives, and therefore the practice of apiculture, from at least the end of the 3rd century BC. In the Early Iberian levels (6th–5th centuries BC) of La Seña (Fig. 3, no. 3) or Tossal de Sant Miquel, there are no beehives (Bonet 1988; 1995). Neither have they been documented at Los Puntalicos Blancos (Gátova, València), a site of the 6th century BC, nor at La Lloma del Manoll (Llíria, València) whose occupation spans the 5th and 4th centuries BC.[2] At a number of sites that can be dated only in broad terms as Early to Late Iberian, fragments of beehives collected on the surface cannot be assigned definitively to one period or another, although all the indications are that they belong to the Middle or Late Iberian period; beehive fragments are certainly very frequent at Middle and (especially) Late Iberian sites. On the other hand, they hardly existed in Roman imperial times, being found only at seven sites whose occupation is exclusively of this period. This decrease of pottery beehives during the early imperial period may not in fact imply the abandonment of apiculture in an area where it had previously enjoyed such success, but perhaps rather the adoption of some other type of beehive more in keeping with the recommendations of the Roman writers (as discussed above).[3]

Other Equipment Possibly Used in Ancient Iberian Apiculture

Objects relating to apiculture are difficult to identify, since they are mainly made of perishable materials, such as the wicker baskets on which the honeycombs were squeezed, or are multi-functional, like the containers in which the honey was stored (Gregori *et al.* 1985: 60). Nevertheless, there have been attempts to identify certain artifacts as associated with apiculture.

The iron instrument for cutting the honeycombs is one of the objects that Pla (1968: 51) attributes to this activity in his study of Iberian tools. In spite of the doubts expressed by the author, this functional identification has not so far been refuted. Columella's description of instruments used to extract the honey—a long, double-bladed knife with a curved blade at the tip; a tool flat and sharp on one side, with a curved point on the other—shows that these are not necessarily function-specific tools, but only needed to be long and sharp. At present, the tool illustrated here (Fig. 8, no. 4) is the only one so far documented from the Iberian Culture; it was found in an excavated site dated to the 4th century BC.

The kalathos is the vessel-form that Cuadrado (1968: 129) considered most likely as a container for honey, not only because of its open mouth, but also because it was the most widely exported type of Iberian pottery during the 2nd and 1st centuries BC (Fig. 8, nos. 2 and 3). Conde (1992: 138), on the other hand, does not agree with the hypothesis that it was a receptacle used for a commercial product, but believes that it was bought or sold in its own right. While there is a certain similarity with the straight-sided, almost cylindrical, containers used in Rome to store honey (Fernández Uriel 1988: 190), the truth is that no confirmed evidence exists of their use for this purpose. Although chemical analysis would be necessary to demonstrate the point with certainty, we ourselves believe that the kalathos was a receptacle for some product—whether honey, beeswax or something else. For one thing, it has an essentially coastal distribution, and appears in shipwrecks as part of the cargo (Fernández Izquierdo 1995); for another, it is improbable that, within the great variety of Iberian pottery, the kalathoi of the Catalan area should have been exported extensively as objects of commercial value, but those of the southeastern region only rarely. These considerations suggest to us that the Mediterranean distribution of these kalathoi was due to their industrial production to hold a product specific to this region, which was exported within the commercial circuits of the Roman republican world (Guérin 1987: 52, n. 2; 1993: 89).

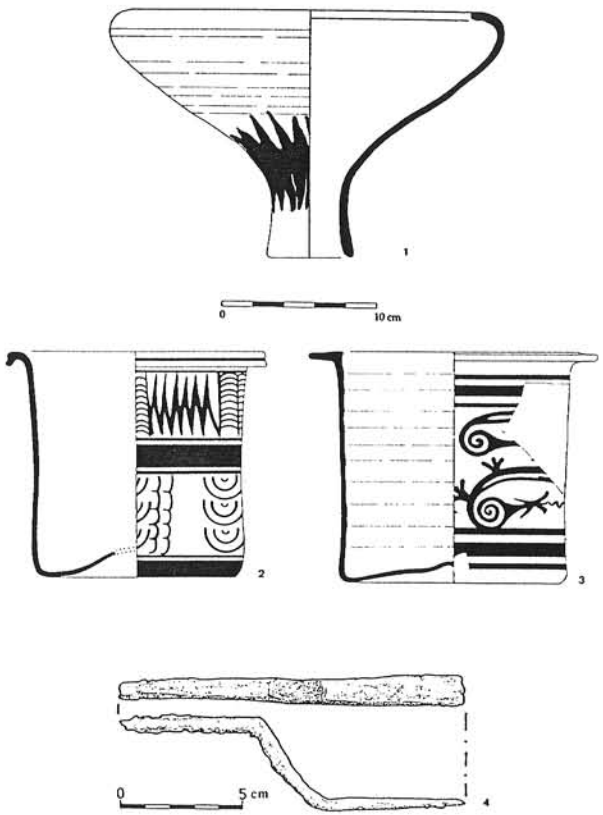

Figure 8 Other equipment possibly associated with ancient beekeeping: (1) A ceramic funnel from Tossal de Sant Miquel (Llíria, València); (2, 3) Two ceramic kalathoi from Tossal de Sant Miquel (Llíria, València); (4) An iron instrument for cutting honeycombs from La Bastida de les Alcuses (Moixent, València) (after Pla 1968).

Furthermore, the kalathos is a type of vessel manufactured from the 3rd to the 1st centuries BC, its fabric is consistent with that of the pottery beehives, and it is very common on sites occupied during this same period. Within the area of our survey, it appears at all excavated sites (Fig. 7, no. 2; Fig. 8, nos. 2 and 3) and at the majority of those explored by surface reconnaissance.

The conical funnel ending in a long appendage (Fig. 8, no. 1; cf. Bonet 1995: figs. 6, 91; Mata and Bonet 1992: 138) has also been related to the process of pressing and decanting honey from the cut honeycombs into containers. Until very recently, in the area of Jumilla-Yecla (Murcia), honey was pressed over a funnel using a strainer of esparto grass (*Stipa tenacissima*) on top to filter solid particles from the honey when extracting it from the honeycombs (Molina García 1989). The presence of remains of grass fibres in funnels from the archaeological site of Coimbra del Barranco Ancho (Jumilla, Murcia) (Page *et al.* 1987: 18-19) might confirm such a function. The funnel is in any case an uncommon object in the Iberian ceramic repertoire, although it does appear at some sites throughout the whole area from Andalucía (Vaquerizo *et al.* 1992: 76, fig. 11f) to the Ebro valley (Atrián 1966: 157, fig. 2). In our survey region, it has been found only in some rooms at Tossal de Sant Miquel (Fig. 3, no. 27).

General Discussion

Pottery beehives dating from the 3rd century BC are not a foreign form, but an indigenous Edetan product. At present they have not been documented in any other areas of ancient Iberia where Greek (Cataluña, where the only two Greek colonies known in Spain, *Emporion* and *Rhode*, are located) or Punic influence (Andalucía, Spain) was more intensive. These Edetan pottery beehives are thus the first archaeological artifacts that can be attributed with certainty to apiculture in the Iberian peninsula in antiquity, although knowledge of it in earlier times cannot be ruled out, since beehives were also made from perishable materials such as cork or wood.

Apiculture is an activity that requires knowledge of the behaviour of bees and skill in their handling, but little specialization, and so can readily be developed in a domestic context. Until the introduction of modern apiculture with boxes of mobile frames, many peasants kept bees, especially those who lived in isolated country houses and farms (Gregori *et al.* 1985: 53; Jemma-Gouzon 1989: 132). In pre-Roman times, therefore, the production of honey may have been important in the family economy, both as a foodstuff and as a commercial product.

The data furnished by the excavated sites (i.e. unpublished inventories of the reports of excavations) seem to indicate an activity developed in a domestic setting. Thus, at El Puntal dels Llops beehives have been documented in 12 of the 17 rooms (Fig. 7); at El Castellet de Bernabé (Fig. 3, no. 13) fragments of beehives have been found in almost all the rooms (Guérin 1995); the same is true of La Seña (Fig. 3, no. 3). The absence of fragments of beehives, except for one complete example, at Tossal de Sant Miquel (Fig. 1, no. 2585; Fig. 3, no. 27) is explained by the selective retention of material from the excavations of the 1930s and 1950s, since in the restoration campaign of 1994 they appeared equally in rooms 15, 42, 43 and 46.

On the other hand, at sites 3, 13, 14 and 27 (Fig. 3) structures have been documented that were intended for the processing of foods such as oil, wine or flour which, judging by the size of the installations and the technology employed, do not appear to be for production on a grand scale (Bonet *et al.* 1994: 124, 126-27; Pérez Jordà 1993: 89-90). These data support the hypothesis that at Edetan sites during the Middle Iberian period there existed a system of domestic production based essentially on subsistence agriculture, with commercial relations of a local or regional nature. By the Late Iberian period, however, when the Romans conquered the Iberian peninsula, the quantity of pottery beehives recovered at almost all these sites increases; this may suggest that, as well as production for home consumption, some of the honey and honey-products derived from it began to be marketed long-distance, in agreement with what Roman authors mention about honey and beeswax from *Baetica* (Andalucía, Spain) (Blázquez 1968: 249).

In conclusion, evidence of cereal, olive and vine crops already document extensive agriculture within the territory of ancient *Edeta*. The pottery beehives discussed in this paper now provide additional evidence about the agricultural system, one much like that found

on the island of Keos in Greece (Cherry *et al.* 1991: 263). Their local fabric suggests a technological advantage: they are more durable and, because they are open at both ends, they allow honey to be collected several times a year. Consequently, the growth of honey and beeswax production allowed the marketing of these products beyond our survey area.

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About the Authors

Both authors hold PhD degrees from the Universitat de València, Spain. They are specialists on the Iron Age, and particularly in the Iberian Civilization of the Mediterranean coastal region of Spain. Their current research focuses on spatial archaeology and building techniques. C. Mata is a Lecturer in the Departament de Prehistòria i Arqueologia at the Universitat de València, and she is the director of a survey project concerned with the Iberian city of *Kelin* and its landscape. H. Bonet, Curator in the Prehistoric Museum of València, has directed several restoration projects on Iberian sites such as La Bastida de les Alcuses (Moixent, València), Tossal de Sant Miquel (Llíria, València) and Puntal dels Llops (Olocau, València).

Notes

1 These field surveys are part of the investigation project 'The Iberian city of Kelin and its landscape' directed by C. Mata, subsidized by the Institució Valenciana d'Estudis i Investigació 08-42 (1992–93), by the Universitat de València (1994) and by the Generalitat Valenciana GV-2403/94 (1995–97).

2 At La Lloma del Manoll, as at Castellet de Bernabé, it is necessary to distinguish between the Middle Iberian site, situated on the summit of the hill, and the Late Iberian and Roman imperial site, located on its lower part and on the surrounding plain.

3 The dating of occupation at the rest of the sites considered here is very variable and imprecise, making it impossible to say whether they belong to the Middle or Late Iberian period, or even to Roman imperial times.

References

Atrián, P.
1966 Excavaciones en el poblado ibérico El Castellillo (Alloza, Teruel). Cuarta y quinta campañas. *Teruel* 36: 155-207.

Ballester, I., D. Fletcher, E. Pla, F. Jordá and J. Alcácer
1954 *Cerámica del Cerro de San Miguel de Liria*. Corpus Vasorum Hispanorum. Madrid: Consejo Superior de Investigaciones Científicas.

Blázquez, J.M.
1968 Economía de los pueblos prerromanos del área no ibérica hasta la época de Augusto. In *Estudios de economía antigua de la Península Ibérica*, 191-269. Barcelona: Ed. Vicens Vives.

Bonet, H.
1988 La Seña. Villar del Arzobispo, els Serrans. In *Memòries Arqueològiques a la Comunitat Valenciana 1984-1985*, 253-57. València: Generalitat Valenciana.
1995 *El Tossal de Sant Miquel de Llíria: la antigua Edeta y su territorio*. València: Diputació de València.

Bonet, H., P. Guérin and C. Mata
1994 Urbanisme i habitatge ibèrics al País Valencià. *Cota Zero* 10: 115-30.

Bonet, H., and C. Mata
1981 *El poblado ibérico del Puntal dels Llops (El Colmenar) (Olocau, Valencia)*. Trabajos Varios del Servicio de Investigación Prehistórica 71. València: Diputació de València.

Cherry, J.F., J.L. Davis and E. Mantzourani
1991 *Landscape Archaeology as Long-Term History: Northern Keos in the Cycladic Islands from Earliest Settlement until Modern Times*. Monumenta Archaeologica 16. Los Angeles: Institute of Archaeology, University of California at Los Angeles.

Columella
1959 *Los doce libros de agricultura*. Col. Obras Maestras, vol. II. Barcelona: Ed. Iberia.

Conde, M.J.
1992 Una producció ceràmica característica del món ibèric tardà: el kalathos-barret de copa. *Fonaments* 8: 117-69.

Crane, E.
1983 *The Archaeology of Beekeeping*. London: Duckworth.

Cuadrado, E.
1968 Corrientes comerciales de los pueblos ibéricos. In *Estudios de economía antigua de la península ibérica*, 117-42. Barcelona: Ed. Vicens Vives.

Fernández Aragón, M.
1992 Santa (Llíria, València). Notícia i estudi d'un jaciment ibero-romà basat en materials de superfície. *Lauro* 6: 33-43.
1994 Datos para el estudio del poblamiento antiguo—Bronce, Ibérico Tardío y Romano—en torno al Castellet de Bernabé (Llíria, Valencia). *Archivo de prehistoria levantina* 21: 135-53.

Fernández Izquierdo, A.
1995 Presencia de kalathoi en yacimientos submarinos valencianos. *Saguntum: Papeles del Laboratorio de Arqueología de Valencia* 29: 123-29.

Fernández Uriel, P.
1988 Algunas anotaciones sobre la abeja y la miel en el Mundo Antiguo. *Espacio, Tiempo y Forma, Historia Antigua* (serie II) 1: 186-208.

Gregori, J., J. Cucó, F. Llop and M.R. Cabrera.
1985 *Bosc i muntanya, indústria tradicional, comerç i serveis*. Temes d'Etnografía Valenciana III, Col. Politècnica 20. València: Institució Valenciana d'Estudis i Investigació.

Guérin, P.
1987 Le problème de la diffusion des céramiques ibériques peintes dans le sud de la Gaule au IIème et au Ier siècles avant J.C. L'exemple de Ruscino. *Revue archéologique de Narbonnaise* 19: 31-55.
1993 El sombrero de copa: quelques résultats récents. *Documents d'archéologie méridionale* 16: 88-92.
1995 El poblado del Castellet de Bernabé (Llíria) y el horizonte ibérico pleno edetano. Unpublished PhD dissertation, Universitat de València.

Jemma-Gouzon, D.
1989 *Villages de l'Aurès, archives de pierre*. Paris: L'Harmattan.

Jones, J.E., A.J. Graham and L.H. Sackett.
1973 An Attic country house below the Cave of Pan at Vari. *Annual of the British School at Athens* 68: 355-452.

Lillo, P.
1981 *El poblamiento ibérico en Murcia*. Murcia: Universidad de Murcia.

Martín Morales, C. (ed.)
1981 *Cerámica popular de Andalucía*. Madrid: Ministerio de Cultura.

Mata, C., and H. Bonet.
1992 La cerámica ibérica: ensayo de tipología. *Trabajos Varios del Servicio de Investigación Prehistórica* 89: 117-73.

Mateu, I., M.E. Burgaz and J. Roselló.
1993 *La apicultura valenciana. Tradición y aprovechamiento*. Sèrie Divulgació Tècnica 23. València: Generalitat Valenciana.

Molina García, J.
1989 Nuevo tipo cerámico en el ajuar ibérico para miel (consideraciones arqueológico-etnográficas). *Murgetana* 78: 11-18.

Page, V., J.M. García Cano, A. Iniesta and M.J. Ruiz.
1987 *10 años de excavaciones en Coimbra del Barranco Ancho, Jumilla*. Murcia: Consejería de Cultura, Educación y Turismo.

Pérez Jordà, G.
1993 La producció d'oli al món ibèric: l'exemple del Camp de Túria. Unpublished dissertation, Universitat de València.

Pla, E.
1968 Instrumentos de trabajo ibéricos en la región valenciana. In *Estudios de Economía Antigua de la Península Ibérica*, 143-90. Barcelona: Ed. Vicens Vives.

Rosselló, G.
1966 *Museo de Mallorca. Sección Etnológica de Muro*. Guías de los Museos de España 28. Madrid: Ministerio de Educación.

Saglio, E.
1900 *Dictionnaire des antiquités grecques et romaines*, Vol. IV.ii. Paris: Librairie Hachette.

Vaquerizo, D., F. Quesada and J.F. Murillo.
1992 La cerámica ibérica del Cerro de la Cruz (Almedinilla, Córdoba). Departamentos O, P, Ñ. *Anales de Arqueología Cordobesa* 3: 51-112.

Vázquez Hoys, A.M.
1991 La miel, alimento de eternidad. *Gerión, Anejos* 3: 61-93.