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Ceramic production and household organisation of Late Bronze Age communities: forming processes and spatial distribution of the ceramic vessels of Genó (north-eastern Iberian peninsula)*

Producción de cerámicas y organización doméstica en las comunidades del Bronce final: procesos de modelado y distribución espacial de los recipientes cerámicos de Genó (noreste de la península ibérica)

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ABSTRACT

This paper focuses on the reconstruction of forming processes and ways of doing of the Late Bronze Age ceramic productions from the settlement of Genó (Lleida, Spain). An integrated analysis of pottery forming with the typological traits of the ceramic ware and the spatial distribution of the technological data between the houses of this site is proposed. The analysis of manufacturing traces revealed that up to eight hand-made forming processes were used to produce the ceramic wares of several houses of the village. Comparison of typological features with pot-forming processes, as well as their spatial distribution, suggest that the production was carried out by several producers or even several groups of producers. Instead, other work processes of forming were probably shared within the context of ceramic production. Furthermore, certain ways of doing prevail over others located at specific houses or sectors of the settlement. This raises new hypotheses about the social interactions and the household organisation of the communities that inhabited the village of Genó during the Late Bronze Age.

RESUMEN

Este trabajo reconstruye los procesos de modelado y las maneras de hacer de las producciones cerámicas del Bronce final del asentamiento de Genó (Lleida, España). Integra el estudio de los procesos tecnológicos con la tipología de los recipientes y con su distribución entre las casas de este asentamiento. Las trazas de fabricación revelan que se usaron hasta ocho procesos de modelado a mano para producir las vajillas cerámicas de varias viviendas de este poblado. La comparación de la distribución espacial de los recipientes, de sus características tipológicas y sus procesos de modelado sugieren que la producción cerámica estaba a cargo de varios productores o incluso de varios grupos de productores. En cambio, otros procesos de trabajo en el modelado eran probablemente compartidos en el contexto de la fabricación cerámica. Unas maneras de hacer, además, prevalecen sobre otras localizadas en determinadas casas o áreas del asentamiento. Ello permite proponer nuevas hipótesis acerca de las interacciones sociales y la organización doméstica de las comunidades que habitaron el poblado de Genó durante el Bronce final.

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Palabras clave: *tecnología cerámica; procesos de modelado; maneras de hacer; conocimiento técnico; trazas de fabricación; distribución espacial; unidades domésticas; Bronce Final; península ibérica*.

1. INTRODUCTION

The end of the Bronze Age in the north-eastern Iberian peninsula is characterised by a series of social, economic and ideological transformations that continued into the Iron Age and led progressively to the development of socio-economical inequalities and the formation of social elites. These transformations, which began at the end of the 2nd millennium BCE, occurred in a context distinguished by its clear and different social realities.

The diversity of the Late Bronze Age communities from this area is reflected in the settlement patterns, which lack homogeneity and exhibit significant differences between the coastal lands, the western plain and the mountainous areas (*e. g.* Francés and Pons 1998; López-Cachero 1999, 2007; Ruiz Zapatero 2004; Francés 2005; Pons 2014). The funerary spaces also show a wide diversity, for example, in funerary architecture or in the number of graves in the cremation cemeteries (*e. g.* Ruiz Zapatero 1985, 2014; López-Cachero 2008; Pons 2012). In this context, the settlement dynamics emerged in the western lowlands (the Segre-Cinca basins) since the Early Bronze Age highlights for the proliferation of small villages, generally located on hilltops, with a planned layout and the use of stone architecture (López-Cachero 1999; López and Gallart 2002). The settlements of Genó, Carretelà (Lower Segre) (Maya *et al.* 1998, 2001-02) and Vincamet (Lower Cinca) (Moya *et al.* 2005) exemplify this occupation model with a series of juxtaposed houses organised around an open-air central area.

This type of enclosed settlement, containing a variable but significant number of houses, has been considered representative of a higher demographic density in this territory, gathering several domestic groups in the same villages (Moya *et at.* 2005; López-Cachero 2007), possibly with kinship ties (Ruiz Zapatero 1985, 2014; López and Gallart 2002). Each of these villages would have been economically self-sufficient and would have managed and exercised control over its surrounding territory (López and Gallart 2002; Moya *et al.* 2005; Nieto *et al.* 2020). Moreover, judging by the regularity of houses, the absence of strong differences on the domestic implements as well as the scarcity of grave goods on the first cremation cemeteries, these societies have been considered, to a larger extent, egalitarian (López-Cachero 2007).

In addition to research into the settlement patterns and funerary practices, several studies have focused on characterising the economic structure of human groups in this area during the Late Bronze and Early Iron Ages based on the cultivation of crops and livestock husbandry (*e. g.* Albizuri *et al.* 2011, 2019; Alonso and Bouby 2017; Nieto *et al.* 2021), the production and circulation of metals (Rafel *et al.* 2008; Belarte *et al.* 2020) and the evolution of storage systems and their capacities (Prats 2020). Despite these interdisciplinary studies, several questions still remain unanswered concerning the organisation dynamics of these communities as well as about how the production of material goods was organised, such as the ceramic production.

This paper aims to provide new insights into the manufacturing processes of the Late Bronze ceramic productions by focusing on the case of Genó (Aitona, Lleida) (Fig. 1) and the technological analysis of the ceramic ware of this site. More specifically, we centred the analysis on identifying pottery forming processes by examining the manufacturing traces.

The reconstruction of pottery forming processes has emerged as a direct marker of the specific ways of doing and the technical behavior of pottery producers. The learning process of these techniques usually involves an observation and repeated practice exercised through close interactions between apprentices and tutors, during which these technical practices are progressively embedded and modified very little once learnt (Gosselain 2011; Roux 2011; Calvo Trias and García Rosselló 2014). Although cases of technical innovation and borrowing may occur (Gelbert 2003; Roux 2009), forming techniques tend to be more stable and resistant because of the apprenticeship processes they entail. This view is widely supported by several ethnoarchaeological investigations that confirm how ceramic technical practices are reproduced and transmitted among several generations of producers (*e. g.* Pétrequin and Pétrequin 1999; Gosselain 2000; Gelbert 2003; García Rosselló 2008; Calvo Trias *et al.* 2015; Roux 2019). An approach to ceramic productions based on the technical behaviour (reconstruction of pot-building sequences) and the spatial distribution among the houses (production and/or consumption spaces) can therefore provide new evidence on the structure of ceramic production and be used to determine whether the manufacture was carried out by one or more producers or even groups of producers (Gomart 2014; Gomart *et al.* 2015).

The Genó site represents one of the most well-known examples of the Late Bronze Age settlements from north-eastern Iberian peninsula. It has provided pivotal data on the social and economic structure of the Late Bronze Age communities from the western plain (Maya *et al.* 1998; López-Cachero 1999, 2007). Genó also constitutes an ideal case for carrying out a distribution analysis of pottery manufacturing because all the dwellings were excavated (i) and a large part of the layout of the settlement with a single occupation phase is preserved (ii). In addition, this site also stands out for the large number of vessels attributed to each house (iii), which were left in their original place as a consequence of a fire event that destroyed the site (iv) (Maya *et al.* 1998).

This paper focuses on determining whether the ceramic productions of Genó were produced with certain 'ways of doing' or, conversely, if different technical practices coexisted in each of the houses or in specific sectors of the settlement. The combined analysis between the typological traits and the forming processes also allowed us to detect in which products the technical actions varied according to the vessel's shape and size. Based on these results, it has been possible to discuss whether the ceramic production of this site was carried out by one or several producers/groups of producers. Finally, the spatial distribution of the pot-forming processes has allowed us to propose a series of new hypotheses and questions about the ceramic production and household organisation of the community that inhabited this settlement during the Late Bronze Age.

2. THE SETTLEMENT OF GENÓ (AITONA, LLEIDA)

Genó is located in the south of the province of Lleida, in the municipality of Aitona (Fig. 1). The site is positioned on a hilltop at a distance of approximately 50 m from the course of the Segre, near the confluence of this river with the Cinca and the Ebro. At its summit, the settlement would occupy an area roughly 1,000 m^2. Geologically, the hill was formed from a series of horizontal strata of marl, sandstone and limestone.

R. Pita (1958: 44) discovered the settlement in April 1955. It was excavated in 1966 by himself and L. Díez-Coronel on behalf of the *Institut d'Estudis Ilerdencs* (IEI) (Pita and Díez-Coronel 1969). Later, J. L. Maya (1982; Maya *et al.* 1998) carried out nine excavation campaigns, in 1977 and between 1979 and 1985, which focused on all the dwellings, the entrance and some field surveys in the street, which is still largely intact.

According to the available radiocarbon data, the settlement of Genó developed during the Late Bronze Age: 1278-906 cal. BCE 1σ and 1383-837 cal. BCE 2σ (Maya *et al.* 1998: 153-155) (Annex Tab. 1). It is a small village that was inhabited by less than a hundred people. The architecture is characterised by a planned layout defined by an open-air central space[1] (López-Cachero 1999). The access is via the eastern slope, where a series of successive platforms of the geological substratum were fitted out as steps to reach the gate that led to a central street that progressively widened. At the perimeter of the central area a total of 18 juxtaposed houses were built with stone architecture, attached to each other by a series of middle walls. These houses, in turn, were supported by a rear wall, largely lost due to erosion in the south and west sectors, which at the same time constitutes the wall enclosure of the settlement (Maya *et al.* 1998: 55-58).

In general, the construction criterion of the houses is homogeneous in terms of dimensions and structure, since they were built by means of a door in the front façade followed by one or two access steps. The rooves, made of mud-covered twigs, were supported by abundant posts and the internal organisation gave priority to the front areas for domestic activities, opposed to the rear, which was more suitable for rest and storage (Maya *et al.* 1998: 49-54). Apart from the ceramic ware, the material evidence consists of lithic assemblages, millstones and some biotic remains (scarce carpological and faunal remains) that were found in several dwellings of the settlement and show an economic activity based on farming, harvesting and food processing (Maya *et al.* 1998: 160-161; Ollé and Vergès 1998). In this regard, the distribution of these domestic implements would reflect a certain self-management of the majority of the houses.

Only house H-2 breaks the general scheme due to its larger dimensions, atypical floor plan, a large concentration of vessels for consumption and storage and the only evidence of bronze work in the whole site (Rovira *et al.* 1998). In fact, it is not possible to conclude whether it was the residence of a craftsperson with a certain social status (Maya *et al.* 1998: 168) or rather a communal space where different tasks were carried out, as well as the storage of certain products[2]. Therefore, we cannot rule out that the productive activities of this house went beyond the domestic sphere.

Although the community of Genó built the settlement to ensure its durability, they were forced to abandon it due to a fire. As a result, the archaeological material appears *in situ*, the stratigraphic excavation was very simple and the degree of preservation and the quantity of ceramics was exceptional. All in all, the case of Genó constitutes a good example of domestic materiality.

[1] This planned layout is also defined as enclosed settlements.

[2] F. J. López-Cachero. *Estudio de la habitación 2 de Genó: una aproximación al conocimiento del espacio doméstico de las comunidades de CC.UU Antiguos en el Bajo Segre*. Unpublished dissertation. Universidad de Barcelona. Barcelona, 1998.

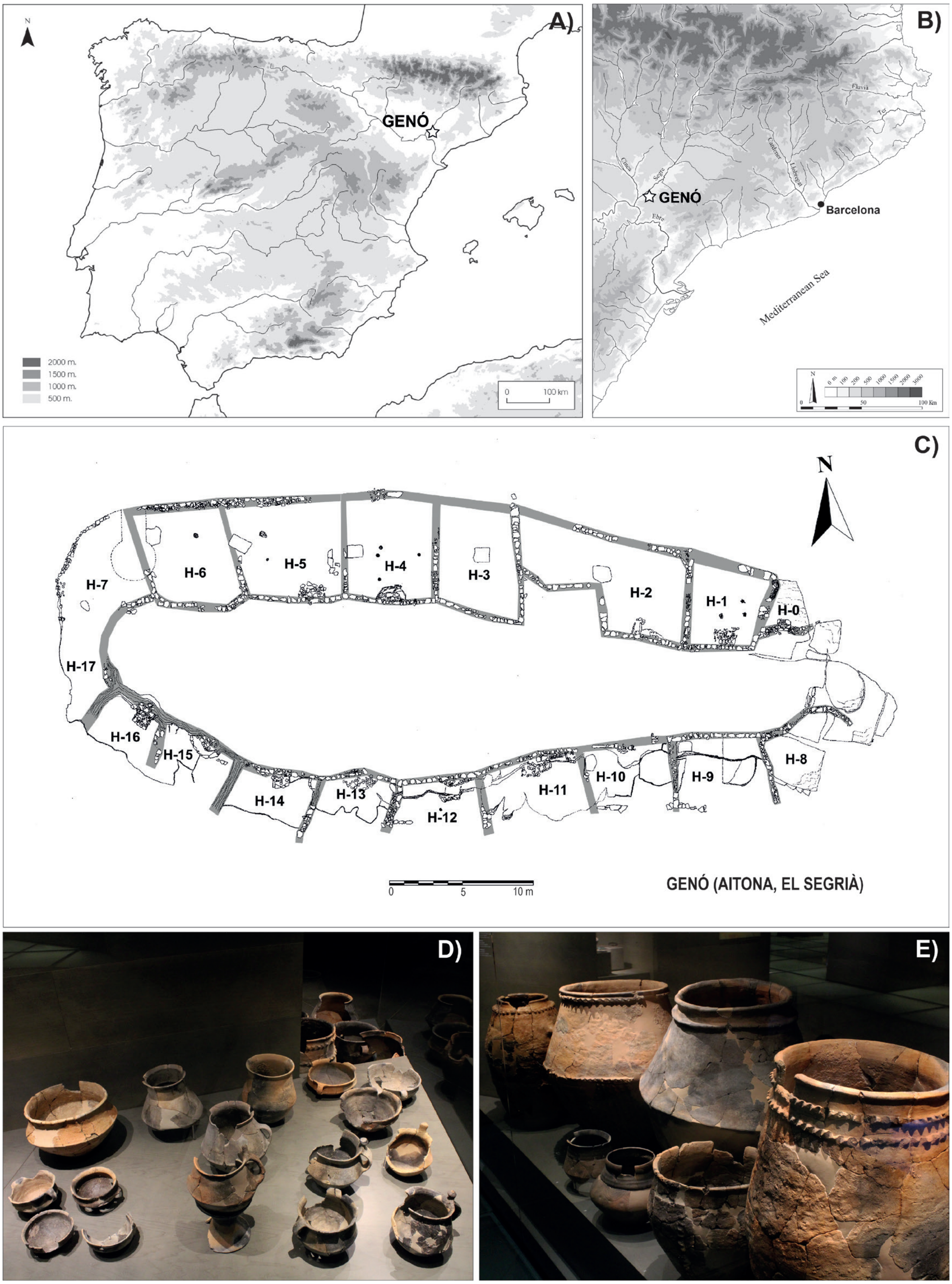

Fig. 1. Location of Genó (Aitona, Lleida) in the north-eastern Iberian peninsula (A, B). Plan of the Genó settlement and H Houses (C). Carinated vessels (D) and jars (E) of the site exhibited in the permanent collection of *Museu de Lleida* (MLL). Plan of Genó provided by F.J. López-Cachero and ceramic photography provided by J. Cámara. In colour in the electronic version.

3. MATERIALS AND METHOD

3.1. Vessels analysed

The ceramic assemblage from the settlement of Genó encompasses a total of 577 elements (vessels with reconstructed profiles, rims, bases and individual grip elements) from the rooms and the entrance to the settlement (Annex Tab. 2). In total, 7 basic types can be distinguished from a total of 242 vessels with reconstructed profiles from the different rooms of the settlement[3] (Maya *et al.* 1998) (Fig. 2).

The technological study is based on a number of vessels with diagnostic traces from practically all the dwellings of the settlement (houses H-1 to H-16). The analysed vessels correspond to the referenced ceramics published in the monograph of the site (Maya *et al.* 1998) and currently deposited in the collection of the *Museu de Lleida* (MLL) (Fig. 1D-E). Out of an estimated number of 275 ceramic vessels, a total of 189 vessels with a partially or completely preserved profiles were analysed (Annex Tab. 2). Of these, 171 could be assigned to a forming sequence. This sample encompasses several vessel types, ranging from small to large-sized vessels with different shapes: opened carinated profiles (F1), non-carinated opened profiles (F2), non-carinated closed profiles (F3), biconical supports (F5) and profiles with necks (F6). The majority correspond to unrestored vessels from the museum collection, while several of the analysed vessels are currently on display in the permanent exhibition (MLL)[4]. For the latter, the selection criteria focused on the access to both the inner and outer surfaces, the development of diagnostic linear fractures and the accessibility to transversal fractures. In addition, a total of 14 base profiles and 83 grip elements (65 associated with vessels) were analysed, which provided information on the forming process of specific parts of the vessels.

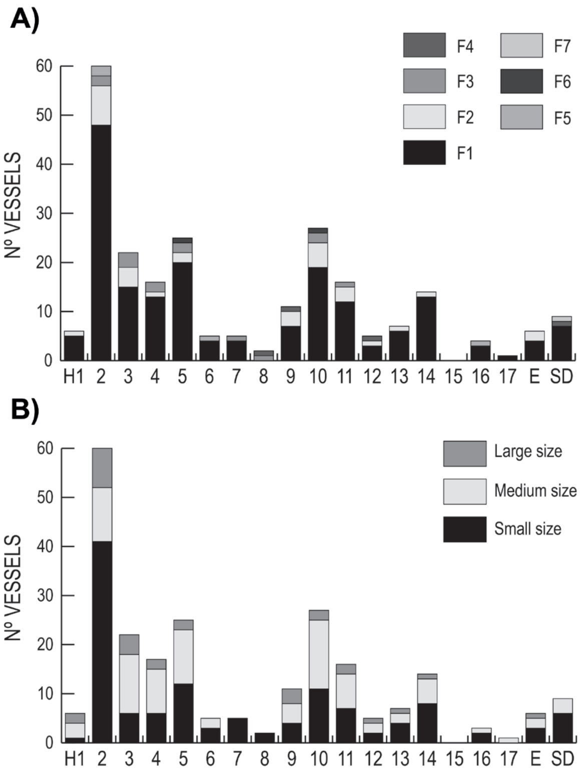

Fig. 2. Total number of vessels with reconstructed profiles from each house (H1-H17) at Genó according to their shape (A) and size (B). E = vessels recovered from the entrance to the settlement. SD = vessels without a referenced location (previous excavations to 1977). The numeric code (F1 to F7) refers to the type of vessels: F1 = carinated profiles; F2 = S-shaped opened profiles; F3 = closed profiles; F4 = opened profiles; F5 = biconical supports; F6 = profiles with neck; F7 = closed carinated profiles.

3.2. Technological analysis based on examining manufacturing traces

The technological approach has focused on identifying the forming processes of the ceramic ware of Genó. This work did not consider other phases of their manufacture, such as the acquisition and management of raw materials, or surface treatments and firing.

The analysis of technological traces on ceramic vessels has (re)emerged as a valuable referential framework to reconstruct the techniques used in the pottery manufacturing processes (*e. g.* Livingstone Smith 2007; García Rosselló and Calvo Trias 2013; Roux 2019; Thér 2020). Manufacturing traces were recognised by means of macroscopic observations, optical microscopes of low magnifications (5x-8x) and angular lighting. The recording system of traces is based on two methods that allow us to systematically describe macro-traces and the internal structure of vessels in the radial plane (Livingstone Smith 2007; García Rosselló and Calvo Trias 2013; Cámara 2019).

We used a combined analysis of macro-traces to determine the forming techniques with which the initial

[3] The description of the seven basic types has been included in the Annex Materials and methods.

[4] Several ceramic vessels are currently on display at the *Museu de Lleida* (MLL) (n=44) and the *Museu d'Arqueologia de Catalunya-Barcelona* (MAC) (n=13). The vessels currently located in the MAC-Barcelona have not been analysed and included in this work, excluding only the jar H-10/27 which has several potsherds preserved in the collection of the *Museu de Lleida*. Data provided by Dr. Carme Berlabé (museum curator, MLL).

volume of vessels is obtained (primary forming techniques, auxiliary techniques, construction sequences and reinforcements) (García Rosselló and Calvo Trias 2013). We also determined the techniques with which the surfaces were modified and the vessel shape obtained. The ordered sequence of techniques and elementary gestures used on each part of the ceramic vessels (base, belly, shoulder and rim) enabled us to reconstruct the forming methods, or forming sequences, used to produce the ceramic vessels (Roux 2011, 2019). These techniques were interpreted based on the correlation of traces and their comparison with a series of referential collections, both experimental and ethnoarchaeological (Rye 1981; Martineau 2005[5]; Gelbert 2003; Livingstone Smith 2007; García Rosselló and Calvo Trias 2013, 2019; Lara 2017; Roux 2019; Pétrequin 2020).

3.3. Quantitative analysis of the measurements of the assembled elements

In order to establish whether the assembled elements used on each forming sequence quantitatively vary, the height and their corresponding thickness (*i. e.* wall-thickness at the point of the height measurement) were measured in the cross-sections in both the upper and lower belly of each vessel.

Since the ceramic assemblage contains vessels with variable shapes and sizes, the measurements of the assembled elements have been compared according to the proportions of the vessels: small size (vessels up to 2 l), medium size (capacity ranging from 2 to 16 l) and large size (from 18 to more than 60 l) (Annex Tab. 3).

The height and thickness values were first compared with a scatter plot according to each forming technique. In order to statistically compare the measurements of each group according to their forming sequence and the vessel's size, the equality of variances was evaluated with the Levene's test, and the Welch's test (ANOVA) was used when variances were unequal, both with a probability threshold of $\alpha = 0.05$ (Hammer *et al.* 2001). The distribution of the values in the box plots also allowed us to assess the similar and different distribution patterns of the measurements of each forming sequence, as the interquartile range and the median are represented in each box.

[5] R. Martineau. *Poterie, techniques et sociétés. Etudes analytiques et expérimentales à Chalain et Clairvaux (Jura), entre 3200 et 2900 av.J.-C.* Ph.D. Thesis inédite. Dijon: Université de Franche-Comté. Dijon 2000.

3.4. Spatial distribution of pot-forming sequences

The spatial distribution of the pot-forming sequences is based on previous work in which forming processes were analysed with multivariant statistics and were plotted at intra-site scale for each house (Gomart 2014). First, the frequency of techniques for each dwelling has been shown in the plan of the settlement. Here, the distribution of large vessels was added to the spatial analysis since the majority of houses contained at least one jar and 23 out of a total of 28 large-sized vessels were analysed. Second, the Correspondence analysis (CA) was used to test the degree of closeness or remoteness of each forming sequence with regard to each house. Forming processes were finally plotted in a second plan of the settlement, according to the discussion derived from the obtained results.

4. RESULTS

4.1. Reconstruction of forming processes

The analysis of macro-traces enabled us to reconstruct the forming techniques and methods (Tab. 1) and the attachment systems of grip and secondary elements (Tab. 2). At least eight forming sequences have been identified at Genó (GA1 to GA8)[6].

The first forming method (GA1) is characterised by the base forming with a spiral coil using discontinuous digital pressures. The belly, the shoulder and the rim are entirely built using coils (partially or non-deformed) with slightly internal and external overlapping. The surfaces were modified by scraping, leading in occasional cases to trimming, whilst some vessels were shaped using digital pressures and in a single jar an outer layer of clay was added to the external surface.

The second forming method (GA2) comprises vessels built with the coiling technique from the base to the rim, which were then shaped with the beating technique.

Bases and the lower belly of vessels associated with the GA3 method were formed by moulding over a convex support and hammering the outer surface. The upper belly and the rim were subsequently built using the coiling technique similar to the previous forming methods.

The fourth method (GA4) presents a series of traces suggesting the use of a concave support to shape by compression the lower parts previously formed with

[6] Annex Results (I) presents a complementary description of the eight forming sequences and the catalogue of traces associated with each forming method (Annex Fig. 1 to 7).

the coiling technique. The upper parts and rim were also formed with coils and some vessels were also beaten once the support was removed.

Ceramic vessels produced with the GA5 forming method are characterised by the use of thick coils in a spiral for building the base and thick superimposed coils for building the belly and rim. Likewise, coils were slightly overlapped from the inner and outer wall. This system using thick coils shows clear parallels with the current ceramic productions of the Komba ethnic community from north-eastern Ghana (Calvo Trias and García Rosselló 2012; Calvo *et al.* 2016; Javaloyas *et al.* 2018).

The sixth forming sequence (GA6) comprises a number of vessels with macro-traces that evoke the use

FORMING METHOD	Nº VESSELS	BASE FORMING	BELLY FORMING	SHOULDER FORMING	RIM FORMING	SHAPING TECHNIQUES
GA1	74	Coil in a spiral (subcircular configurations in the cross-sections) (n = 14)	Coils partially or not deformed, with an oblique alternate overlapping (C/Z/S-shaped configurations in the cross-sections)		Last coil with internal overlapping (n = 14), external overlapping (n = 20) or superimposed (n = 12)	Scraping (n = 15), trimming (n= 5) or adding an external layer of clay (n = 1)
GA2	53	Coil in a spiral (subcircular configurations in the cross-section) (n = 13)	Forming process with coils, then shaped with the beating technique (flat areas on the external surfaces and vertical foliated configurations in the cross-sections with oblique/subcircular deformed configurations)		Last coil with internal overlapping (n = 8), external overlapping (n = 9) or superimposed (n = 13)	Beating the external surface of the belly (n = 41) and shoulder (n = 33)
GA3	5	Moulding over a convex support and hammering the external surface (n = 4) (vertical configurations in the cross-sections, regularity of the profile and flat areas on the external surface)		Coils slightly or not deformed (S/Z-shaped configurations)	Last coil with internal (n = 3) and external overlapping (n = 1)	
GA4	11	Coils shaped by compression against a concave support (oblique configurations in the cross-section, an individual wavy variation on the external surface and hemispherical depressions on the internal surface of the belly)		Coils slightly or not deformed (S/Z-shaped configurations)	Last coil with internal overlapping (n = 4), external overlapping (n = 4) or superimposed (n = 1)	Once the support was extracted, the external surface of the belly was beaten (n = 8)
GA5	7	Thick coil in a spiral (subcircular configurations), with a lateral added coil (n = 1)	Very thick superimposed coils (O-shaped configurations), placed towards the inner and the outer wall		Thick coils with internal overlapping (n = 2) or superimposed (n = 4)	
GA6	15	Forming with assembled elements (possible a large spiral coil or slabs) (n = 5)	Slabs or very elongated elements, modified with discontinuous pressures (spaced horizontal variations and regular fractures, vertical divisions in the same row and long oblique/vertical configurations in the cross-sections)		One or two assembled coils with internal overlapping (n =5), external overlapping (n = 3) or superimposed (n = 1)	
GA7	2	Preserved in both cases, not determined	Slabs or large assembled elements, shaped with the beating technique once were built (horizontal and vertical regular fractures and concavities on the external surface of the belly)		One or two assembled coils	Beating the external surface of the belly and shoulder
GA8	4	Thick coil in a spiral (subcircular configurations in the cross-sections) (n = 2)	Forming process with thick coils, then shaped with the beating technique (flat areas on the external surfaces and vertical foliated configurations in the cross-sections, with an oblique to vertical orientation of pores and particles)		Horizontal coils (n = 2)	Beating the external surface of the belly
TOTAL	171					

Tab. 1. Reconstruction of pottery forming sequences identified at the settlement of Genó-Aitona (GA).

	ATTACHMENT SYSTEMS			AUXILIAR TECHNIQUES	TOTAL
	SH	PI	CI	DR	
Button appendix handles	0	2	7	0	**9**
Handles (oval section)	0	5	14	0	**19**
Cordons	44	3	0	0	**47**
Drilled lugs	0	0	0	12	**12**
Circular lugs	0	2	0	0	**2**
TOTAL	**44**	**12**	**21**	**12**	**89**

Tab. 2. Grip and secondary elements associated with the insertion systems. SH = Simple hooking; PI = Partial insertion; CI = Complete insertion; DR = Uni/bi-directional drillings

of very elongated elements or slabs. These elongated elements can be juxtaposed in horizontal rows to build the belly (Rye 1981; Vandiver 1987; Roux 2019) and be superimposed or internally overlapped over each other (Thér *et al.* 2019). Slabs were modified with discontinuous digital pressures whilst the rim was formed with one or two coils.

Method GA7 was only identified in two cases were large assembled elements or slabs were also used for building the belly, though they were distinguished from the GA6 method since the vessels were shaped using the beating technique. Indeed, the integration of both techniques within the same forming practices is observed in the modern-day communities from southern India (Degoy 2005).

Vessels formed with the GA8 method represent those vessels formed with thick coils which were then shaped using the beating technique. This method was determined by comparing the coils measurements of the GA2 method, which revealed the use of higher and thicker coils compared to the rest of vessels (see section 4.2 and Annex Results (II)).

Forming sequences also include vessels that present handles and plastic elements attached to the walls following different systems. Oval section-handles and cylindrical button appendixes, a type of appendix handle that has been found widely throughout the Segre-Cinca region (Capuzzo and Achino 2017), were commonly attached using a complete insertion by drilling the walls or by drilling the upper part of the handles. Instead, lugs and digitally impressed cordons were generally joined following a simple hooking on the walls or ocassionally with a partial insertion.

4.2. Quantitative variability of the height and thickness of the assembled elements

The forming methods identified by analysing the macro-traces were quantitatively compared by measuring the height and thickness (*i. e.* wall-thickness) of the assembled elements used in each of the forming sequences[7]. The distribution of values (height and thickness) in the box plots (Fig. 3) and scatter plots (Annex Fig. 8) shows an unequal but variable distribution according to each type of assembled elements: mainly between slightly or non-deformed coils (i), thick coils (ii) and very elongated elements or slabs (iii).

The coils measurements assigned to methods GA1 and GA2 tend to be distributed together, with a progressive increase in both the coil thickness (axis Y) and height (axis X) in the scatter plot (Annex Fig. 8). The distribution of coil values associated with GA3 (upper belly) and GA4 also show a similar distribution to the previous methods. Furthermore, the boxplots (Fig. 3) illustrate a progressive increase in the coil height and thickness according to the vessels' size (GA1 and GA2).

Vessels built with thick superimposed coils (GA5) tend to increase both the height and thickness of coils, especially when compared to the previous forming methods (Fig. 3 and Annex Fig. 8). Moreover, some small-medium sized vessels shaped with the beating technique (GA2 outliers) were detected with similar values to the GA5 method. Given that they differ from GA5 in the shaping process and present higher and thicker values compared to the rest of vessels of GA2 method, it is possible to assign these vessels to another forming sequence (GA8).

The use of slabs (GA6) follows another distribution, with very elongated and higher elements than the coils used in the other forming methods (Annex Fig. 8). Simultaneously, these elements are not as thick and show similar thickness values to the rest of the vessels from other methods (see Fig. 3).

Excluding some outliers for both height (GA2) and thickness of coils (GA2 & GA4) (Fig. 3), the results of the unequal-variance test (Welch's ANOVA test) (Annex Tab. 4 to 7) confirm that significant differences existed between the means of the height and thickness of the assembled elements analysed according to their corresponding forming methods (i) as well as the vessel sizes in the case of GA1 and GA2 methods (ii).

[7] A complementary description of the quantitative analysis of the assembled elements is presented in Annex Results (II).

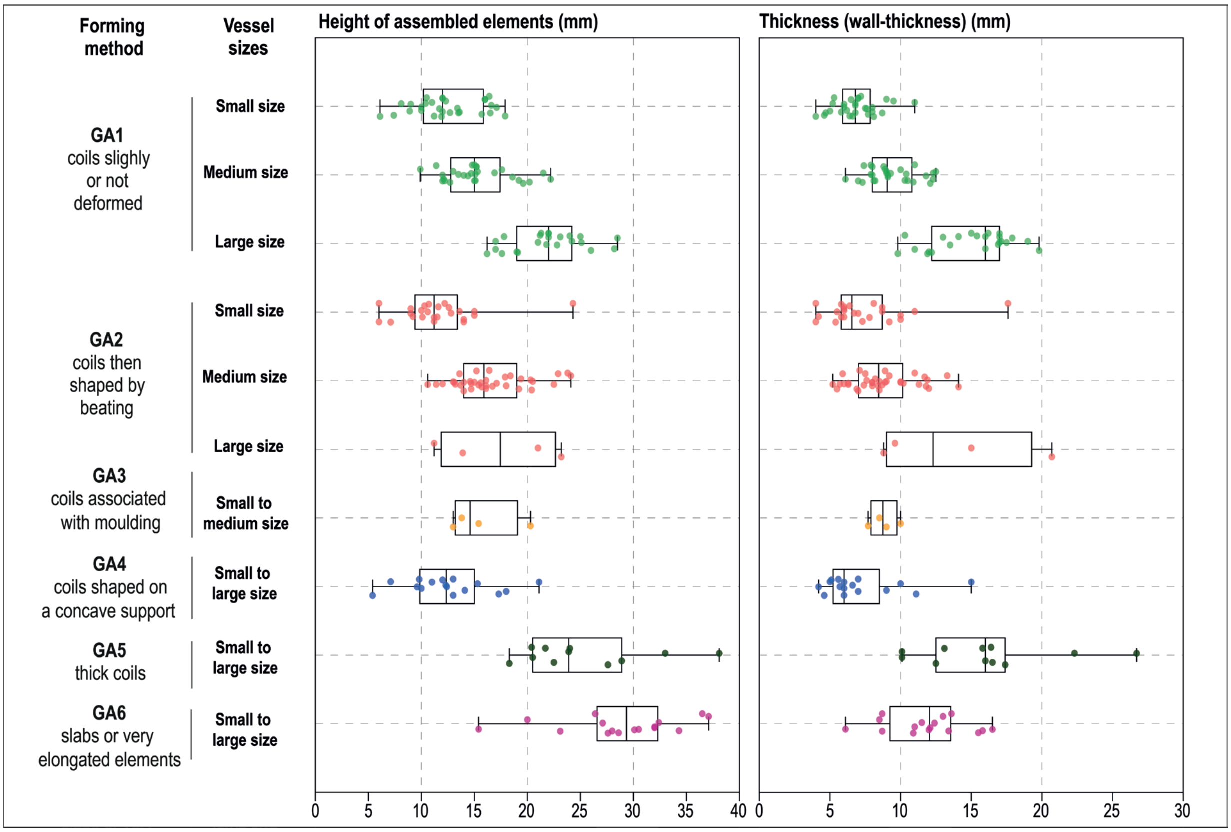

Fig. 3. Box plot of the height and thickness measurements of the assembled elements from the ceramic vessels of Genó according to their forming methods. Methods GA1 & GA2 were also compared to the vessel's size, while the methods GA3 to GA6 were included within a single group due to the low quantity of measurements. In colour in the electronic version.

4.3. Comparison of pot-forming processes with the vessels' shapes and sizes

The cross-analysis of the eight forming methods with the shape (Fig. 4A) and size (Fig. 4B) of the vessels with reconstructed profiles show some associated patterns according to each forming sequence. The first two methods (GA1 and GA2) represent the largest number of vessels analysed, and therefore comprising diverse shapes and sizes. Nonetheless, GA1 is used on small to large vessels and on three of the most prevalent shapes in the ceramic assemblage: opened carinated profiles (F1), non-carinated opened profiles (F2) and non-carinated closed profiles (F3). In contrast, GA2 predominates in small-medium sized vessels and it is almost exclusive to the carinated profiles (F1).

Similarly, GA3 and GA4 are used in the production of small and medium vessels and only in a large-sized vessel from H-2, which features the use of an external support to sustain the lower part during the forming. In addition, the two methods are used exclusively in the production of carinated vessels (F1).

GA5 and GA6 include small to large-sized vessels with different shapes, although the quantity of vessels is lower compared to GA1 and GA2. While GA5 is used for the shapes F1 to F3, GA6 is employed on the shapes F1, F2, F3 and F6 (profiles with neck). It should be noted that one of the biconical supports analysed (F5) is also produced with very elongated elements or slabs (GA6). In the case of GA7 and GA8, the former has been used in two medium-large sized vessels with carinated profiles (F1) and the latter in small-medium sized vessels with carinated profiles (F1).

Following these results, two dynamics can be observed within the ceramic manufacturing processes at Genó (Annex Fig. 9):

a) Methods GA1, GA5 and GA6 are interchangeably used in the production of small to large-sized vessels and comprise different types of vessels: shapes F1 to F6.

b) Methods GA2, GA3, GA4, GA7 and GA8 are generally used on small-medium sized vessels and on a small number of jars. These methods in turn are practically restricted to vessels with carinated profiles (F1).

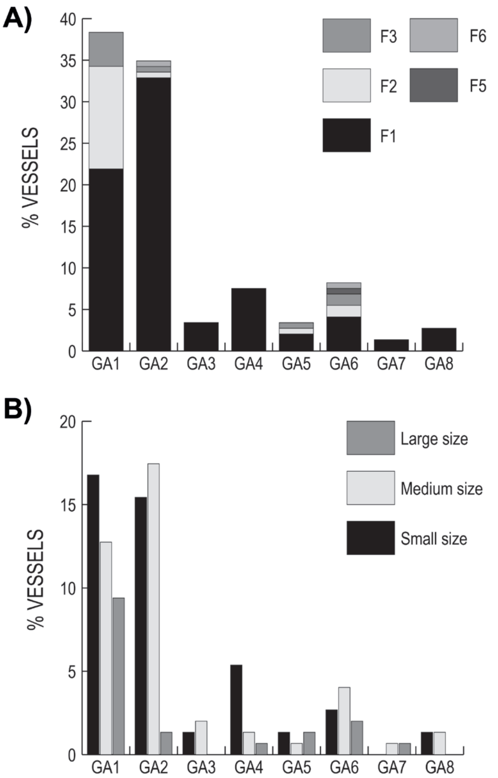

Fig. 4. Percentage of vessels attributed to each of the eight forming methods (GA1-GA8) identified at Genó, according to their shape (A) and size (B). Total number of vessels included in the diagrams: 146 (A) and 149 (B).

4.4. Distribution of pot-forming methods at intra-site scale

The spatial distribution of pot-forming methods was carried out based on the houses that contained a representative number of ceramic vessels. The data collected come from the northern (H-1 to H-6) and southern (H-9 to H-15) houses, while the houses that flanked the entrance (H-0 and H-8) and the west side of the settlement (H-7, H-16, H-17) did not yield a significant ceramic assemblage and consequently a very low number of vessels were analysed.

The distribution in the plan of the settlement shows that a large proportion of vessels produced using GA1 and GA2 are located throughout the site, in the northern and southern houses. The other forming sequences (GA3 to GA8) comprise a minor quantity of vessels and exhibit distinct distributional patterns[8]. By combining the reading of the correspondence analysis (Annex Fig. 11, Annex Tab. 8-9) with the global distribution of forming methods as well as the distribution of large-sized vessels according to their forming (Annex Fig. 10), the houses can be classified as follows:

a) Houses H-1, H-2, H-3, H-9 and H-10, where GA1 and GA2 clearly predominate, although other methods are detected within this group:

House H-2, where vessels produced with the GA4 and GA8 methods are identified.

Houses H-3 and H-10 where some vessels produced with slabs (GA6 and GA7) are documented.

House H-3, where a jar with an added outer layer of clay is also documented.

b) Houses H-4, H-14 and H-15, with ceramic assemblages characterised as mixed (GA1, GA2, GA5, GA6 and GA8), but with one of the larger vessels produced with GA5 in H-4 and H-14.

c) Houses H-5 and H-6, dominated by GA1 and GA2, but with vessels produced using GA6 and the jars produced with GA1 and GA6 (H-5).

d) Houses H-11, H-12 and H-13, characterised by the importance of GA6, although they have other vessels produced with other methods, excluding the jars: GA1, GA2, GA3 and GA4. Here it is worth mentioning that H-13 has vessels produced with GA8.

e) In addition, the vessels recovered from the entrance to the settlement are characterised by GA1, GA2 and GA4 methods.

5. DISCUSSION

5.1. Ceramic production and technical practices at Genó

The analysis of traces, based on both qualitative and quantitative attributes, was used to identify up to eight pot-forming sequences, distinguished by the primary forming techniques used to build the base and the belly (thin to thick coils, very elongated elements or slabs, moulding over a convex support) and the techniques employed to modify the surfaces and shape the vessels (scraping, trimming, beating and shaping by compression against concave supports).

Several forming methods share the same primary forming technique (GA1 and GA2, using thin or partially deformed coils; GA5 and GA8, using thicker coils; GA6 and GA7, with the use of very elongated elements or slabs) and only vary among them by the subsequent use of the beating technique (in this case, GA2, GA7 and GA8). In fact, similarities between methods GA1-GA2 and GA5-GA8 can also be observed respectively when the height and thickness of coils are measured, as they share similar values that only vary significantly according to the vessel's size. Thus, we infer that the

[8] A detailed description of the spatial distribution of forming methods has been added in Annex Results (III).

only difference between these respective pot-building sequences corresponds to the use, or not, of the beating technique. The other methods are distinguished by moulding the lower belly and base, while the upper part is formed with coils (GA3), and by building the vessels with coils (thin or slightly deformed) and then shaping by compression on a concave support (GA4). Both forming methods share similar coils measurements and use a similar procedure to GA1-GA2. In GA3 method, hammering was also used during moulding, while in GA4 method the beating technique was used once the vessels were extracted from the support.

These results, which reflect technical variations in the primary forming techniques and the shaping techniques, may indicate that the techniques with which the volume of vessels was obtained would correspond to structural processes (Calvo Trias and García Rosselló 2014), *i. e.* techniques linked to several learning networks and probably related to different producers (Roux 2011, 2019). In turn, the shaping techniques, among which highlights the beating technique used in several forming sequences, might have been part of a secondary process (García Rosselló and Calvo Trias 2013: 432-434), learnt in several apprenticeship networks or also shared within the context of ceramic production.

These interpretations are further supported when the technological data is compared with the shapes and proportions of the ceramic ware. The building sequences in which the beating technique is used (GA2, GA7 and GA8) are practically restricted to carinated profiles (type F1) and are mainly used to produce small-medium sized vessels, excluding a few exceptional cases of jars (Annex Fig. 9). This also occurs in the case of GA3 and GA4, which are basically used to produce small and medium vessels with carinated profiles. In contrast, GA1, GA5 and GA6 comprise a number of vessels with variable proportions (small to large vessels) and different shapes (types F1 to F6) with which several needs could have been covered; for instance, the consumption, preparation, storage or even transportation of food products (Clop 2002). Thus, it seems that potters used the same forming techniques to produce the vessels with variable shapes and sizes while they generally applied the beating technique to shape the carinated vessels of small and medium size. Moreover, we can also observe that potters also shared other technical processes regardless of the primary forming techniques, such as the insertion systems of grip elements.

Based on this evidence, it is possible to infer that the production of the ceramic ware of Genó was carried out by at least three groups of producers, who used distinct technical practices (use of partially or not deformed coils, very thick coils, slabs or very elongated elements), but who shared other working processes, among which the beating technique and the attachment systems of grip elements. Therefore, grouping the forming sequences according to their primary forming, we observe that the ways of doing GA1 and GA2 comprise the 73.86% of the volume of vessels analysed, followed by the GA6-GA7 and GA5-GA8, which represent 10.8% and 6.25% respectively.

In contrast, GA3 (moulding over a convex support and coiling) and GA4 (coiling and then shaping by compression on a concave support) normally involve other operational schemes and thus other learning processes compared to the previous forming sequences (García Rosselló and Calvo Trias 2013: 432). Although the apprenticeship of the moulding processes can be faster (Gelbert 2003; Roux 2019: 267-269), these forming methods, that both also include the use of coils, might have been practiced either by independent individual producers or even by one of the groups of producers. Given that we cannot ensure that GA3 and GA4 strictly belonged to one of the aforementioned groups, we can state that they represent 2.84% and 6.25% of the sample of vessels analysed.

5.2. Contributions to the structure of ceramic production and distribution within the settlement

5.2.1. Issues concerning the contexts of production and household organisation

Before assessing the spatial distribution of the ways of doing, several issues regarding the production contexts and the households must be considered.

Firstly, the houses that preserve a large part of their layout are composed of a ceramic assemblage with variable shapes and sizes as well as a significant number of carinated profiles in all houses (Fig. 2). Although the quantity of vessels is unequal among the houses, this distribution indicates that several activities were carried out in each dwelling, among which food preparation or processing and storage practices (Maya *et al.* 1998: 108-111). Other material evidence reveals economic activities related to farming and harvesting (carpological remains and use-wear analysis of lithic tools) (Ollé and Vergès 1998; Alonso 1999) as well as food processing (millstone artefacts) in several houses (Maya *et al.* 1998: 83-84). All this evidence would be indicative of a certain degree of self-management of the houses and would suggest that a portion of their ceramic wares was also produced on a domestic scale (Maya *et al.* 1998:160), probably in order to cover several of their subsistence and social needs (Clop 2002, 2019).

Secondly, the production and distribution of large jars, potentially usable for storage practices, deserve some separate comments. The building process of large jars demands a higher investment of time and work compared to the production of other vessel sizes (i) (Brodà *et al.* 2009), so their production was probably more eventual (ii). Furthermore, due to their size and weight, they are more fragile and less movable vessels (iii) (Skibo 2013: 28). Given that a significant number of houses contained from one to four large vessels[9], excluding here house H-2 with up to eight jars, it is most likely that they were produced at the scale of the settlement (Maya *et al.* 1998: 166). This would indicate that each house was also responsible for the production of their storage vessels for their own use. It is therefore possible that part of the ceramic production of Genó was local and carried out at the scale of the settlement. However, as Maya *et al.* (1998: 160) mentioned, these possibilities need to be proven by analysing the mineralogical composition of the ceramics and the sourcing areas of raw materials.

5.2.2. Distribution of ways of doing among the houses

Based on the preceding issues, a high proportion of vessels and jars produced with certain ways of doing can be considered representative of the prevalent technical practices in each house. By analysing the spatial distribution of the ways of doing, grouped according to their primary forming techniques (GA1-GA2, GA5-GA8, GA6-GA7) (Fig. 5), several hypotheses can be proposed to explain the technical variability in each sector of the settlement:

(1) The predominance of the ways of doing GA1-GA2 in the northern (H-1, H-2 and H-3) and southern (H-9 and H-10) houses, to the east of the settlement, as well as the production of jars with the same pot-building processes probably indicate that the inhabitants of these houses shared the same technical know-how. These houses, however, contain some vessels produced with other forming sequences: H-10 with vessels made with GA4 and GA6, H-2 with vessels built with GA8, and H-3 with one of the vessels produced using GA7. In addition, one of the jars from H-3 was also formed by adding an outer layer of clay. This low quantity of vessels produced with other ways of doing may also indicate that these houses contained and probably used ceramic vessels not necessarily produced by themselves.

(2) The northern houses from the centre of the settlement (H-4 and H-5) are also characterised by the GA1-GA2 methods and the production of one of the jars with these ways of doing, indicating a probable connection with the producers linked to these technical practices. However, some vessels and the other large jar produced with other ways of doing were detected: in H-4 some vessels and one of the jars were produced with GA5-GA8 while in H-5 at least one of the vessels and the second jar were produced with GA6. This mixed composition of the ceramic ware in terms of ways of doing might thus reflect that producers with distinct forming practices cohabited in these houses (i) or that there were systems of cooperation and supply of vessels (including jars) at the scale of the settlement (ii).

(3) The southern houses, in the centre of the settlement (H-11 to H-13), contain a significative number of vessels and the jars produced with GA6-GA7, although vessels associated with GA1-GA2 (excluding large vessels) also prevail in their ceramic assemblages. Likewise, house H-13 contains two thick vessels associated with GA8. The fact that several vessels and remarkably the jars were produced with GA6-GA7 strongly suggests that the southern houses were settled by producers linked to these technical practices. Here it must be added that other ceramics from these houses or even H-5 might have been produced with slabs (GA6), but this technique can hardly be distinguished from other forming processes in small-medium vessels (Roux 2019: 166-168) and hence from some vessels produced with slightly more elongated coils (GA1-GA2). Moreover, the erosion of the southern houses, which signifies an approximate loss of a third of the layout, might have also affected the preservation of the number of pots and consequently the ways of doing may not be completely represented at a quantitative level.

(4) The western houses of the settlement were the most affected by the erosion and the construction of a modern building over houses H-6 and H-7 (Maya *et al.* 1998: 34-37). Consequently, these houses did not provide a significant quantity of vessels. In house H-6 several vessels were built with GA1-GA2 and only one of the vessels (biconical support) was produced with GA6, which may suggest that this house was associated with these ways of doing. Houses H-14 and H-15, characterised by the GA1-GA2 and GA5, with a large vessel also produced with GA5, were most probably linked with producers that used these technical practices. Ultimately, in H-7 and H-16 a few vessels associated with GA1-GA2 were recognised, although the number of preserved and analysed vessels from these spaces is very small and cannot be conclusive at this level of the analysis.

[9] Large vessels with a capacity ranging from 18 to more than 60 l (see Annex Tab. 3 and Annex Fig. 8).

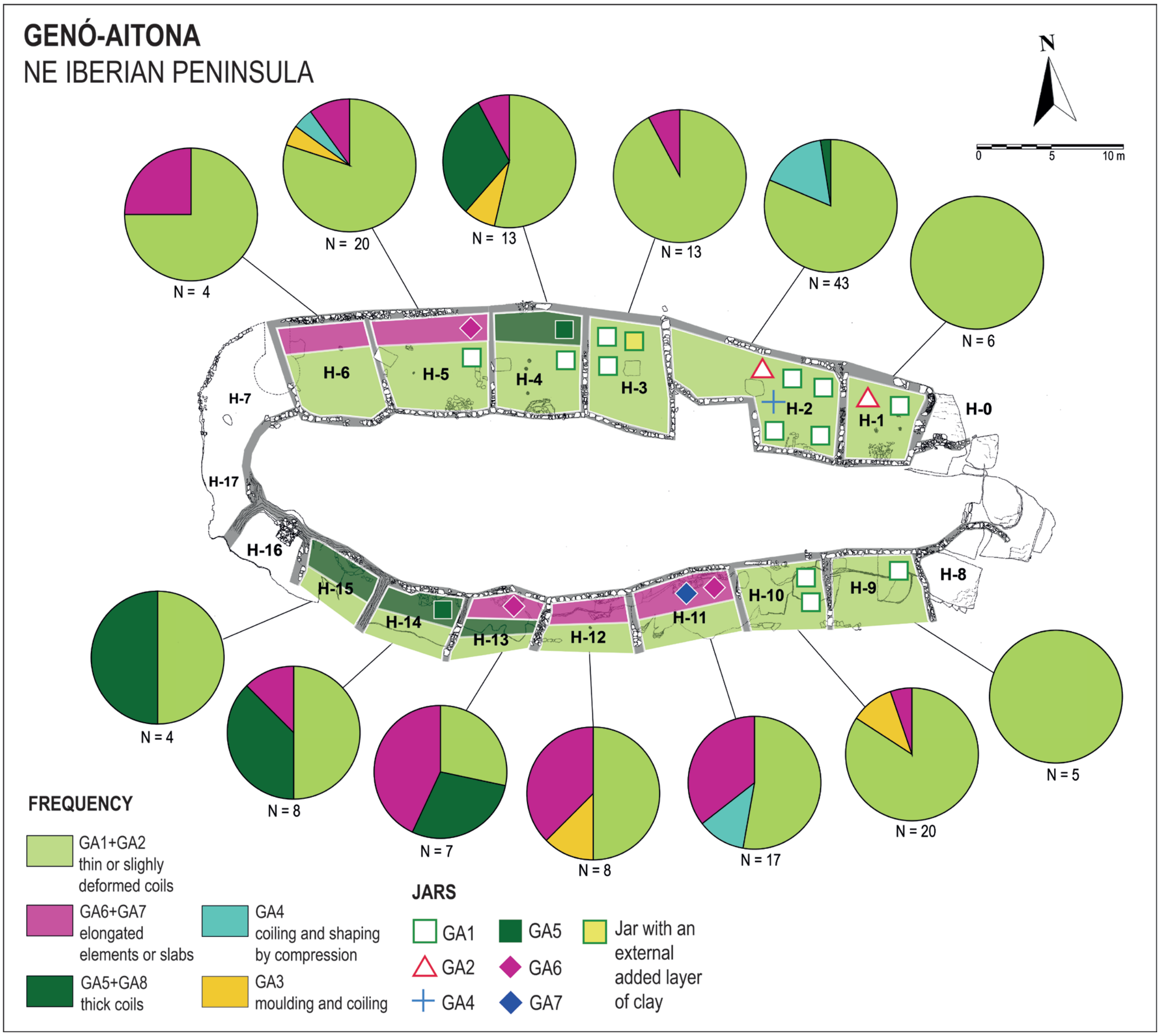

Fig. 5. Spatial distribution of the prevalent pot-forming sequences, grouped according to their primary forming, and the distribution of large vessels in each house at Genó-Aitona (GA). Frequent forming methods: GA1+GA2, GA6+GA7, and GA5+GA8. Houses with other forming methods: GA3 in houses H-4, H-5, H-10 and H-12, and GA4 in houses H-2, H-5 and H-11. In colour in the electronic version.

It should be noted that the northern (H-4 and H-5) and southern (H-11 to H-14) houses from the centre of the site contain heterogeneous ceramic assemblages in terms of ways of doing. This suggests that the individuals of these spaces may have produced and consumed their own products (i) or they also used vessels produced by other potters (ii). Hence, these houses were most probably inhabited by producers linked to GA5-GA8 and GA6-GA7 and who would have received vessels from the prevalent group: possibly houses H-11 to H-14, where none of the jars were produced using GA1-GA2.

Within this possible circulation of ceramic products among the houses of Genó, the prevalence of some ways of doing (GA1-GA2) could also indicate that one of the groups was responsible for the production of the largest quantity of vessels of the village, in particular house H-2, where GA1 and GA2 methods clearly predominated. This raises the question of whether this group must have had a strong productive capacity and hence could have plus-produced a higher quantity of vessels beyond their social needs. A similar situation has been proposed for the LBK settlement of Cury-lès-Chaudardes (Early Neolithic, northern France), where the prevalence of particular ways of doing along the occupation sequence of the site could reflect more permanent groups of producers that provided vessels to other groups who were progressively integrated into the settlement (Gomart 2014; Gomart *et al.* 2015).

Inversely, producers linked to other technical practices could have also provided vessels, in a low frequency, to those houses where the ways of doing GA1 and GA2 predominated. This plausible situation might have occurred at houses H-3, H-4, H-10 and H-14, which contained vessels produced using GA6/GA7, and in houses H-2 and H-13, where thick vessels produced with GA8 are also documented.

5.2.3. The case of house H-2

In this context, it is interesting to highlight the role of house H-2, which yielded a high number of ceramics for consumption and storage, and whose function is still unresolved (López-Cachero 2007). The concentration of the bronze-work evidence in this house initially led to the interpretation that a craftsperson in charge of this productive process inhabited this house (Maya *et al.* 1998: 160; Rovira *et al.* 1998). Based on the quantity of pots for consumption or food preparation, other research has proposed that this house had other functions (complementary or not) and acted as an assembly space or was even used for collective consumption practices (Sardà and Diloli 2009; Sardà 2010).

The large proportion of vessels produced with GA1-GA2 at house H-2 most probably indicates that the same producers who inhabited this house were also the users of these ceramic products. This would be particularly visible in the large-sized vessels, since five out of a total of eight jars were built with these ways of doing. This allows us to hypothesise that other producers with a distinct technical know-how did not necessarily contribute and provide vessels for this space. Nonetheless, a single small thick vessel produced with the way of doing GA8 was detected within the ceramic ware of H-2. These results suggest the hypothesis that, if other producers accessed this space, they were probably merely users of the ceramic products.

5.3. New questions based on the spatial distribution of pot-forming processes and the construction of the site

The ceramic production at Genó seems therefore to have been carried out by several producers or even groups of producers who lived in the houses where a large quantity of vessels and jars were produced with the same ways of doing. The coexistence of producers with different technical practices is observed in several ethno-archaeological investigations in which producers originating from other places were integrated into other settlements: new family nuclei founding a new house within the same settlement (Gelbert 2003), the incorporation of producers from other settlements within the same region (Gosselain 2002; Javaloyas *et al.* 2018) or even the displacement of individuals on a macro-regional scale (Mayor 2010; Livingstone Smith 2016). In these situations, which often occur for multiple reasons (*e. g.* Gelbert 2003; Livingstone Smith 2016), producers are inclined to retain the ways of doing from their birthplace (Calvo Trias and García Rosselló 2014; Roux *et al.* 2017).

At Genó, the fact that some ways of doing (GA1-GA2) are more frequent and prevail in several houses from the eastern sector of the village (H-1 to H-6, H-9, H-10) suggests that producers with this technical know-how were probably more prevalent in the settlement, compared to other methods that were less common (GA6-GA7 and GA5-GA8), but more frequently located in certain northern and southern houses (H4, H-5, H-11 to H-14). Here, the idea arises that the houses from the northern sector were planned and possibly built before the construction of the southern sector (López-Cachero 1999). This hypothesis is fundamentally based on a series of construction parameters that vary between the northern and the southern houses: the southern sector displays a higher adaptation to the hill compared to the northern sector, the southern houses have less levelled floors and millstones were reused to build their walls (Maya *et al.* 1998: 50-51). This gradual construction raises several questions about the occupation dynamics at the scale of the settlement, including here the distribution of the pot-forming processes:

Since some ways of doing are more prevalent (GA1-GA2) in the northern sector (H-1 to H-3) and others less frequent (GA6-GA7) in the southern sector (H-11 to H-13), was there a group of producers who inhabited the settlement from the beginning and others who were incorporated when the southern sector was progressively built?

Given that houses H-9 and H-10 also contain a significant quantity of vessels produced with the common ways of doing (GA1-GA2), could this evidence indicate that the northern inhabitants would have settled some of the southern houses once they were built?

Finally, in the houses where several ways of doing coexisted, including jars produced with different pot-building processes (GA1 and GA5 in H-4; GA1 and GA6 in H-5), several questions can be proposed: Were these houses inhabited by producers with different technical practices, for example, due to kinship ties? Or did these houses receive vessels (including some jars) from other houses of the settlement?

These questions, based either on the integration or fission processes commonly observed in the ethnography, require further study with more research at Genó and other Late Bronze Age settlements of the Segre and Cinca valleys of the north-eastern Iberian peninsula.

6. CONCLUSIONS

The results of the technological analysis focusing on the forming processes and their correlation with the typological traits of the ceramic ware have contributed to shedding light on how the ceramic production was organised at the Genó site. The wide diversity of ways of doing used in the manufacturing of vessels reveals that several producers, or even groups of producers, with variations in their technical practices must have been in charge of the ceramic production in this village. These producers used different primary forming techniques (use of coils slightly or not deformed, thick coils, slabs or very elongated elements, the moulding process and the use of concave supports) to build a wide range of vessel shapes and sizes, with which they might have covered several of their subsistence and social needs. In addition, these producers may have also shared other working processes in the context of the ceramic production, among which the beating technique stands out.

The spatial distribution of forming processes among the houses also brings new evidence to discuss the household organisation that might have characterised this Late Bronze Age settlement. One of the groups of producers, more prevalent at the site and possibly with a larger productive capacity (*i. e.* more volume of vessels produced with slightly/not-deformed coils), might have settled in the northern (H-1 to H-6) and southern houses (H-9 and H-10), at the entrance to the settlement. In turn, the location of different ways of doing in the north-central houses (also in houses H-4 to H-5), but mainly in the southern houses (H-11 to H-14), suggests that other producers, or possibly groups of producers, with a minor presence at the site (*i. e.* low volume of vessels produced using thick coils and slabs/elongated elements) inhabited these sectors of the village. In fact, these houses contained heterogenous ceramic assemblages in terms of pottery forming, which might reflect that they only produced a portion of their ceramic wares and might have received vessels produced with the prevalent ways of doing. This suggests the hypothesis that there was a possible circulation of ceramic products at the scale of the settlement, suppling ceramic vessels either between houses or from one group to another, without forgetting that foreign productions might also have been introduced into the village.

It therefore seems likely that several producers or groups of producers with variations in their technical practices cohabited at the settlement of Genó during its occupation phase. This hypothesis is consistent with the contributions proposed for the settlement patterns of the western plain from north-eastern Iberian peninsula (the Segre-Cinca area), underlining that each enclosed village might have gathered or integrated several domestic groups (López and Gallart 2002; Moya *et al.* 2005; López-Cachero 2007). These interpretations are based fundamentally on the architectonical traits of the settlements, concentring a significant number of houses and segregated sectors within the villages (López *et al.* 2002), and the aggregation of several groups of burial barrows at the same cremation cemeteries (Ferrández *et al.* 1991; López-Cachero 2008). At Genó, the possibility that the northern sector was built prior to the southern sector (López-Cachero 1999) raises a series of questions based on the spatial distribution of the ways of doing: Did some producers from the northern houses split and move to the southern sector at the entrance to the settlement? Were foreign producers with other ways of doing integrated in the southern houses when the settlement was progressively built? Or did producers with distinct technical practices cohabit in some houses due to, for example, kinship ties?

These questions that arise from the spatial distribution of pot-forming processes at Genó need to be further studied in parallel with new advances in the archaeological research of the Late Bronze Age societies in the north-eastern Iberian peninsula. Ultimately, the possibilities and hypotheses highlighted throughout this work need to be contrasted in depth and complemented with new research into the pottery manufacturing processes at Genó (*e. g.* acquisition and management of raw materials, surface treatments and firing), as well as compared with other ceramic productions from the settlements of the Segre-Cinca area.

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ANNEX: SUPPLEMENTARY FILE

A supplementary file is available in the open access web site of the journal. It includes:

– Figs. 1-6. Macro-traces associated with the GA1, GA2, GA3, GA4, GA5, GA6 and GA7 forming methods at Genó-Aitona (GA).

– Fig. 7. Macro-traces associated with the insertion system of button appendix handles.

– Fig. 8. Scatterplot with the height and thickness (wall-thickness) of the assembled elements measured from the upper and lower parts of the belly of the ceramic vessels of Genó.

– Fig. 9. Examples of vessels' shapes and sizes attributed to each of the eight forming methods (GA1-GA8).

– Fig. 10. Spatial distribution of the eight forming methods (GA1-GA8) in each house at Genó-Aitona (GA) and distribution of the large-sized vessels and jars from each house (H-1 to H-14).

– Fig. 11. Correspondence analyses of houses (H-1/H-16) and the eight forming methods (GA1-GA8) at Genó.

– Tab. 1. Calibration of radiocarbon dates from Genó with OxCal v.4.4.3 program (Bronk Ramsey 2021) and the IntCal20 atmospheric curve (Reimer *et al.* 2020) in 1 and 2 *sigma* (σ).

– Tab. 2. Number of ceramic elements and vessels from the ceramic assemblage of Genó and number of ceramic vessels analysed in this study.

– Tab. 3. Categories of vessel's size based on the *size index* (maximum diameter*height/arithmetic mean of the set of values) and their capacity.

– Tab. 4. Descriptive statistical parameters for the height measurements of the assembled elements used in figure 3 and Annex Fig. 8 according to each forming method.

– Tab. 5. Results of the Levene's and Welch's (ANOVA) tests for the height measurements of the assembled elements.

– Tab. 6. Descriptive statistical parameters for the thickness measurements of the assembled elements used in figure 3 and Annex Fig. 8 according to each forming method.

– Tab. 7. Results of the Levene's and Welch's (ANOVA) tests for the thickness measurements of the assembled elements.

– Tab. 8. Contingency table crossing the eight forming sequences (GA1-GA8) with the houses (H-1-H-16).

– Tab. 9. Results of the correspondence analysis from Annex Fig. 11 and Tab. 8.

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