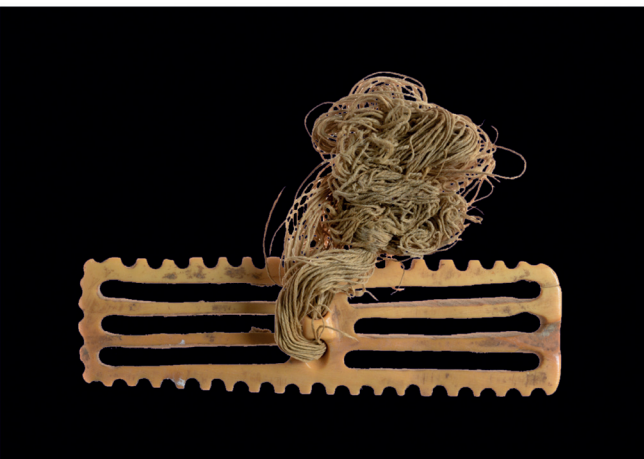
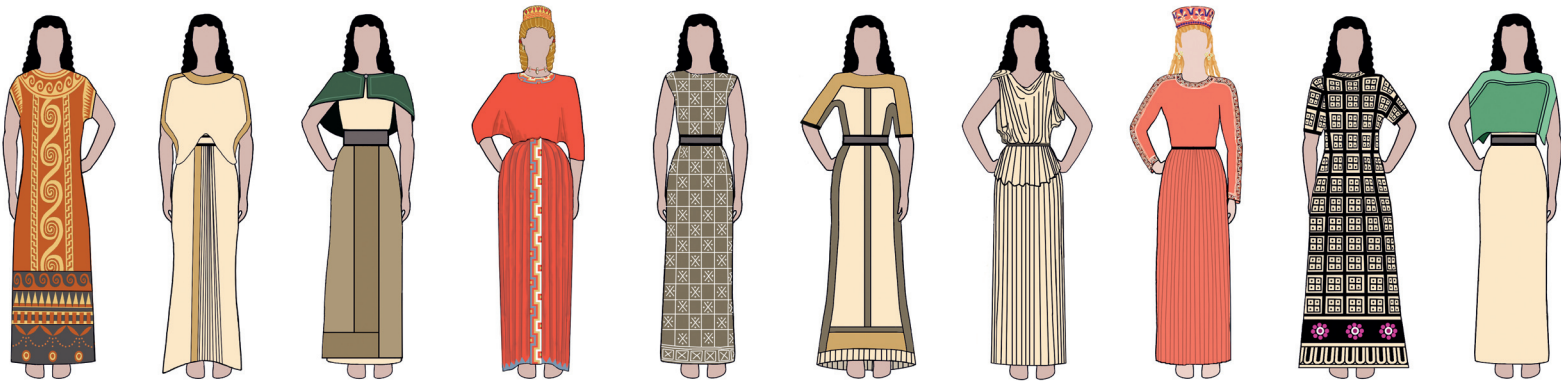




# REDEFINING ANCIENT TEXTILE HANDCRAFT STRUCTURES, TOOLS AND PRODUCTION PROCESSES

*Macarena Bustamante-Álvarez, Elena H. Sánchez López, Javier Jiménez Ávila (eds.)*





*PURPUREAE VESTES VII*  
*Textiles and Dyes in Antiquity*

Redefining Ancient Textile Handcraft  
Structures, Tools and Production Processes

**Proceedings of the VII<sup>th</sup> International Symposium  
on Textiles and Dyes in the Ancient Mediterranean World  
(Granada, Spain 2-4 October 2019)**

*Macarena Bustamante-Álvarez, Elena H. Sánchez López, Javier Jiménez Ávila (eds.)*

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*Los trabajos de edición de este libro coincidieron con los peores momentos de la crisis sanitaria provocada por la COVID-19 que golpeó duramente en muchos de los territorios que en él están representados. Por ello queremos dedicarlo a la memoria de los/las colegas y amigos que perdieron sus vidas y a todos cuantos padecieron las graves consecuencias de tan terrible pandemia en todo el Mundo.*

*Macarena, Elena y Javier*



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## PURPUREAE VESTES VII

Redefining Textile Handcraft. Structures, Tools and Production Processes (Granada, 2019)

*The International Symposium Purpureae Vestes VII “Redefining textile handcraft. Structures, tools and production processes” took place at the University of Granada (Spain) over the 2-4 October 2019. Almost 120 specialists on ancient textiles coming from different scientific institutions in 20 countries presented the results of their recent investigations through 50 communications and 35 posters. There were interesting discussions in the eight sessions in which the Congress was divided and on the last day participants could visit the wonderful archaeological and monumental ensemble of “La Alhambra de Granada”, World Heritage.*

*The Symposium had the financial support from the University of Granada (Departamento de Prehistoria y Arqueología, Grupo de Investigación GAECATAO/HUM 296) and the Campus de Excelencia Internacional del Mar (CEIMAR), in the framework of the Plan de Excelencia, Consolidación y Apoyo a las Universidades Andaluzas. PECA 2018, it also had the logistical support from the universities of Valencia (Spain) and Salento (Italy).*

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Granada, Spain 2-4 October 2019



# A SPOOLS ENIGMA? THE IRON AGE CASE AT ARSLANTEPE (MALATYA, SOUTH-EASTERN TURKEY)

*Romina Laurito* \*, *Federico Manuelli* \*\*

**Abstract:** Spools are textile objects usually interpreted as loom weights. They have been discovered in the Iron Age levels of a large number of sites in the whole Mediterranean area. Their massive spread throughout the entire region suggests the presence of some significant change in the textile production; but what kind of change? Unpublished data from the Iron Age levels at Arslantepe (Malatya, south-eastern Turkey) shed some new light on the reasons behind the appearance and profusion of these tools. The systematic study of hundreds of clay spool-shaped objects discovered at the site shows a clear change in the use of the textile techniques at the beginning of the Iron Age, characterized by a progressive decline of other types of loom weights and probably related to an increase in the weaving activities. A combined typological, diachronic and techno-functional analysis allows us to examine some significant aspects of this production as well as the chronological distribution of these objects.

**Keywords:** Mediterranean, Anatolia, Euphrates, 1<sup>st</sup> millennium BC, Textile production, Weaving activities.

**Riassunto:** I cosiddetti *spools* sono oggetti in argilla relativi alla produzione tessile, generalmente interpretati come pesi da telaio. Sono stati portati alla luce dagli scavi condotti nei principali siti datati all'Età del Ferro lungo tutto il bacino del Mediterraneo. La loro diffusione suggerisce la presenza di cambiamenti significativi nella produzione tessile in questo periodo; ma quali cambiamenti? Dati inediti provenienti dai livelli dell'Età del Ferro scavati nel sito di Arslantepe (Malatya, Turchia sud-orientale) gettano nuova luce riguardo la comparsa e diffusione di questi oggetti. Lo studio sistematico di centinaia di *spools* mostra un chiaro cambiamento nell'uso delle tecniche tessili all'inizio dell'Età del Ferro. Questo è caratterizzato da un progressivo abbandono di altre tipologie di pesi da telaio e da un probabile incremento generale delle attività di tessitura. In questo articolo, la combinazione di analisi tipologiche, diacroniche e tecno-funzionali permetterà di investigare aspetti significativi relativi a questa produzione così come la distribuzione cronologica di questi oggetti.

**Parole chiave:** Mediterraneo, Anatolia, Eufrate, I millennio a.C., Produzione tessile, Attività di tessitura.

## Introduction: the spools enigma nowadays

Clay spool-shaped objects are peculiar textile items traditionally interpreted as loom weights for warp-weighted looms.<sup>1</sup> They are generally crudely made with crumbling pastes and are poorly preserved, indicating that in most cases they were left unbaked.

Only in recent years has this material started receiving appropriate attention from scholars and been taken into consideration for chronological, socio-cultural and economic issues. Despite the fact that they were already attested in the Aegean world during the Neolithic era, clay spool objects show an exponential increase throughout the whole Eastern Mediterranean region during the Iron Age.<sup>2</sup> Their identification as loom

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<sup>1</sup> CECCHINI 2011, 195-196; RAMHSTORF 2011, 320-322; SPINAZZI-LUCCHESI 2018, 55-59.

<sup>2</sup> RAMHSTORF 2015, 8-9.

weights is first of all related to their contexts of discovery. They have usually been found in clusters, even in sets of rows or stored in depositions or caches and sometimes associated with other weaving tools.<sup>3</sup> Their primary use for weaving activities has been also confirmed by means of experimental testing conducted at the Center for Textile Research at the University of Copenhagen (CTR).<sup>4</sup> However, because of differences in type, dimension, weight and other characteristics, the multifunctional employment of these objects in many textile practices related to the use of the threads, i.e. winding, warping and storing, has also been suggested.<sup>5</sup> The ubiquity and massive presence of spools in all the main Iron Age sites from the Aegean to the Levant and from inland Syria to Anatolia supports the adaptability of these objects for various aspects of the textile *chaîne opératoire*.

Recently, scholars have tried to delineate the distribution and chronology of the spool objects as well as the historical and socio-economic implications of their proliferation during the Iron Age. Nowadays, it can be asserted with a certain margin of confidence that clay spools first began to spread during the 13<sup>th</sup> century BC, as shown at some sites in the Aegean and the Levantine regions.<sup>6</sup> Moreover, the occurrence of spools is also attested from the second half of the 2<sup>nd</sup> millennium BC in eastern and central Europe.<sup>7</sup>

More than their use and origin, what can still be considered puzzling and a source of controversy is the nature of the changes that the appearance of this class of material and its spread over such a wide geographical area might entail. Indeed, spools rapidly disseminate throughout the Mediterranean in the early 12<sup>th</sup> century BC, promptly replacing the pierced loom weights that were mostly used during the previous millennia.<sup>8</sup> But what is most impressive is actually the quantitative increase related to this change, which seems to mark a staggering increase of the weaving activities over time. Recently, the profusion and dissemination of these objects has been mainly examined from different purposes and angles within the framework of the spread

of the new techniques, transformations and mobility that affected the Mediterranean at the end of the 2<sup>nd</sup> millennium BC.<sup>9</sup>

In the next pages the spool-shaped objects coming from Iron Age Arslantepe will be described and examined through typological, diachronic and techno-functional approaches. The aim is to identify potential aspects of innovation in the textile production and handcraft economy at the site and in the wider context of the Syro-Anatolian region at the turn of the 1<sup>st</sup> millennium BC.

### The archaeological evidence: spool contexts at Iron Age Arslantepe

Arslantepe is located in south-eastern Anatolia, in the Upper Euphrates region about 12 km south of the river in the fertile Malatya plain. The Italian Archaeological Expedition in Eastern Anatolia (MAIAO) has been working at the site since the beginning of the 1960s, allowing the reconstruction of an uninterrupted sequence that stretches from the end of the 5<sup>th</sup> millennium BC to the Byzantine period.<sup>10</sup> During the Iron Age (*ca.* 1200-600 BC), Arslantepe was the capital of the powerful independent Neo-Hittite kingdom of Malizi/Melid.<sup>11</sup>

The Iron Age occupation was the focus of the first explorations at the site in the 1930s,<sup>12</sup> and of the first round of excavations conducted by the Italian expedition.<sup>13</sup> After a long interruption, investigations on the Iron Age levels restarted at Arslantepe in 2008. Excavations and research are still on-going and an uninterrupted sequence of monumental buildings that spans the period from the 12<sup>th</sup> to the 7<sup>th</sup> century BC has been brought to light.<sup>14</sup>

The systematic classification and multi-disciplinary study of hundreds of textile tools, mainly clay spool-shaped items, is currently in progress. In sum, spools are ubiquitous at Iron Age Arslantepe and have been found in essentially all the excavated contexts. They

<sup>3</sup> RAHMSTORF 2003; LUCIANI 2005, 928-929; MAZAR 2019, 121-123; MORANDI BONACOSI 2019, 185-197.

<sup>4</sup> OLOFSSON *et al.* 2015, 92-95.

<sup>5</sup> SIENNICKA and ULANOWSKA 2016.

<sup>6</sup> MAZAR 2019, 122.

<sup>7</sup> RAHMSTORF 2003, 397-400.

<sup>8</sup> CECCHINI 2011, 195-196; SIENNICKA and ULANOWSKA 2016, 27-28.

<sup>9</sup> MAEIR and HITCHCOCK 2017; MIDDLETON 2018.

<sup>10</sup> FRANGIPANE 2019.

<sup>11</sup> HAWKINS 2000, 282-329.

<sup>12</sup> DELAPORTE 1940.

<sup>13</sup> PECORELLA 1975.

<sup>14</sup> MANUELLI 2018, 142-150.

have been often found in groups, sometimes associated with other textile objects, coming from both household and representative contexts. However specific connections with industrial domestic sectors have not been identified yet.

A brief description of the main sets of Iron Age spools and their context of discovery is offered here.<sup>15</sup> A cluster of 10 spools have been found *in situ* as dropped-off or stored at the bottom of a large krater embedded in the floor of a representative room belonging to a complex dated to the beginning of the 12<sup>th</sup> century BC (Arslantepe Period IIIA). Moreover, other groups of objects, including spools and conical pierced loom weights, have been discovered from the filling layers external to this structure. Another cluster of 4 spools has been discovered *in situ* lying on the external platform of a monumental building dated to the 10<sup>th</sup> century BC (Arslantepe Period IIIB). Moreover, five different clusters of spools, corresponding to a total of 15 items, have been brought to light from the filling layers of a building dated to the late-9<sup>th</sup> century BC and a group of 7 spools have been uncovered in the context of a monumental hall dated to the beginning of the 8<sup>th</sup> century BC (Arslantepe Period II).

#### Spool data: typology and techno-functional analysis

More than 180 clay spool-shaped objects have been brought to light at Iron Age Arslantepe. They are mostly unbaked and only a few show traces of fire, even if at relatively low temperatures.<sup>16</sup> They are

generally well produced, mostly manufactured from medium and mixed chaff and mineral fabrics (Fig. 1). Their colors range from dark grey to brown and to pale green tones. Surface treatments are not attested, while clear traces of clay manipulation are sometimes noticeable. Traces probably left by a string or yarn are also occasionally visible on their surfaces as faint impressions. The spools do not have any holes or perforations made intentionally; only tiny dots occur on rare examples, the function of which is unclear.

From a typological point of view, spools may be classified into three groups (Fig. 2). They are mostly cylindrical with slightly concave sides and flattened ends. A second type has a cylindrical elongated body with rounded and convex ends, while a third group includes smaller short squashed-body examples with both flattened and convex ends. Spools have an average length of 80.5 mm and an average weight of 144.5 g. Sporadically, a few small or large examples occur (the smallest measure 55 mm and weigh 30 g; the biggest measure 104 mm and weigh 287 g).

Spool shapes change significantly over the centuries (Fig. 3). In the Early Iron Age I (Arslantepe IIIA, *ca.* 1200-1000 BC) they occur in a variety of sizes. The predominant range is between 120 and 200 g in weight, 40 and 50 mm in thickness and 63-84 mm in length. A few specimens weigh 20-116 g and only two weigh 205 and 287 g respectively. During the Early Iron Age II (Arslantepe IIIB, *ca.* 1000-850 BC) they generally maintain the same range of weight, but some changes are recognizable. The majority are



Fig. 1. Arslantepe, Iron Age spools. 1: manipulations. 2: Dots and impressions (photos MAIAO).

<sup>15</sup> MANUELLI *et al.* forthcoming.

<sup>16</sup> *IBID.*; MANUELLI 2018, 154-155.



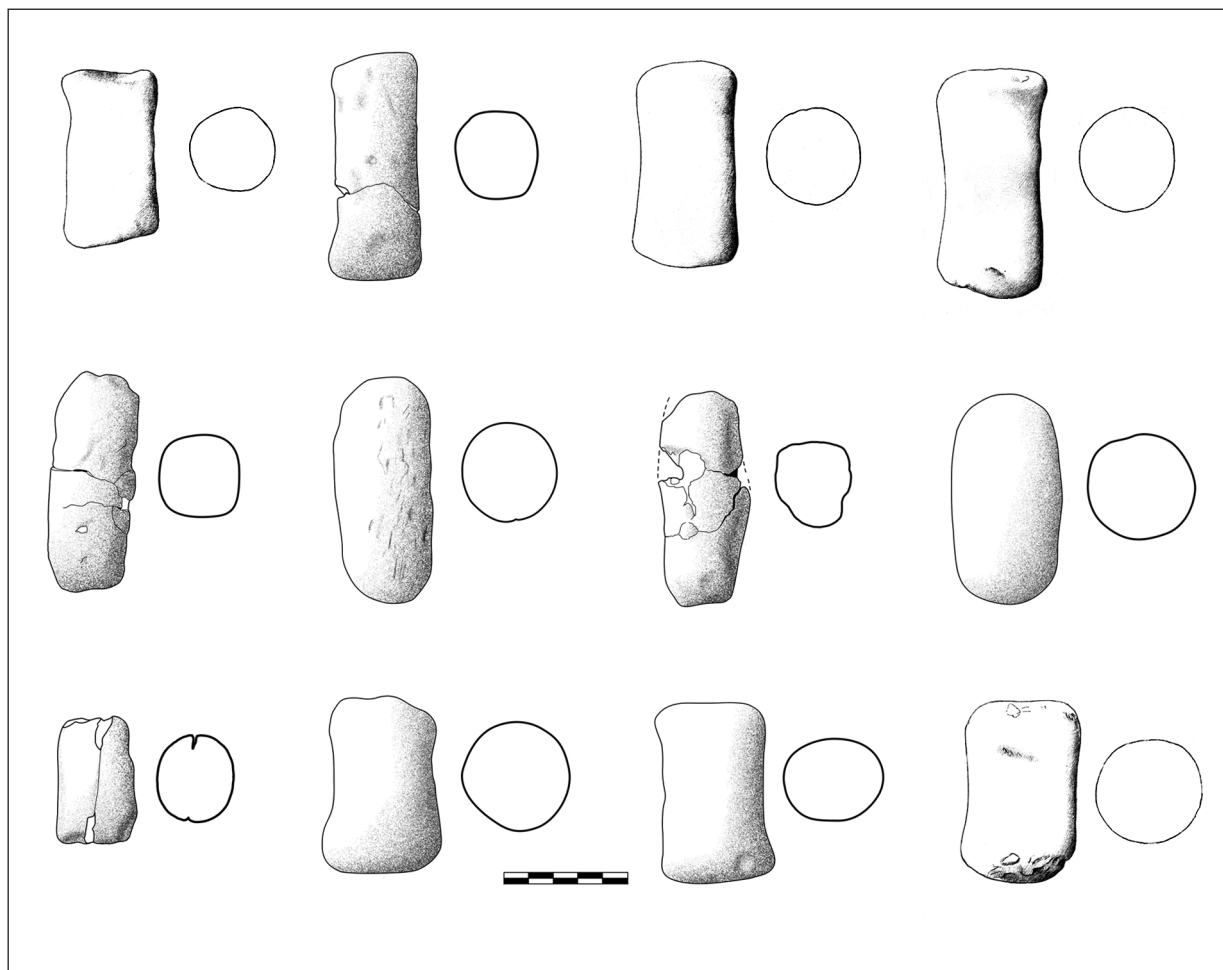


Fig. 2. Arslantepe, Iron Age spools typology (drawings MAIAO).

lighter (between 120 and 180 g) and very few spools weigh less than 120 g and rare examples weigh more than 210 g. But it should be considered that from this period they are also more elongated and less thick, having an average of 35-42 mm in thickness and 82-102 mm in length. Unfortunately, only a few spools are attested from the Middle Iron Age levels (Arslantepe II, *ca.* 850-600 BC) and these are not sufficient to generate any reliable results.

The three identified types are all attested during the whole Iron Age, but it is quite evident that the squashed spools are more numerous in Arslantepe IIIA than in the later periods. On the other hand, the concave and cylindrical ones are more frequent in the Arslantepe IIIB period. This means that while maintaining the same range of weight they became, as said, more elongated over time. At this stage of the analyses and

without targeted experiments it is premature to say whether this typological transformation corresponds to any functional or manufacturing process change.

We should note here the coexistence of spools with other loom weights, mostly conical pierced specimens and a few rounded donut-shaped objects, and its diachronic evolution over the different Iron Age phases at the site. Indeed, in Period IIIA spools and pierced loom weights coexist, while in the later Period IIIB spools are the exclusive tools used for weaving. Their number then decreases drastically in Period II. Interestingly, spools and conical weights are both characterized by a consistent weight, i.e. between 100 and 220 g. Considering the effect of weight and thickness on the weaving process they might be mostly suitable for weaving fine fabrics, as the experiments carried out at the Center for Textile Research have already shown.<sup>17</sup>

<sup>17</sup> MÄRTENSSON *et al.* 2007.

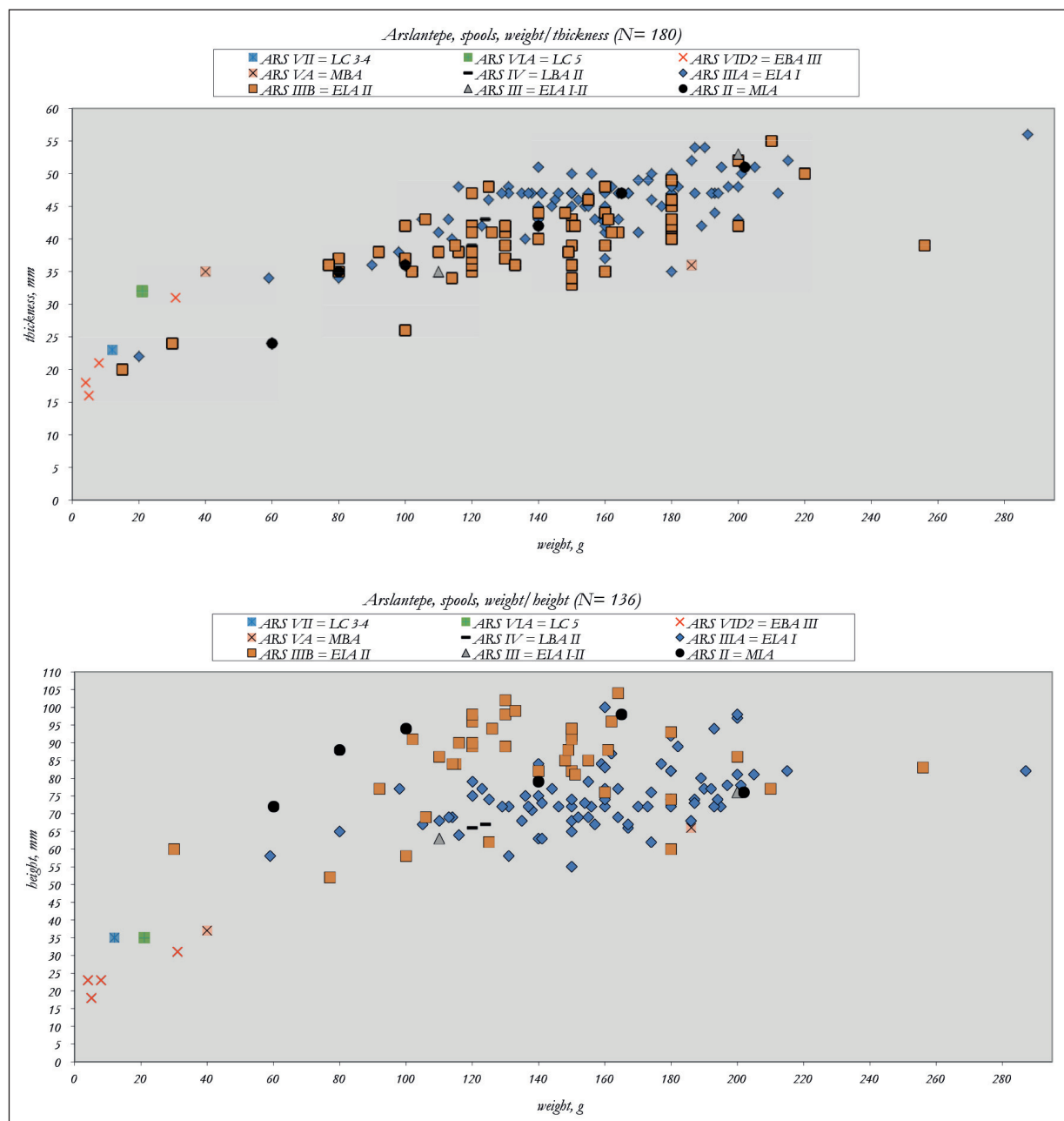


Fig. 3. Arslantepe, spool development from Late Chalcolithic to Iron Age. 1. Weight/thickness ratio; 2. Weight/height ratio.

### Diachronic and regional patterns

The comparison of the Iron Age spools with the earlier specimens brought to light at Arslantepe offers some relevant observations. First of all, spool-objects were very rare at the site before the Iron Age and just a few examples have been discovered (Fig. 4). Generally, they are all well manufactured, and in some cases the surfaces are burnished or even decorated. In addition, some specimens are pierced

along the vertical axis. But it should also be noted that what has been classified under the definition of spool in these early periods is characterized by relevant differences in shape, size and clay pastes. Moreover, their dimensions are extremely reduced and only from the Middle Bronze Age do spools start to weigh more than 100 g, while in the earlier periods the majority weigh less than 40 g and some of them even less than 10 g. Considering these features, it is hard to connect these tools with proper weaving



Fig. 4. Arslantepe, spool development. 1. Iron Age; 2. Early Bronze Age III; 3. Late Chalcolithic 5 (photos and drawings MAIAO).

processes, although they might be used in additional textile activities.<sup>18</sup> Indeed, considering the ratio of thickness and weight, their use as bobbins for winding the thread should be assumed.

In any case, the elaboration of the metric data shows a strong continuity in the specimens from the Middle Bronze Age to the Iron Age, while the earlier Late Chalcolithic and Early Bronze Age examples are distinctively lighter. In this framework it is interesting to note that petrographic and geochemical analyses applied to Iron Age spools indicate that these objects share their paste recipes with those dated back to the Middle and the Late Bronze Age.<sup>19</sup> This association is not accidental and might support the spread of spool-shaped objects as loom weights during the 2<sup>nd</sup> millennium BC, further revealing an interesting aspect of continuity with the Iron Age.

It is also interesting to integrate the data coming from Arslantepe into a wider set of regional comparisons (Tab. 1). However, the scarcity of quantitative and metric published data makes this challenging and results cannot be considered conclusive. It is in any case relevant to note that the Arslantepe spools share important dimensional similarities with those coming from Tille Höyük.<sup>20</sup> Considering the geographical vicinity of the two sites, we can emphasize some sort of affinity in the textile production of the region of the Upper Euphrates. In contrast, looking southwards, spools from Cilicia, northern Syria and the Middle Euphrates region are bigger and heavier, as seen for instance at Tell Taynat, Tell Afis and Tell Shiuk Fawqani.<sup>21</sup> This diversity might reflect cultural and regional differences that merit further in-depth analyses and thoughts in the future.

<sup>18</sup> SIENNICKA and ULANOWSKA 2016.

<sup>19</sup> Analyses were conducted by Dr. Pamela Fragnoli (Austrian Archaeological Institute, ÖAI-ÖAW Vienna). Preliminary results are presented in MANUELLI *et al.* forthcoming.

<sup>20</sup> BLAYLOCK 2016, 260.

<sup>21</sup> LUMB 2014; CECCHINI 2011, 212-214; LUCIANI 2005, 928-930.

	HEIGHT		WEIGHT	
	Height range (mm)	Med. height (mm)	Weight range (g)	Medium weight (g)
ARSLANTEPE (Iron Age)	55-104	77	30-287	149,8
ARSLANTEPE IIA	72-98	85	60-202	124,5
ARSLANTEPE IIIB	58-104	85	30-256	143,8
ARSLANTEPE IIIA	55-100	75	59-287	159,8
Tell Tayinat FP 3			50-360	150-230
Tell Tayinat FP 4			50-750	150-400
Tell Tayinat FP 5			230-500	
Tell Tayinat FP 6			490-750	
Tille Höyük	44-93			
Tell Afis	70-130	90-110	100-500	250-260
Qatna	81-109			380-400
Tell Shiuk Fawqani			270-400	

**Tab. 1.** Arslantepe, Iron Age spool comparisons (sources: Lumb 2014; Blaylock 2016; Cecchini 2011; Morandi Bonacossi 2019; Luciani 2005).

### Final remarks

The typo-functional study of the spools from Arslantepe has shown important aspects that merit some few final comments. The analysis of the whole repertoire of objects coming from the site and the elaboration of metric parameters seems to indicate that the use of the spools for proper weaving activities started at Arslantepe at the beginning of the 2<sup>nd</sup> millennium BC. During the earlier periods some alternative use for the light and small specimens in further textile activities, such as bobbins for winding and storing the threads, can be suggested. The mass-production and ubiquity of spool objects during the Iron Age should also testify to a quantitative improvement of the weaving processes in this period. The definite switch to the use of spools, at around 1000 BC onwards in Arslantepe IIIB after a period of coexistence with pierced loom weights, might reflect important changes in production. It seems to suggest the necessity to produce as many weaving materials as possible in the shortest amount of time, following the development of some crucial economic transformations that need further detailed studies.

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