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journal homepage: www.elsevier.com/locate/quaintCrops of the first farming communities in the Iberian Peninsula[☆]Leonor Peña-Chocarro^{a, *}, Guillem Pérez-Jordà^a, Jacob Morales^b^a *GI Arqueobiología, Instituto de Historia, CCHS-CSIC, Albasanz 26-28, 28037 Madrid, Spain*^b *Departamento de Ciencias Históricas, Universidad de Las Palmas de Gran Canaria, Pérez del Toro 1, Las Palmas de Gran Canaria 35003, Spain*

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ABSTRACT

Agriculture was introduced in the Iberian Peninsula in the mid-6th millennium cal BC. The first Iberian farmer communities grew seven different cereal species (hulled and free-threshing wheats and hulled and naked barley), seven legumes (broad beans, lentils, peas, grass/red pea, common vetch and bitter vetch) and two oil crops (flax and poppy). The distinct agricultural diversity from area to area gave way to a complex mosaic of regional variability. This paper aims at exploring not only the main features characterising Neolithic agriculture in Iberia, but also at delineating its variability and the underlying causes linked to numerous factors including environmental constraints, economic and social issues, and cultural traditions and their demographic movements.

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1. Introduction

The origin and spread of agriculture continues to be one of the main focuses of interest in world Prehistory. The profound change that characterises the outset of the Neolithic period affected human lives at various levels, e.g. demography, subsistence, technology, environment, social organisation, etc. In the Iberian Peninsula, the evidence indicates the arrival of different groups of farmers that settled a varied landscape comprising an assorted range of ecosystems. Interaction between farmers and landscapes is reflected in the archaeobotanical record which from 5550 cal BC reveals a marked diversity of crops across the region.

It is clear that agriculture by the mid-6th millennium cal BC was present in a number of Iberia's areas. The archaeobotanical record points to a well-developed agriculture comprising a varied set of crops including hulled (*Triticum monococcum*, *T. dicoccum* and the "new" glume wheat) and naked wheats (*Triticum aestivum/durum*), barley (*Hordeum vulgare*), several legumes such as lentil (*Lens culinaris*), pea (*Pisum sativum*) broad bean (*Vicia faba*), grass and red pea (*Lathyrus sativus* and *Lathyrus cicera*), bitter betch (*Vicia ervilia*) and common vetch (*Vicia sativa*), poppy (*Papaver somniferum*) and

flax (*Linum usitatissimum*) (Antolín, 2015; Pérez Jordà, 2013; Zapata et al., 2004) Combined in different ways, these groupings characterise the diversity of crop choices in the Neolithic of south-western Europe.

The earliest evidence of agriculture in the Iberian Peninsula is from the site of Mas d'Is (Alicante) where an AMS dating of a cereal grain yields a 5550 cal BC dating (Bernabeu et al., 2003). During the second half of the 6th millennium cal BC, agriculture spread across the Peninsula into the eastern coast (Catalonia), the south (Andalusia), the Pyrenees, the Northern Plateau, the Upper Ebro Valley and Portugal. According to the available corpus of AMS dates, only the Cantabrian region adopted agriculture later, during the 5th millennium cal BC.

Archaeobotanical evidence from the Portuguese Neolithic period is extremely sparse limiting our capacity of exploring its agricultural beginnings. Moreover, archaeobotany in Portugal has received very little attention despite the importance of this country in understanding the transition from hunter-gathering to food production. In fact, systematic sampling and methodical application of recovery techniques are little developed. Only two recently studied sites, Lapiás das Lameiras and São Pedro de Canaferrim near Sintra, provide significant data, including AMS dates of several cereal species that prove the existence of agriculture by the mid-6th millennium cal BC (López López-Dóriga, 2015).

Since our 2004 detailed paper in the *Journal of World Prehistory* (Zapata et al., 2004), research into the origins of agriculture in the Iberian Peninsula has greatly expanded and more data is available.

[☆] To Lydia Zapata, a pioneer in the study of Iberian Neolithic agriculture.

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This development is partly the result of the gradual awareness of researchers of the need of systematic archaeobotanical sampling coupled with an intense growth of environmental archaeology and dating of short-lived specimens.

Over the course of the last 12 years, new archaeobotanical projects have been undertaken in areas such as Catalonia, notably at the site of La Draga (Girona) (Antolín, 2015, 2016; Antolín and Buxó, 2011; Antolín and Jacomet, 2015; Antolín et al., 2014, 2015; Buxó et al., 2000; Palomo et al., 2011; Revelles et al., 2014, 2015) and a series of other sites (Agustí et al., 1987; Antolín, 2016; Antolín et al., 2013; Bosch et al., 1998; Buxó, 1997; Buxó and Canal, 2008; Oms et al., 2013). Research has also taken place in Valencia (Pérez Jordà, 2013; Pérez Jordà and Peña-Chocarro, 2013), Andalusia (Espejo Herrerías et al., 2013; Martínez Sánchez et al., 2014; Peña-Chocarro, 1999; Peña-Chocarro et al., 2013, 2015; Pérez Jordà et al., 2011), the Cantabrian region (Cubas et al., 2016; López López-Dóriga, 2015; Zapata, 2002, 2007), Inner Iberia (López García et al., 2003; Rodríguez et al., 2016; Stika, 2005), and the Pyrenees (Antolín, 2016; Clemente-Conte et al., 2016; Lancelotti et al., 2014; Marínval, 1995; Oms et al., 2016), as well as the two Portuguese sites mentioned previously (López López-Dóriga, 2015; López López-Dóriga and Simões, 2015).

Additionally, significant funding was obtained to explore the origins of farming in the western Mediterranean region at a large scale with a focus on the Iberian Peninsula. The Spanish Ministry of Education and Science (HAR, 2008–01920/HIST) funded between 2008 and 2011 the study of the origins and spread of agriculture in southern Spain and northern Morocco. This coincided with the outset of an ERC Advanced grant (n° 230561) in 2009 funded by the European Research Council coordinated by one of us (L. Peña-Chocarro) entitled: Origins and spread of agriculture in the western Mediterranean region-(AGRIWESTMED). Among the objectives of the AGRIWESTMED project was the characterisation of crop assemblages and their associated weeds so as to define the region's Neolithic agriculture, investigate the agricultural technology of the first western Mediterranean farmers (with particular emphasis on harvesting techniques), examine crop husbandry practices and provide an accurate chronological framework of agriculture's emergence. The overall goal was therefore to integrate the diverse type of data and examine the characteristics of Iberian agriculture in light of the better known farming practices recorded elsewhere in Europe. The project has yielded more than one hundred papers on a number of different issues.

The current study therefore summarises the archaeobotanical results of AGRIWESTMED while integrating recent research on Neolithic plant remains carried out by other colleagues. The goal is to provide an updated overview of the beginnings of farming in the Iberian Peninsula from the perspective of more than a decade of intense research since the publication of our aforementioned paper (Zapata et al., 2004). The focus of this research is on the early phases of the Neolithic (6th–5th millennia cal BC).

Located in the most south-western corner of the Mediterranean region, at the crossroads of both Mediterranean and Atlantic influences, the Iberian Peninsula is characterised by a variety of environments resulting in a great floral diversity shaping its assortment of landscapes. Apart from the mountainous Euro-Siberian biogeographic region along the northern coastal fringe marked by an oceanic climate with mild and wet conditions and the absence of summer drought, the Peninsula is dominated by Mediterranean conditions with varied degrees of continentality. Despite climatic variability, the first Iberian farmer communities settled lands sharing, in general, ecological features similar to their Mediterranean homelands. Their gradual expansion across the territory was accompanied by processes of adaptation to different environmental conditions resulting in failures and successes.

2. Materials and methods

The past decade saw the emergence of new regional archaeobotanical data and the publication of several surveys (Antolín, 2016; Buxó, 1997; Peña-Chocarro and Zapata, 2010, 2014; Pérez Jordà, 2013; Pérez Jordà et al., 2017; Zapata et al., 2004, 2005). This research resulted in a concentration of archaeobotanical investigations in specific regions and vast extensions devoid of Neolithic plant remains. The unbalanced regional information reflects the focus of prehistoric research over the past two decades on the Mediterranean coast, areas of the South, a small region of the Cantabrian and, more recently Inner Iberia, the Pyrenees and Portugal. The new data come from recently excavated sites as well as from analysis of samples collected during new campaigns of excavation in old sites. Furthermore, samples of certain old sites were reviewed and some identifications refined.

For the needs of this study, Iberia is divided into seven different areas according to the main zones where archaeobotanical research was carried out: the Cantabrian region extending along the northern fringe of the peninsula (including sites in Cantabria and the Basque Country); the Pyrenees with well-documented sites at high altitudes sites; the north-east of the Iberian Peninsula corresponding to Catalonia; the Valencia region; the southern part of Iberia with sites in Andalusia, and Inner Iberia which for the purposes of this paper only refers to the Northern Plateau and the Upper Ebro Valley. It is also noteworthy that data from Portugal for the first time appears in a survey of early agriculture in the Iberian Peninsula. What follows is a brief summary of the plant remains in these regions (Fig. 1).

2.1. Cantabrian region

Archaeobotanical data in this region are still scarce as early Neolithic sites are yet unknown. Most consist of seeds yielding 5th millennium cal BC radiocarbon datings, including the plant assemblages of the cave of El Mirón (Cantabria) (Peña-Chocarro, 2012; Peña-Chocarro et al., 2005a, b) and from sites in the Basque Country (Kobaederra and Pico Ramos) (Zapata, 2002, 2007; Zapata et al., 2004).

2.2. The Pyrenees

This region is poorly known from an archaeobotanical perspective. Until recently, the only evidence was from Balma Margineda (Andorra) (Marínval, 1995) comprising cereals from a context dated to the 6th millennium BC by wood charcoal remains. Recent research (Oms et al., 2016) centred on the chronology of the site has resulted in re-examination not only of the dates of earlier excavations, but short-lived specimens. The new datings of the second half of the 6th and first half of the 5th millennium cal BC rejuvenate the Neolithic layers.

More recently, an archaeobotanical study of Cova de Els Trocs identified cereals from the site's earliest levels that are dated to the transition between the 6th–5th millennium cal BC (Rojo Guerra et al., 2013, 2014). Equally interesting is the plant material from the Cueva de Coro Trasito (Clemente-Conte et al., 2016) at 1600 m asl where the dates of the Neolithic levels range between the last third of the 6th millennium to the first third of the 5th millennium cal BC. Camp del Colomer also yielded an excellent assemblage of plant remains ranging from 4500 to 4200 cal BC (Antolín, 2016). In addition, the site of Cova Colomer (Lleida) in the pre-Pyrenees contains plant remains from the end of the 6th millennium cal BC (Oms et al., 2013).

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