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## Waterlogged plant remains from the Roman healing spa of *Aquae Flaviae* (Chaves, Portugal): Utilitarian objects, timber, fruits and seeds

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### ABSTRACT

More than 3500 individual pieces of waterlogged archaeobotanical remains were found in the excavation of the Roman healing spa of *Aquae Flaviae* (Chaves, Portugal), carried out between 2006 and 2013. Most of these were recovered in stratigraphic units sealed by the brick barrel vault collapse in last decade of the 4th century AD.

The waterlogged material studied, included several types of archaeobotanical remains: timber used for construction (beams, poles, boards and wedges), wooden objects (combs, bowls and containers, corks, handles, spindle whorls, etc.) and macro carpological remains (seeds, fruits, pine scales and cones, etc.). The study of the wood assemblage was focused firstly on the identification of the material selected for woodworking and also on providing answers regarding the technical and technological features used in manufacturing these items. Regarding fruits and seeds, the analysis was oriented towards macro remains species identification.

A selection of species for specific purposes was clearly identified both in timber pieces and in several types of objects as well as the carving of specific features in these pieces according to its function. Active management of wood resources could also be inferred. Furthermore, relevant information was gathered concerning the presence of *Pinus pinea*, *Castanea sativa*, *Buxus sempervirens* and several species of the *Prunus* family, which show great importance on a regional or supra regional levels. The first presence of cypress tree (*Cupressus sempervirens*) during Roman times in western Iberia was also identified.

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### 1. Introduction

The excavations in Largo do Arrabalde, Chaves, northern Portugal (Fig. 1), that took place from 2006 to 2008 and 2012 to 2013, led to the discovery of an extremely well preserved set of structures: the long sought Roman healing spa that gave the city its Roman name: *Aquae Flaviae* (Carneiro, 2013). The historic and symbolic meaning for Chaves and the scientific importance of the findings justified the building of a museum, currently under construction, with the purpose of displaying the ruins of the Healing Baths complex.

The monumentality of the healing spa complex and relative size it occupies in the Roman city (about a fourth of the total area) attests to the important role it must have had in the formation and development of *Aquae Flaviae*. As with other spa cities throughout the empire, such as Badenweiler (Mylius, 1936), Bath (Cunliffe, 1969), Hammam Salehine (Gsell, 1901) or Hamat Gader (Hirschfeld, 1997), people would come to *Aquae Flaviae* from long distances seeking a cure for their ailments. Both this affluence of people and the attested role of the city in controlling the mining and distribution of gold in its territory (Martins, 2010), must have contributed to the importance of the city, indicated by its early attribution of the municipal status, the architectural quality of its bridge and the material evidence from previous excavations in the Roman city (e.g. Carneiro, 2003, 2005, 2009).

The spa complex was built directly atop the hot mineral springs (~73 °C) of Chaves. Two main building phases were identified: one

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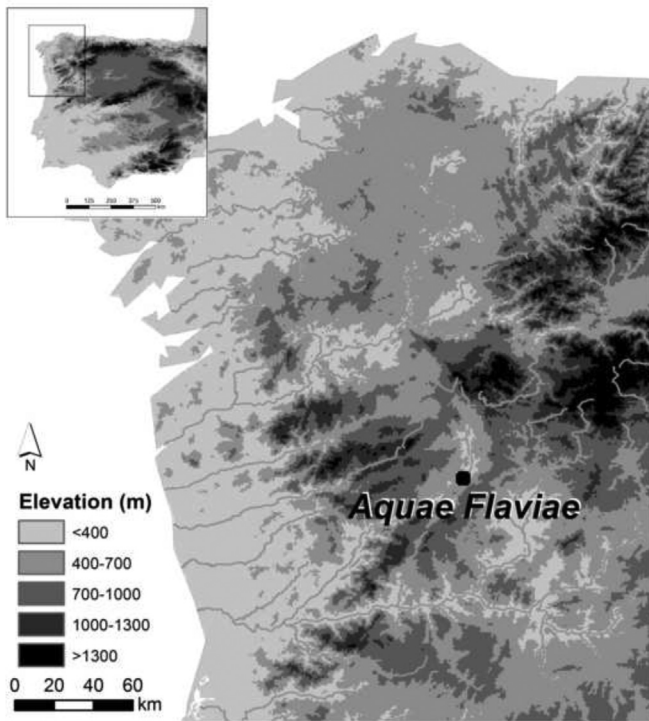


Fig. 1. Location of *Aquae Flaviae* in the northwest region of the Iberian Peninsula.

from the 1st century AD, of which only a few *opus signinum* pavements and the foundations of some walls destroyed by the second phase are extant; and the other, corresponding to a major renewal of the complex, ascribed to the late 2nd or early 3rd century AD by the radiocarbon dating of the wooden formwork of an *opus caementicium* wall connecting pool A to the cloaca 1 (Beta – 391931: Cal AD 135–335 ( $2\sigma$ )) and by the marble portrait of a young girl bearing the hairstyle of Julia Mamaea found at the bottom of pool A, together with a small anepigraphical marble altar, that presumably belonged in a niche in the pool's wall as part of the decoration of this building. To this second phase belong the construction of the two large main pools (A and B), eight smaller secondary pools, a large *palaestra* and an intricate water flowing system comprising reservoirs, *cloacae* and several conduits connecting the pools to the spring (Fig. 2). Next to the bathing area, there is also a small *exedra nymphaeum* that was built in phase I and monumentalized in phase II (Carneiro, 2013).

The sealing of these Roman contexts, caused by the collapse of the brick barrel vault (most likely caused by an earthquake event) that originally covered Pools A and B, and the simultaneous clogging and abandonment of the draining system, combined with the presence of the hot water springs that kept the mud and debris soaked, made the preservation by waterlogging of several thousands of plants remains possible. Several other types of archaeological materials were also found in pristine condition such as metal and bone objects and even the bodies of three individuals who were caught by the fall of the ten meter high brick barrel vault while they were bathing in pool A in the last decade of the 4th century AD. The presence of these individuals indicates a sudden and unforeseen collapse of the building, which is coherent with a natural disaster, such as an earthquake (Rodríguez-Pascua et al., 2011). Other archaeological evidence of this cataclysmic event recorded during excavation include valuable items under the rubble, the folding of the *opus signinum* pavements of rooms 2 and

4, and the conjugated fractures in some of the brick walls of the structure.

This fortunate set of preservation conditions is unique. Waterlogged preservation is of very rare occurrence in the Iberian Peninsula, given the general lack of anoxic environments in which organic materials can withstand biological degradation processes. This scarcity is further emphasized in the context of Roman and Iron Age excavations in northwest Iberia. In this region, in more than 150 years of archaeological investigation on Roman and Pre-Roman sites, no more than a handful of contexts from these periods provided the conditions for waterlogged preservation of wooden objects, timbers, fruits, or seeds (Alves et al., 1988–89; Alves and Rieth, 2007; Martín-Seijo and Teira Brión, 2010; Martín-Seijo and Carrión, 2012; González Soutelo, 2014). There are also few examples of Roman contexts where wood was also preserved by waterlogging in other areas of Iberia: the mine of Arditurri 3 (Moreno-Larrazabal et al., 2011), the port of Oiaso (Studer, 2003), the wells of Iesso (Buxó et al., 2004), the Arade 1 Shipwreck (Domínguez-Delmás et al., 2013), Tossal de les Basses (Carrión and Rosser, 2010) and the wharf at Caño de Sancti Petri (Bernal et al., 2005).

Rare findings of extraordinary well preserved carbonized wood remains provided some hints about the use of wood for construction (e.g. the hillfort of Penices – Figueiral, 1995a) or for the manufacture of daily life objects (e.g. Martín-Seijo and Carrión Marco, 2012, Martín-Seijo, 2013). However, the scarce waterlogged evidence in the region is enough to demonstrate that assemblages of carbonized wood are usually too fragmentary to give an accurate perspective of the role of wood in the life of ancient communities. Waterlogged wood remains appear frequently in contexts where they can be ascribed to specific functions (e.g. the wooden fences of Areal – Martín-Seijo and Teira Brión, 2010) enhancing the relevance of their palaeoethnobotanical inferences. At the same time, for that reason, waterlogged wood remains are not necessarily representative of what must have been the wide usage human communities gave to wood resources. However, they may provide good evidence of some technological aspects of woodworking, being of the utmost importance to further understand a wide range of aspects of past human daily life such as the usage of wood for construction, wood crafting, fuel, ritual practices, etc., (Earwood, 1993; Pugsley, 2003; Ulrich, 2007).

The problem with preservation by carbonization is that plants or plant parts which contact with fire during some kind of processing are more prone to be preserved and, thus, be retrieved in archaeological excavations. That is valid for all plant remains, including wood, but is particularly relevant for fruits and seeds. Waterlogged preservation may provide access to remains that are not frequently recovered in standard dry-land sites because, for some reason, they are not frequently carbonized. Such is the case of Areal. In this site, carpological remains of species that were rare or completely absent in other Roman sites in Northwest Iberia were retrieved, such as *Castanea sativa*, *Olea europaea*, *Juglans regia*, *Ficus carica* and several *Prunoideae* (Martín-Seijo and Teira Brión, 2010; Teira Brión, 2010). The waterlogged remains of the port of Oiaso acted similarly in Roman archaeology of the Basque Country, allowing important inferences regarding trade activities in Antiquity (Peña-Chocarro and Zapata Peña, 2005). Whether by the diversification of plant remains or by the exceptional preservation that allows more accurate identifications, waterlogged preservation is crucial to properly understand agriculture and forestry activities and, eventually, practices related to food consumption and commercial activities.

Considering the scarcity of this kind of contexts, the study of the waterlogged plant remains from the healing spa of *Aqua Flaviae* was directed towards the understanding of the relationship between human communities and their plant resources in a small urban

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