

Dendrochronological research of samples from the *Yarmouth Roads* shipwreck (England, GB)

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Introduction

The *Yarmouth Roads* shipwreck is located in the Solent straight (**Fig. 1**) was first excavated in the 1980s (Rich, <https://forseadiscovery.wordpress.com/whats-in-a-name-the-yarmouth-roads-shipwreck-and-the-iberian-connection/>). Specific construction features suggest that this could be the remains of a 16th-17th century merchant ship built in some Spanish shipyard.

To assess the date and provenance of some timber elements, a timber sampling campaign was carried out in 2015 by underwater archaeologists of Maritime Archaeology Trust / Maritime Archaeology Ltd. based in Southampton, UK. The collected samples were sent for dendrochronological research to the laboratory of dendrochronology of the department of botany at the University of Santiago de Compostela (USC). The research of these samples were carried out within the frame of the Marie Curie ITN ForSEAdiscovery project (PITN-2013-GA-607545).



Figure 1. Location of *Yarmouth Roads* shipwreck site.

Material and Methods

Three samples were received at the laboratory of the USC (see Appendix 1). To assess their suitability for dendrochronological research, two lines were cleaned in the transverse surface with razor blades, and chalk powder was applied when needed to enhance the contrast between ring boundaries.

The samples were identified as deciduous oak (*Quercus* subg. *quercus*) after observing in the transverse section large vessels arranged in a ring-porous disposition and large multiseriate medullary rays, features that are characteristic of this subgenus. The presence of pith and sapwood was also registered.

Ring widths were measured to the nearest 0.01 mm with a TimeTable measuring device (VIAS, University of Vienna) coupled with the program PAST4 v. 1030 (SCIEM). Crossdating between the samples and with reference chronologies was done with the same program.

Results dendrochronological research

The tree samples presented an insufficient number of tree rings for dendrochronological research (**Table 1**). Nonetheless, ring widths were measured in order to get information about the growth rate of the trees selected for those specific timber elements.

Table 1. Results of species identification and tree-ring analysis. Species: 1, *Quercus* subg. *quercus*; pith: present (+1) / absent (-); bark edge: present (+, LW: latewood, EW, earlywood) / absent (-) / estimated; MRW: mean ring width (cm); σ : standard deviation (cm).

Sample number	Type of timber element	Species	Dendro code	N° rings	Pith	Sapwood	Bark edge	MRW	σ
YAR01-001W-01S	Framing element	1	YAR00010	47	+	0	-	3.46	1.09
YAR01-002W-01S	Framing element	1	YAR00020	35	+	6	-	3.91	1.40
YAR01-003W-01S	Horizontal timber	1	YAR00031	24	+	3	-	4.05	1.05

The comparison of these tree-ring series between them did not produce statistically sound results. Therefore, these samples remain for now relatively and absolutely undated.

Final remarks

In future campaigns it is strongly recommended to target a larger number of samples, including more framing elements and other timber elements that may provide higher number of tree rings (e.g. planking elements).

APPENDIX 1. SAMPLES FROM THE *RIBADEO I* SHIPWRECK RETRIEVED IN 2015 FOR DENDROCHRONOLOGICAL ANALYSIS AND WOOD IDENTIFICATION



Figure 1A. Sample YAR01-001W-01S, *Quercus* subg. *quercus* (dendro-code YAR00010).



Figure 2A. Sample YAR01-002W-01S, *Quercus* subg. *quercus* (dendro-code YAR00020).

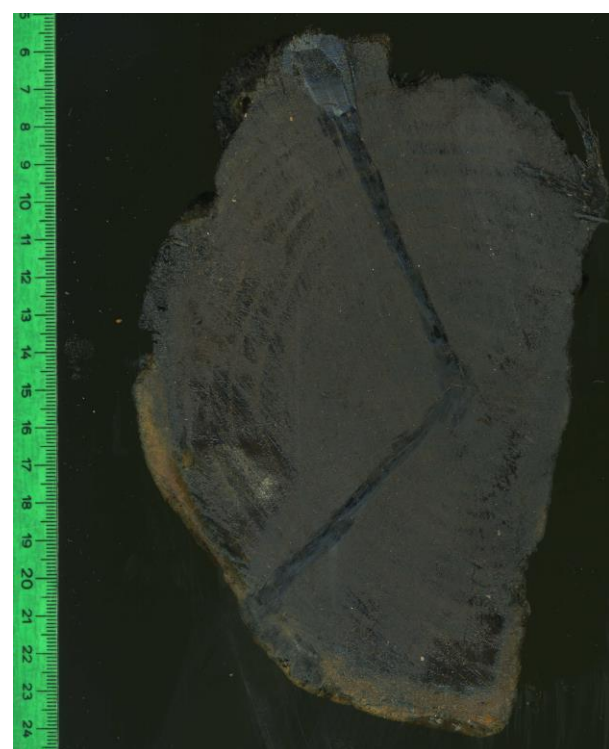


Figure 3A. Sample YAR01-003W-01S, *Quercus* subg. *quercus* (dendro-code YAR00031).

