

PLANT MACROFOSSILS FROM ROMAN HARBOUR IN ZATON NEAR ZADAR (CROATIA)

Renata ŠOŠTARIĆ¹, Mirna A. KRAJAČIĆ², Smiljan GLUŠČEVIĆ³, Sara MAREKOVIĆ¹, Sven D. JELASKA¹

¹ Department of Botany, Faculty of Science, University of Zagreb, Marulićev trg 20, 10000 Zagreb, Croatia, e-mail: renata@botanic.hr, sara@lipa.botanic.hr, sven@botanic.hr

² Popovičeva 17, 10000 Zagreb, Croatia, e-mail: mirnakrajacic@net.hr

³ Department of Underwater Archaeology, Archaeological Museum Zadar, Trg opatice Čike 1, 23000 Zadar, Croatia, e-mail: sgluscevic@amzd.hr

Introduction

The village Zaton near Zadar (Croatia) is situated on the eastern coast of Adriatic Sea (44.23° N, 15.16° E) (Fig. 1). In the Roman times this place was a harbour, two meters submerged today, of a neighboring city of Aenona (presently called Nin)

The researches of the sunken Roman harbor lasted, with major and minor interruptions, since the year of 1968. The last series of methodical researches were done in the period from the year 2002 to 2007 (Fig. 2), when the archaeobotanical samples, presented in this poster, were also taken. Cultural layers, dated from 1st-3rd Century A.D., abound with ceramics (originating from Asia Minor, Middle East, Africa, North Italy and Greece), glass, metal and wood. The findings of wooden sea-going vessels called *serilia* or *serilla* are considered especially precious. They attributed to the shipbuilding skills of the Liburnian (prehistoric) tradition, where the parts of the vessel were connected with a so-called "braid" or tie technique (Fig. 3).

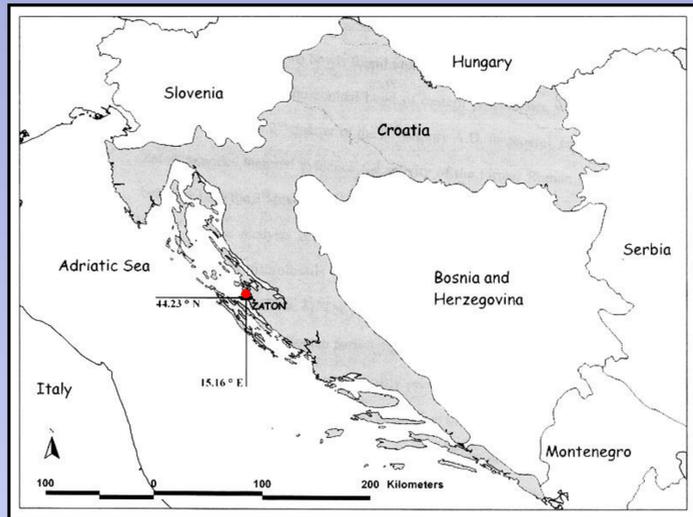


Fig. 1. Geographical location of Zaton.

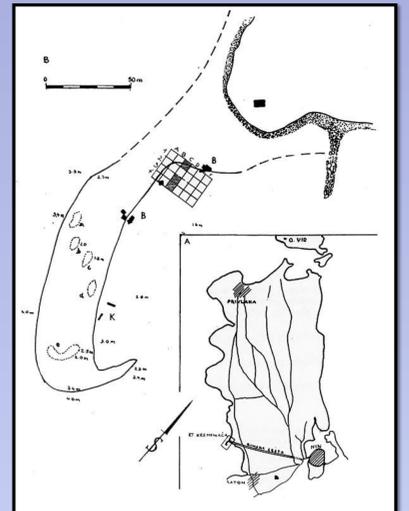


Fig. 2. The location of archaeological locality in Zaton.

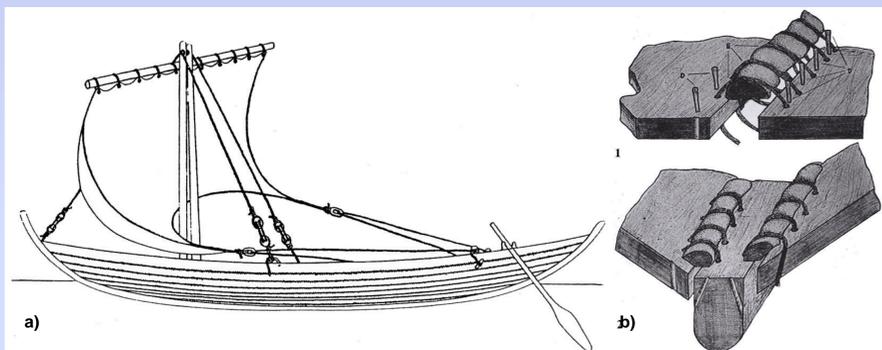


Fig. 3. Liburnian vessel *serilia*: a) vessel portrait, b) parts of the vessel connected with a so-called "braid" or tie technique.

Materials and methods

The excavations, which were performed within a quadrant network frame, included 10 quadrants. 71 samples were collected and numbered from total of 9 distinguished layers. The samples were washed through sieves and partially extracted on the field. The analysis of plant material was done at the Department of Botany (Zagreb, Croatia) and partly at the Institute for Geobotany (Hanover, Germany).



Fig. 6. *Cordia myxa*.

Results and discussion

As many as 3,609 macrofossils were isolated from the samples and 94% of them were identified. In addition, 64 different plant species and 55 other taxa, including cf-determinations, were identified.

The group of weeds and ruderal plants with 30 different species demonstrates major diversity. (Fig. 4a). According to the number of plant remains, most numerous group is the group of cultivated and useful fruits, trees and shrubs. (Fig. 4b).

The most important in agriculture and trading were cultivated fruit trees and nuts: grapevine (*Vitis vinifera*), olive (*Olea europaea*), fig (*Ficus carica*), stone pine (*Pinus pinea*) (Fig. 5), walnut (*Juglans regia*), almond (*Prunus amygdalus*), (sour)cherry (*Prunus avium/cerasus*), peach (*P. persica*) etc. The finding of *Cordia myxa* (Fig. 6) on the site in Zaton is very interesting because all other antic archaeobotanic findings of this plant are from Egypt and Tunisia, so Assyrian plum was probably imported to the harbour of Zaton by trading ships from African or other countries.

The group of cultivated and useful herbs consists of species used as spices or vegetables. From this group we especially want to mention *Raphanus sativus* (Fig. 5), found in layer 3 and dated to the second quarter of the 2nd century A.D., which so far represents the oldest undoubted material evidence of its cultivation in Europe in the Roman period.

The most diverse group are weeds and ruderal plants: *Agrostemma githago*, *Ajuga chamaepitys*, *Anagallis arvensis*, *Atriplex patula*, *Chenopodium album*, *Cichorium intybus*, *Euphorbia helioscopia*, *Glaucium corniculatum*, *Medicago arabica* group (Fig. 5) etc.

In vicinity of the Roman harbour of Aenona there is natural freshwater spring Boljkovac. Already in the Roman times the water was brought with the aqueduct to the town of Aenona, which explains the findings of freshwater plants (*Typha angustifolia* and *Typha latifolia*) in the samples.

The group of (semi)natural vegetation is presented with the species of Mediterranean evergreen *Quercion ilicis* woodland (for example *Quercus ilex* and *Myrtus communis*) and the grassland species (for example *Daucus carota*, *Silene vulgaris*, *Prunella vulgaris* etc.). The species *Suaeda maritima* on the other hand is halophyte with habitat on the coast edge.

This mosaic of different plant groups reflects the paleoenvironment and vegetation of researched locality, anthropological influence, agriculture, diet of sailors, content of ship cargo and variety of trade.

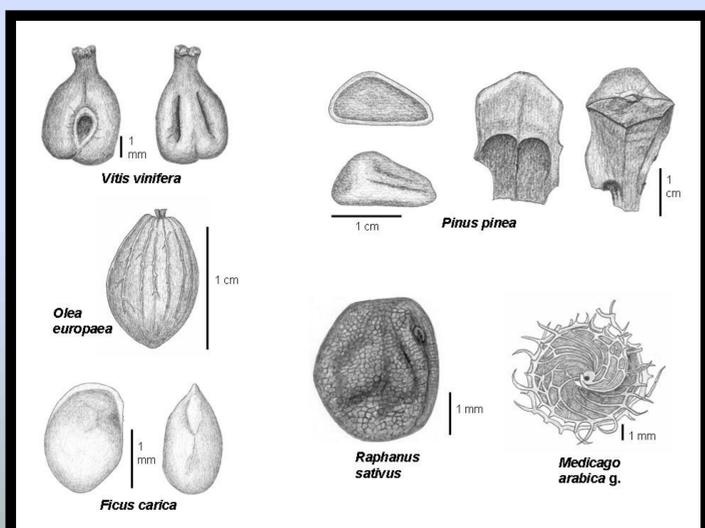


Fig. 5. Some of most numerous and interesting plant remains found in Zaton.

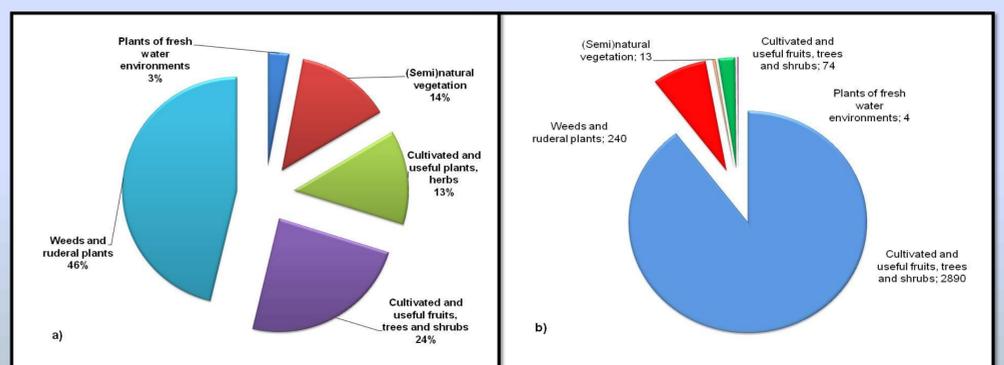


Fig. 4. The identified plant species grouped in ecological categories: a) according to the number of different species, b) according to the total number of plant remains.