

Fuel from late-antiquity smithing earths: a comparison between Lecce and Faragola sites (Puglia-Italy)

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Summary: The results of anthracological investigations of Late-Roman/Early-Medieval smithing earths from two different archaeological contexts are here presented. The sites are located in two diverse environmental settings of Apulia region (SE Italy): P.tta Epulione, in the southern part and Faragola village in the north. Despite the great number of species available in both contexts, oak and mastic tree wood were preferred to because of their intrinsic values as fuel; nonetheless, selection cannot prescind from exploiting local resources.

Key words: smithy, fuel, charcoal, Late-Roman/Early Medieval, southern Italy.

INTRODUCTION

Anthracological analyses of fuel residue from ancient forges are still very rare, even if the discovery of smithies in archaeological contexts provide an unique opportunity to understand: i) the way in which man chose fuel for mineral working and ii) the impact of such specialized activities had on the local environment. Unlike other fire-activities, such as domestic hearths, which can use straw or dung as fuel, metallurgy requires exclusively timber (or charcoal) because of the high thermal value needed.

Qualities of timber are defined by three main factors: inflammability, persistence and height of the flame and, even more, calorific value. This last one mostly qualified a timber as good fuel.

Combining archaeological observations and anthracological analysis, it is possible to: identify wood species employed as fuel in smithing; point up some pattern in the selection of timber; define the catchment basin of ancient metallurgy.

Within this work, we intend to show the results of archaeological-anthracological analyses carried out in two Late-Roman/Early-Medieval sites, located in two different environmental settings of Apulia region (SE Italy): P.tta Epulione, in the southern part and Faragola village in the north (Fig. 1).

P.tta Epulione archaeological evidence dates back to the 3rd century AD and clearly refers to a blacksmith's workshop placed in ancient Lecce, very close to a roman road. The anthracological records of those forges have been compared with the palaeoenvironmental data collected in the coeval site of P.tta Castromediano, in order to define the catchment basin and, eventually, to recognize a selection of the fuel.

Evidence at Faragola was found in the Early-Medieval levels (6th-7th century AD), which obliterated the Late-Roman monumental ruins. They

provide unique information on metallurgic activities for this period in the area. Besides, being part of a wider anthracological 'campaign' carried out at the site, comparison can be made with other contexts and intentional selective patterns can be inferred.



FIGURE 1: Localization of the archaeological sites above mentioned.

DATA AND RESULTS

The excavation of a blacksmith's workshop at P.tta Epulione has revealed a sequence of three plans of burnt clay, layers of ash and remains of hearths, overlapped between them and characterized by abundant iron slags. Those layers could be interpreted as working plains for metallurgical activity. The three forging hearths represent different phases of use, over a brief time period (phase I: US 253; phase II: 283 and 282; phase III: 289 and 291). The working plain of phase I (US 254) was flanked by two pits, in which a pair of anvil bases were probably inserted, and a particular concentration of charcoals and ashes.

The examination of charcoal remains collected in P.tta Epulione's forges, has led to the following results:

Phase I

Forge: *Quercus ilex* type 40%; *Olea europaea* 60%;
Working plain: *Pistacia lentiscus* 60%, *Q. ilex* type 30%, *Olea europaea* 5%, *Erica cf. arborea* 2%, *Rhamnus/Phillyrea* 2%.

Phase II

Forge: *Olea europaea* 49%, *Quercus ilex* type 34%,
Erica cf. arborea 2%, seeds remains 15%.

Phase III

Forge: *Olea europaea* 47%, *Quercus ilex* type 17%,
Erica cf. arborea 17%, *Rhamnus/Phillyrea* 4%, seeds remains 15%.

The anthracological spectrum of smithies identified at Faragola site reveals that *Quercus cf. pubescens* wood accounts for 85% of the total fuel employed, while *Pistacia lentiscus* and *Rhamnus/Phillyrea*, for 6 and 9% respectively.

DISCUSSION

Anthracological analysis of P.tta Epulione clearly shows:

- a) the large incidence of olive tree and evergreen oak as main fuels in smithing activity, along the whole sequence of forges;
- b) the utilization of pruned branches of olive trees as fuel, because of the contemporary presence of olive charred fruits in archaeobotanical records.
- c) the charcoal mound, found next to the forge of phase I (US254), represents the results of cleaning actions and refers to the second last charge of the forge, in which mastic-tree wood was mainly used.
- d) all the taxa attested as fuels belong to the landscape described in the P.tta Castromediano anthracological record. *Quercus ilex* and *Pistacia lentiscus* trees refer to the maquis xerophytic vegetation, as attested in ancient maps and documents, while *Olea europaea* reminds of the particular countryside landscape (Primavera *et al.*, in press).

Fuel identification in Faragola reveals:

a) Oak was the main employed taxon, while mastic tree and buckthorn were probably used as lightning elements.

b) Comparison with hearth and kiln fuel, as well as carpentry, reveal that the elements found in the forges were part of the local natural environment. This included, on the hill-top, coppice dominated by *Quercus cf. pubescens*, *Ulmus cf. minor*, *Acer* sp., *Fraxinus cf. excelsior*, and, in the sunny river valleys, termophilus wood made by *Rhamnus/Phillyrea*, *Pistacia lentiscus*, *Juniperus* sp. (Caracuta and Fiorentino, 2009).

CONCLUSION

The anthracological analyses carried out in the Late-Roman site of P.tta Epulione and the Early Medieval settlement of Faragola, reveal a programmatic selection of wood.

Despite the great number of species available in both contexts, oak and mastic tree wood were preferred because of their intrinsic values as fuel. Nonetheless, the selection cannot prescind from exploiting local resources. Evergreen oak together with olive were preferred in the south, where xerophilous wood is much more attested, while deciduous oak and buckthorn were more abundant in the north, where coppice is widespread.

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