

# Metallurgy and forest landscapes from the Gallo-Roman to the Modern Period in Périgord-Limousin (France)

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**Summary:** The results of charcoal analysis from a Roman bloomery and 14 modern charcoal kilns are presented in this article. Charcoal samples were collected in the area known as Châtaigneraie Limousine, in Périgord-Limousin (France). These results show that the chestnut was already used for metallurgical activities during the Roman period. Nevertheless, its use would have been more important as coppicing species during the Modern period for the production of charcoal. Some forests situated at the flat areas of the hills would have been transformed to mono-specific chestnut woodlands during this period. This intensive exploitation of the woodlands however would not have changed all the landscapes. On the valley slopes, the presence of the oak would have been very important together with the chestnut. At hilltops, the ancient vegetation would have been conserved with the presence of the beech. Although the use of the forest was intensive and constant, preservation of these formations has been observed from the 15th century until nowadays.

**Key words:** chestnut, Châtaigneraie Limousine, charcoal kiln, roman bloomery, forest landscape

## INTRODUCTION

The study area, called *Châtaigneraie Limousine* (Limousin Chestnut grove), is situated at the limits of Haute Vienne, La Dordogne and La Charente departments in France. The etymological origin of this place is linked to the important role that chestnut played, first as a fruit tree and starting in the 18th century, as a coppicing species related to the proto-industrial activities such as the production of charcoal for metallurgical purposes due to its low cost and ease of growth in comparison to the oak (Magne, 2004).

We present the results of charcoal analysis from a Roman bloomery (Atelier Commune de Soudat) and 14 modern (15th-20th centuries) charcoal kilns. The main objectives of this study are: 1) to know the evolution of the indigenous vegetation of the studied area, where oak tree and beech tree were the principal species, 2) to know when the foreign chestnut was introduced at the study area and which is the role it plays across time and 3) to know which was the landscape exploited during the most intensive period of forest exploitation, the modern period.

## METHODOLOGY

At the Roman bloomery, 2 liters of sediment were recovered from a charcoal accumulation. For the charcoal kilns, 30 x 30 cm surveys were performed and every 5 cm a sediment sample was recovered. Furthermore, this sediment was sieved with a 4 and 2 mm sieves column and only charcoals larger than 4 mm were analyzed with a reflected light optic microscope.

At the Roman bloomery, we analyzed 250 charcoal fragments. At the charcoal kilns 125 charcoal fragments

were analyzed for each inferior and superior level, of every charcoal kiln.

## RESULTS AND DISCUSSION

We identified *Fagus sylvatica* as the principal species. Deciduous *Quercus* represented 10% of the total and *Castanea sativa* was present (Fig. 1). The chestnut, a foreign species, was probably introduced during this period in France (Belligaud and Fredon, 1985) and is related to metallurgical activities. These results are similar to other roman sites of Périgord-Limousin (Fredon, 1984, 1995; Poirier, 1999; Peyrony, 2001).

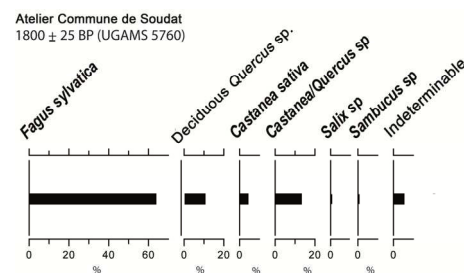


FIGURE 1. Results of the charcoal analysis of the Roman bloomery from Soudat.

For the rest of the structures, all of them modern charcoal kilns, we can classify the results in three different categories:

1) We observe a mono-specific forest, formed by *Castanea sativa*, representing more than 70% of the analyzed charcoal fragments. The other species (deciduous *Quercus*, *Betula* sp. or *Alnus* sp.) were rare. This type of vegetation was only identified at the

charcoal kilns situated at flat areas of the hills. It is a monotone and artificial landscape, as a result of chestnut monoculture.

2) A more varied woodland containing deciduous *Quercus* and *Castanea sativa* was observed, where *Quercus* dominated in most of the cases and *Castanea* encompassed 10-35% of the total, except in T.D.C. where it represented 90%. This type of forest was identified in the charcoal kilns situated at the valleys slopes, where chestnut and oak would have principally grown and we could find other species like the beech, elm, hornbeam or hawthorn. At the clearances, we could find the birch or hazel and near the water sources, the alder, willow or elder. This landscape is less artificial than the vegetation of the flat areas of the hills. Probably, the harder slopes of this landscape played an important role in the less intensive exploitation of these landscapes.

3) The third type of vegetation is composed by *Fagus sylvatica* representing over 10% of the total together with the deciduous *Quercus* and *Castanea sativa*. Charcoal kilns that show us this vegetation were situated at the slopes of the highest mountains. We could classify it as ancient woodland conserved over time. This landscape is the least artificial of the three types of identified forests (Fig. 2).

We do not observe any change in the vegetation neither between the superior and inferior levels of each charcoal kiln nor between the charcoal kilns of different chronologies. We can say that the intensive exploitation of the woodland does not cause deforestation of the exploited forests because of controlled exploitation due to the availability of the wood for charcoal production.

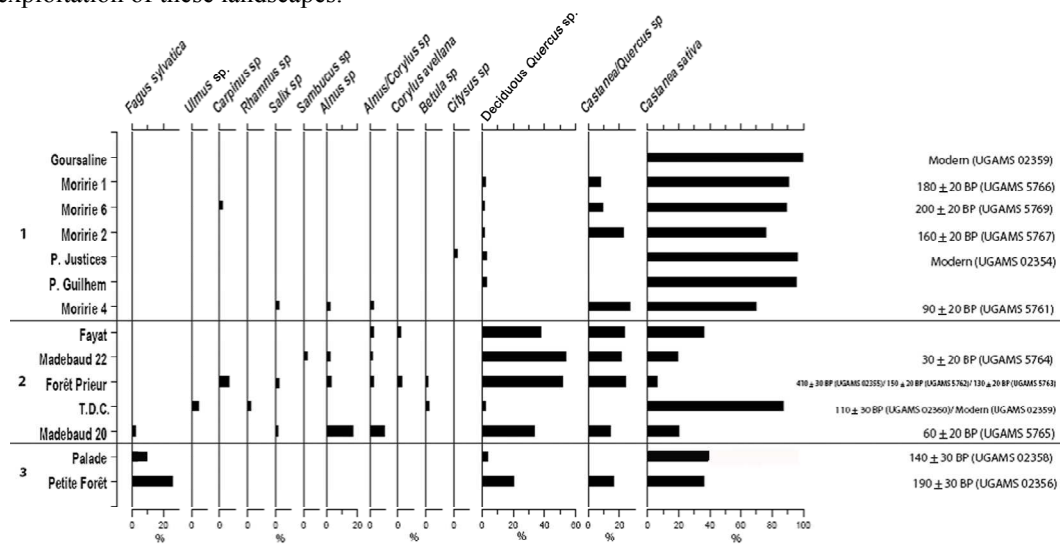


FIGURE 2. Results of the charcoal analysis of 14 modern charcoal kilns.

## CONCLUSION

The results show us a landscape formed mainly by oak and beech and a punctual presence of chestnut during the Roman period. Progressively, beech decreases and the population of oak and chestnut become more important until the present time (Euba and Allée, 2009). From the modern period, beech, a relictual species corresponding to ancient vegetation, is conserved at the highest hills, coppicing woodland of oak and chestnut is present on the slopes and a mono-specific chestnut forest at the flat areas of the hills.

## ACKNOWLEDGEMENTS

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## REFERENCES

BELLIGAUD, G., FREDON, J.J., 1985. L'introduction de châtaignier en Limousin: indications fournies par la découverte de bois carbonisés dans un site

archéologique. *Annales Scientifiques du Limousin* 1, 19-25.

EUBA, I., ALLÉE, PH., 2009. Étude archéobotanique de la forêt de la Châtaigneraie Limousine. In : ALLÉE, PH. (dir.) *Géohistoire et géoarchéologie des territoires forestiers limousins*. Document final de synthèse du P.C.R., Service Régional de l'Archéologie, 133-174.

FREDON, J.-J., 1984. Macrorestes végétaux de sites archéologiques en Limousin. *Trav. Arch. Lim.* 5, 7-15.

FREDON, J.-J., 1995. Contribution de l'anthracologie à la connaissance de l'évolution du couvert végétal en Limousin. *Trav. Arch. Lim.* 15, 19-29.

MAGNE, CH., 2004. *Au temps où le Périgord-Limousin-Angoumois canonait en Atlantique*. CPIE, Varaignes.

PEYRONY, J.G., 2001. La métallurgie antique aux confins du Périgord et du limousin : l'exemple du Piégutais. *Trav. Arch. Lim* 21, 63-72.

POIRIER, PH., 1999. *Anthracologie et environnement de la période gallo-romaine à la période médiévale en Poitou-Charentes*. Ph.D. Thesis. Université Montpellier II.