Abstract: The EST-AP team (Institute of History, CSIC) has already a long trajectory on the study of ancient agrarian landscapes. Within our projects, we have developed several approaches to the analysis and the understanding of the processes of agrarian exploitation in the western provinces of the Roman Empire: on the one hand, Landscape Archaeology and the integration of Geoarchaeology to the study of landscape has offered us with new ways to the analysis agrarian spaces; on the other, these analysis have been integrated in theoretical discussions and the review of the traditional ideas on Roman rural organization. Our contribution aims to present a synthesis of the methodology and most recent results obtained in the excavation of a system of terraces in the Sierra de Francia region, in the framework of the trajectory of our work on agricultural structures. We will also summarize the future lines of research open in the light of data retrieved, with particular relevance to the interpretation of different historical processes at a regional level.
1. Introduction

Our research group, "Social Structure and territory. Landscape archeology " ("EST-AP", Institute of History, CSIC), has conducted several research projects addressed to the analysis of the transformation of social formations in Iberian Peninsula, in the transition from pre-Roman to Roman times. We have developed an approach that proposes Landscape Archeology as methodological framework, that is to say to understand the landscape as synthesis of historical processes, as continuously changing social construction. Dynamism is essential for the historical understanding of the landscape in terms of social relations, particularly when working in mountainous areas or on peripheral hilly regions, where there is the risk to consider that the continuity and stability are dominant tendencies.

Our study areas, located in northwestern Iberian peninsula, are characterised by the significant weight of mineral resources ancient exploitation, especially gold deposits. From the topographic point of view, our study areas present a fairly fragmented morphology, including small mountain areas articulated on valleys, hills and plateaus (sierras and mesetas). In the framework of our regional studies, one of our aims has been the study of one crucial aspect for the global understanding of the study areas: the management of the agrarian spaces in the sectors in which the mining activities have had an essential role. Our point of departure has been the idea that in the context of ancient economies is not possible to establish a clear differentiation between productive sectors. It is rather necessary to consider the exploitation of agricultural and mineral resources on a complementary perspective and within the overall framework of the interests of Rome in the exploitation of provincial resources and in the context of rural communities organized in civitates. Our research in the Sierra the Francia region illustrates this perspective (recent publications are Ruiz del Arbol et al., 2014; Orejas and Ruiz del Arbol, 2015; Sánchez-Palencia, 2014).

During the year 2012 we planned several archaeological activities on the terraced systems of the Sierra the Francia region, in the framework of the project “Estructuras agrarias y poblamiento antiguo en el noroeste peninsular” (PIE, 201010/042) funded by the CSIC. The purpose our intervention was obtaining data to complete the study of the exploitation of the area during Roman times, firmly based on the case study of la Fuente de la Mora and the terraces of the Llano Redondo (a synthesis in Ruiz del Arbol, 2005; see also Ruiz del Arbol et al., 2014).

Thus, in September 2012, we conducted few surface surveys and sondages in two groups of “fossilized” agricultural terraces in the Sierra: the first one was located in the Roman gold mining area of Las Cavenes, in a place known as Las Cabezuelas (El Cabaco); the second, in another non-mining area near La Alberca, known as Los Lanchales (Nava de Francia).

The aim of this contribution is to present the preliminary results our work in the area of Los Lanchales, and to expose a synthesis of the methodology employed and data obtained in the archaeological sondages of the terraces. As we are going to show, the interventions allowed us to record the morphology and structure of several agricultural terraces and obtain a complete sampling framework for soil and pollen analysis, and datations. However, as we are going to present below, results of datation were heterogeneous and show the need of a new systematic study and extensive sampling of the terraces of the area.

2. Our point of departure: colonization of mountainous areas on the northwestern Iberian Peninsula in Roman times

The historical framework of our work is the study of the transformation of northwestern Iberian Peninsula territories under Roman dominion. Our work has shown that Rome direct interests often led to dramatic changes in occupation strategies of peripheral areas. The hills and
mountains, swamps or barren lands for farming became pieces of an overall strategy of the occupation and exploitation of the territory and not marginal spaces or "no man's land".

As stressed above, our research work has developed in regions characterized by ancient mining activity, in particular gold mining. These are sectors of mountain or of foothills, between the Tagus basin and the Cantabrian Coast. One of the lines of research developed by our team is the study of communities occupying these regions before their later conquest by the Roman armies (officially ended in 19 BC), the “castreña” culture (Sastre and Sánchez-Palencia, 2013). Another, is the Roman period and the imposition of new organization frameworks for rural indigenous communities (civitates) and for public mining (metalla publica) (Orejas and Sastre, 1999; Sastre 2001; Orejas and Sánchez-Palencia, 2002). Our research focuses on three areas: settlement and land use through intra and off-site studies; environment, mining and technology, exploitation of agrarian resources; social structure during pre-Roman and Roman periods.

The various activities related to the acquisition of mining resources shaped the landscape permanently. The extraction of gold, promoted under Roman rule during the 1st and 2nd centuries AD, involves much more than a technology change from the previous period. It induces a profound change, linked to the strategic interests of Rome that, from the Augustan times, needed to control gold production to ensure the stability of the monetary system. Asturia, Gallaecia and northern regions of Lusitania contained gold deposits which guaranteed the production of the metal to Rome.

Obviously this caused early and very visible interventions on the territory, that must be understood in the context of the overall changes that took place after the conquest: the new forms of organizing, delineating and occupying the territory as well as a diversification and an intensification of the exploitation of different types of resources. As we have already emphasized, this is not a specialized or sectoral economy, even if the presence of mines is impressive. Beside mining sectors, fertile lands have been systematically occupied and structures for agricultural exploitation have been documented in the vicinity of the mines.

The identification of several agricultural terraced systems – dated to the High Empire - in two of the mining areas studied during our research projects put us on the track of the importance of this form of development of the agrarian space (see Orejas and Ruiz del Arbol, 2015). This was the case of La Sierra de Francia (Salamanca), where the distribution of sites is coherent with the agricultural potential of the land and where the agricultural terraces were built near a rural settlement (La Fuente de la Mora) between two of gold mining sectors in the mining area of Las Cavenes de El Cabaco. We have documented other similar Roman terraced systems in the mining area of Pino del Oro (Zamora). There, over the river Duero, at Peñarredonda (Villargieguia) terraces have been identified and are currently under study (Sánchez-Palencia, 2014).

These two case studies provided also to us the opportunity to develop interdisciplinary field and analytical work in order to complete a full research on these structures and their relationship with the mining sectors and the associated settlement. Moreover, the study of the Sierra de Francia region allows illustrating the interdisciplinary approach employed in our work and the utility of the data from soil analysis (morphological, micro-morphological, physical and chemical) and its application in territorial studies.

3. The methodology employed for the study of the terraces of Sierra de Francia

Research on agrarian landscapes has benefited, in the last ten years, of the development of interdisciplinary projects, of regional basis, and developed from a broader perspective of archaeological record (some good examples are Orejas, 2006; Asins, 2009; Kirchner, 2010; Quirós et al., 2014). This approach has enabled a better identification of agrarian structures, but also to advance in the interpretation of ancient agrarian practices. It seems important to stress
the idea that it is not to give context to archeological sites, but to expand the condition of archaeological object to the entire landscape, understood as a synthesis of social and environmental relations along history.

Research on the Sierra de Francia area has provided our team the opportunity to propose a study where archaeological approaches (stratigraphic, materials ...) converge with soil studies (morphological, micro-morphological, physical and chemical analysis) and their applications to the study of territories. In a first analysis of the area, several terraced systems were identified, thorough photo-interpretation of aerial photographs and field walking. Some groups of terraces were abandoned fairly recently, but others seem older, "fossilized".

Where these terraces are best preserved is in the area known as La Fuente de la Mora (El Cabaco), located between the two main sectors of the mining exploitation and very close to a Roman settlement. We have done a complete study of these, thorough the realisation of multiple stratigraphic sections (Ruiz del Árbol, 2005). The trenches have provided a complete documentation on the Roman agrarian exploitation and on the environmental dynamics of this area. The chronology of the terraces is determined for the 1st and 2nd centuries AD, contemporary to the nearby settlements and coherent with the period of activity of gold mines. Several C14 datations (from burning levels related to terrace preparation) and diverse material within the structure of the terraces (terra sigillata, tegulae,...) provide the basis for datation in Roman times. Also, the measures of the terraces (half of an actus each) were good indicators of their Roman attribution.

Besides of aerial photo-interpretation and a detailed micro-topography, the excavation of the terraces was essential to their study. Every sondage cut transversaly the structure of the terrace. The aim was to document the estratigraphic sequence in order to study its construction and composition (walls, soils associated to Roman agrarian activities and other anthropic activities) as well as the abandonment processes. The stratigraphic sequence has been used both to the identification and description of soils and to the realization of a complete programme of sampling.

The internal study of the terraces has been based in the analysis of the stratigraphic sequence documented in the sections and in the achievement of a complete sampling programme of the soil horizons identified in the profiles. The standard stratigraphic sequence documented in the sections of the terraces is:

- Ah, the organic horizon of surface, the actual soil of the forest.
- Ab, the Roman ploughed soil, sustained by the retaining wall of the terrace (when this wall is preserved it is marked in the stratigraphic sequence with a "—" in brackets).
- C, the mineral soil, completely or partially incorporated to the Roman agricultural soils. It is the active soil of the pre-Roman period.
- 2C, the bed rock, nor affected by human activities.

This sequence has been conserved buried under the soil of the forest. The quick formation of the O-Ah horizons after the abandonment of the area fossilised the ancient agricultural soils in all the sections. Some of the most important features recorded in the profiles of the trenches were the presence of an homogeneus layer, Ab, clearly indicating cultivation in the past. The building of the terraces and the preparation for cultivation of the soils of La Fuente de la Mora implied the total or partial incorporation of the preexistent soils into new cultivated soils and the creation of a homogeneous Ap horizon retained by the wall.
Also, the existence in some of the trenches of the retaining wall has conditioned the way in which the organic horizons have been accumulated after the end of the exploitation of the area helping the fossilization of the terraces in the actual landscape.

There are many morphological features preserved in the profile which allow the adscription of these terraces to the agricultural exploitation of the area, preserved thanks to the fast burial of the soils. It can be cited, for example, the sharp boundary between the Ab and O horizons, or the shape of the surface of separation between those horizons, which forms in some cases sinuosities.

In all the trenches we have done a systematic sampling, taking samples for physical and chemical analysis of soils and pollen analysis. The chemical analysis is being based in the following parameters: pH, organic matter, C/N relation, N%, P, Ca, K.

Samples taken for pollen analysis wanted to contrast the development of the vegetation through the successive pre-Roman, Roman and post-Roman soils; those data are integrated in the study of the profiles and only have sense in the interpretation of the horizons. Through this analysis we have seen that the contemporary soils to the cultivation of the terraces corresponds with the period of bigger deforestation of the zone, without doubt related to the agrarian and mining exploitation, even though the degree of antropization in absolute terms never was very high.

4. The terraces of Los Lanchales

As a part of this research activity we proposed new interventions in the area, intended to contrast and complete those studies undertaken in La Fuente de la Mora with the realization of a number of samples. The specific areas in which the studies were carried out were Las Cabezuelas (El Cabaco) and Los Lanchales (Nava de Francia). We are going to focus now in the activities we developed in Los Lanchales area. We dig one terrace in the area of Las Cabezuelas, in which we checked the soil formation processes in that area and confirmed that no ancient soils were preserved at all.

The Lanchales is the name by which an area of the eastern slope of the Sierra de Francia, close to the village of Casarito (in the municipality of La Nava de Francia) is known. In this area we documented during our fieldwalking surveys the presence of five terraces. As in La Fuente de la Mora, here the conditions of surface visibility are bad, what often happens in these mountain sectors, due to the abandonement of crops and the development of herbaceous vegetation that hides the soil surface and sometimes because of erosion (on the geomorphological and vegetal constraints to the study of mountainous terrace systems and on the methods used, see the recent work by Harfouche, 2015).

Two of the five terraces documented in the area, are in a private property, cultivated (nowadays abandoned) with chestnut trees. The other three terraces, in a higher level, are located in an forested area (public forest, oaks) and are separated from the previous two terraces by a forest track, although the five terraces would have formed in the past the same cultivated area. Surface material has been documented in the lower terraced area, mainly fragments of tile (among these one fragment of tegula), squared granites and some various materials such as slags of iron and fragments of common pottery, possibly Roman, and a small piece of glazed pottery).

Two sondages were done, which cut transversally the structure of the terrace. As in previous sondages, the objective was to document the stratigraphic sequence in order to study the terrace construction and the buried soils. The stratigraphic sequences have been used both to the identification and description of soil profiles and the diverse horizons, and to the realization of a complete programme of sampling. The first survey cut one of the upper terraces, in the oak forest area (sondage 1). The second (sondage 2), cut one of the terraces in the area of chesnut,
particularly the terrace where most surface material was found. The two surveys were performed by buldozer and outlined by hand.

Sondage 1 (9.30 m long x 1.20 m wide and 1.80 m depth) documented the following stratigraphic units (figure 1):

- **US 1** (Horizon Ah 1). It is the surface level of the forest, dark brown colour, with a homogeneous thickness (8-15 cm) over the entire section. Is composed mainly of leaves, with little mineral fraction. Gradual and flat transition to US 2.

- **US 2** (Horizon Ah 2). It is an organic level, with many roots, documented for the entire profile, with an average thickness of 20 cm (in some areas up to 30 cm). Dark brown in color, with few stones (some, small, less than 5 cm) and many roots of all sizes. During the opening of the sondage several pieces of slag appeared at this level (although later, during the sampling, none was documented). This level presents a gradual, flat transition to the US 3.

- **US 3** (Horizon 2 Ab). This is a level of clay, gray-brown color, with few roots, thin and medium, some pebbles and flat and net transition to the US 5.

- **US 4** (Horizon 2 Ab 2). This is very similar to the previous level, but looser, with abundant stone, small and medium (5 to 10 cm). The transition between the US 3 and US 4 is gradual. The transition between the US 4 and US 5 is net and flat.

- **US 5** (Horizon 3B). Homogeneous and compact, yellow, harder at the bottom than at the top. In some cases it is crossed by a root (intrusions reflected in the drawing). This is a level of clay, with some pebble, few roots and gradual and flat transition to US 6.

- **US 6** (Horizon 4 C). This is a clay level, orange, hard. Without roots.

We interpreted US 3 as a level of cultivation, supported by a wall (US 4). After its abandonment these have been buried by the fast formation of a new soil layer (US 1 and 2, the current forest floor). The cultivation level (US 3) has been formed on a previous ground (US 5) documented on the natural soil of the area (US 6).

Datation obtained from a fragment of carbonized wood (*Quercus*) found in US 3, provided the date of AD 1450. The same datation was obtained from another carbon from US 5 (*Quercus*), pointing to a late medieval period.

Sondage 2, was performed in private area, under the chestnut crops. Dimensions were 7 meters long x 1.20 meters wide. The maximum depth reached by the survey was 2.10 meters. In the profile the following stratigraphic units were documented (figure 2):

- **US 1** (Horizon Ah 1). This is the soil of the forest, dark brown, with much litter, which is documented continuously along the entire profile. With little stone, very loose soil and an average thickness of 15 cm. Gradual and flat transition to the US 2.

- **US 2** (Horizon Ah 2). As US 1, is the soil of the forest, with with abundant roots of chestnut of all sizes and some small and medium stones. The roots are most abundant in the area of the wall of the terrace, which is where the chestnuts, which are holding the patch, are lined, just in the change of slope line. The soil is dark brown and very loose. Net transition, flat, to the US 3, in the first six meters of the profile. In the east end of the US 2 covers the US 7, with net and flat transition to US 7.

- **US 3** (Horizon 2 Ab 1). Clay level of brown colour, compact, consistent. With few roots.

- **US 4** (Horizon 2 Ab 2), similar to the previous one but with many stones between 5-10 cm in size (granite, schist and quartz). The US is also very compact.
- US 5 (Horizon 2 AB 3). Brown clay level, similar to the US 3 and 4, brown, compact, consistent. With gradual and flat transition to the US 6.

- US 6 (Horizon 3 B). Dark yellow, with small pebble, many visible (carbon points) and very compact organic matter. It is only documented in the top of the terrace (the western sector of the profile).

- US 7 (Horizon 4 C). Clay homogeneus level, hard and compact, with some roots. Light yellow colour. On the east side of the profile it is clearly delimited by two highly decomposed granite outcrops of rock.

- US 8 (Horizon 5 R). Decomposed granite rock.

In this case the cultivated soil can be identified in the US 3, 4 and 5 (we interpret this as one US, but opted for differentiation due to the presence of stones in US 4), that was supported by a wall which has either disappeared or never existed, since the terrace could have taken advantage of the existence of a clear change of slope in this area. After its abandonment this cultivated soil was buried by a new level (US 1 and 2, the current forest soil). The cultivation level would have formed (UE 3) over a previous ground (US 6) although it could also be a previous cultivated soil. US 6 is settled on the natural ground of the area (US 7 and 8).

However, dates obtained from some charcoal obtained in US 3 and 5 point to a difficult interpretation dates (16.000 BC for the US 3 and 1.000 BC for US 5). Chemical and physical soil analysis are under study. We expect to present these results during the conference, as well as the results of pollen analysis.

However, there are many morphological features preserved in the profile which allow the adscription of these terraces to the agricultural exploitation of the area, preserved thanks to the fast burial of the soils. In both profiles we have documented, as in other part of the Sierra, that the quick formation of Ah horizons after the abandonment of the area fossilised the ancient agricultural soils in all the sections. Another features that can be cited, for example, the sharp boundary between the Ab and Ah horizons.

5. Final considerations: problems posed by the results and future perspectives

The methodology employed in previous years to the study of Roman agrarian spaces was also employed in this case study, and successfully helped to identify the morphology of the terraces, the soil structure and their agrarian function, however the lack of historical context and results of dating pose several problems to its interpretation in the framework of our knowledge of the Sierra.

Future work needs to integrate integral micro-regional analysis and systematic (non-isolated) excavation work and sondages in other terraced systems of the Sierra, to be able of providing context to these structures. Terraces in the upper part of Los Lanchales (sondage 1) can, in any case, shed light to the study of the diachronical configuration of the Sierra de Francia region, and to complete the picture of the processes of landscape development that recently have been observed in the Sierra de Francia (see Blanco-Gónzalez et al., 2015), in order to understand the deep history of the landscape and the importance of agriculture in these mountains sectors.

The case study of Los Lanchales needs further field work, if it wants to contribute to an integral study, pedological and archaeological, of the ancient agrarian colonization of the Sierra the Francia, following the track of other initiatives, such as those of Fernandez Mier in the Asturian Mountain which show the depth and dynamic history of mountainous systems (Fernández Mier y González Álvarez, 2013; Fernández Mier et al., 2014).
Ancient land management, ancient land divisions, historical terraces, pre-industrial mines or rural traditional habitats are much more than fossilised morphologies or isolated relict elements present in today’s landscape. They are valuable as pieces of a complex network of invisible links which reflect the social relationships changing through time. The methodological and technical aspects we quickly discussed and case studies on which we were based, enrich the current view of the potential of this type of study and what remains to be done.

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REFERENCES


FIGURES

Figure 1. Sondage 1
Figure 1. Sondage 2