

# Roman Rural Landscape of High Guadalquivir (Jaén) Lagoons

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## Abstract

A large number of lakes, lagoons, deltas, wetlands and flood plains converge in Andalusia. The analysis of lake and marsh areas during Roman times has been a historical subject insufficiently considered so far by Spanish historiographers. This research aims to undertake the study of those more significant cases of *High Guadalquivir* (Jaén), always within the Roman *Baetica* context. Focusing on the interaction among culture and environment, landscape ecology and socio-natural systems, the authors aim to comprehend the relation of rural settlements to these environments to study various methods of exploiting lagoon areas and to analyse lacustrine landscapes in the historical context of the Roman period.

**Keywords:** Wetlands, Written Sources, Archelogy, *Baetica*, High Guadalquivir

## Wetlands of the High Guadalquivir

The High Guadalquivir constitutes a 12,500 km<sup>2</sup> natural region whose boundaries roughly coincide with today's province of Jaén (Higuera Arnal, 1961). It also represents the term used by historians to refer to that territory during Antiquity, since the province of Jaén did not exist as a political or administrative entity in that historical period. Every time the word, hereinafter, appears in italics, it will refer to the lands of Jaén in Antiquity, whilst it will make reference exclusively to the natural region when it appears in normal format.

From a total number of 90 wetlands registered in the inventory for lagoons and wetlands of the

High Guadalquivir, 56 are located in the Campiña, while the areas of the range subsume the remaining 34 (fig. 1).

This differential distribution might be associated, apart from geomorphological patterns, with the climatology of each area. The relation between climatology and endorheic factors, and between the latter and the presence of wetlands, seems to have been proven. Such relation could justify a major presence of wetlands in the areas around the Valley of the Guadalquivir, especially in the Campiña, where endorheic patterns and a certain degree of aridity coincide. Furthermore, it should also be noted that smoothly-undulated topography and difficult drainage exist (Parra Anguita, Guerrero Ruiz & Ortega González, 2003).

A publication like this, with limited space, impedes the development of an overall analysis of wetlands. Thus, it has been decided to focus on localities of the Campiña Sur where there is diverse and abundant information: Alcaudete, Martos and Jaén, which encompass 46% of the flood areas in this county and whose lagoons might be considered as arrays representative of the whole province.

After collecting and organising the data obtained during various ecological studies carried out in the wetlands of the Alto Guadalquivir (Parra Anguita, Guerrero Ruiz & Ortega González, 2003; Ortega González & Guerrero Ruiz, 2006) a table showing the most remarkable and archaeologically best-known lagoons has been arranged for the selected municipal areas excluding those situated in the *Tarraconense* territory. The table also contains the values which are of major interest for the settled aims and consist of situating these areas geographically, highlighting their physical and environmental characteristics and then comparing



Fig. 1. Location of High Guadalquivir in Spain and its zoning by district. In brackets the number of lagoons by district (Parra Anguita, Guerrero Ruiz & Ortega González, 2003).

this data with ancient written sources and relating the information to the archaeological sites within a relative radius of proximity (fig. 2).

Considering the handled information, it can be noted as the most interesting fact, that from the nine analysed wetlands, most of them belong to the categories of occasionally-seasonal or habitually-seasonal from the perspective of their hydric regime. This fact appears to arise from the continuous aggressions which these ecosystems have suffered in the last decades. Among the different degrading activities, agriculture stands out in the first place and, fundamentally, that which is associate from olive cultivation including

desiccation, overexploitation of aquifers, use of irrigation reservoirs and backfilling of lacustrine plains, followed by debris dumping and, in the last place, livestock.

With regard to the environmental characteristics (Madero, Ortega & Guerrero, 2004; Ortega González & Guerrero Ruiz, 2003; Ortega González, Parra Anguita & Guerrero Ruiz 2004; Ortega González et al, 2001), it can be highlighted that most lagoons are of exclusively superficial origin and only present their aquatic nature during autumn and winter rainfalls, though on occasions summer drought may linger the entire year. This explains the scarcity and little variety of the typical vegetation. Lagoons with a predominance of fresh water shelter abundant aquatic flora (Naranjeros and Rumpisaco) from which the presence of communities characteristic of the temporal Mediterranean wetlands stand out. Within the

<b>Columna1</b>	<b>Columna2</b>	<b>Columna3</b>	<b>Columna4</b>	<b>Columna5</b>	<b>Columna6</b>
<b>Nombre</b>	<b>Coordenadas UTM</b>	<b>Término Municipal</b>	<b>Régimen Hídrico</b>	<b>Área (ha)</b>	<b>Agresión</b>
Honda	30SUG9961	Alcaudete	P/Ea	12,4	1,4
Chinche	30SUG9863	Alcaudete	Eh	5,9	1
Tumbalagraja	30SUG9962	Alcaudete	D	18,5	1,2,4
Las Lagunillas	30SVG3283	Jaén	Ea	21,8	1,2,3,4
Prados del Moral	30SVG2989	Jaén	Eo/Eh	7,5	1,2
Hituelo	30SVG0679	Martos	Ea/Eo	8,2	1,2,4
Naranjeros	30SVG0978	Martos	P	5,2	1,4
Rumpisaco	30SVG1077	Martos	Eh	4	1,4
Las Ceras	30SVG0175	Martos	Eh	1,8	1,2

Fig. 2. Table with the most remarkable and archaeologically best-known lagoons of Alcaudete, Jaén and Martos (Ortega González, Parra Anguita & Guerrero Ruiz, 2004 and own elaboration).

edge which surrounds the lagoon, there is highly degraded palustrine vegetation, since only some rests remain which encompass plants adapted to a high degree of salinity (Honda, Chinche) to species typical of more or less fresh water (bulrush, reeds, rushes and tamarisk). These surround the lagoons in various rings over the plain slopes. In some other lagoons certain stains typical of scrublands can be observed together with rockroses, broom, esparto grass, rosemary and thyme; in drought periods, they can function as a terrestrial ecosystem and the plain is covered by grassland (Chinche, Naranjeros, Rumpisaco, and Prados del Moral). On the other hand, agricultural use is increasing, mainly for olive plantations, both in rainfed and irrigated agriculture, in the lagoon basins of Hituelo, Prados del Moral, Naranjeros and Chinche (fig. 3).

The main animal species which are located in these flood areas comprise little crustaceans and amphibians (toads, frogs, Iberian ribbed newt) to aquatic birds. Among the aquatic birds those which use wetlands as a habitual shelter and those which do so occasionally as part of their migrations, must be distinguished. Marsh harriers, black-winged stilts, avocets, snipes, plovers, moorhens, coots, mallards, red ducks, dabchicks little grebes, white-headed ducks, squacco herons,

herons and flamingos are all species which can be observed in these sites. In the vicinity of the lagoons Honda and Chinche, even the presence of huntable species such as rabbits and red-legged partridges have been detected.

The characteristics and recent uses of some of the most important wetlands of Jaén have been presented here so far, however, what did they look like and what were they used for during the Roman period? In order to answer the first question, the available but scarce paleo-environmental information serves as a reference.

### The High Guadalquivir during the Roman Period

The western area of Jaén, which has largely belonged to the *Baetica* since Augustus' administrative reform (7-2 BC), is formed by different geographical units, from which the Campiña has the greatest personality and where most of the wetlands subject to this study are situated.

This area includes flat and hilly lands through which the Guadalquivir and its tributaries flow. It houses numerous wetlands and has highly fertile soils which sustain cereals, vines and olive trees, explaining why this area has been an agricultural centre throughout the successive historical periods and the fact that ten of the 22 documented Roman cities of the province of Jaén are found here: *Baecula* (Bailén), *Cantigi* (Espeluy), *Illiturgi* (Mengíbar), *Obulco* (Porcuna), *Vcia* (Marmolejo), *Vrgavo* (Arjona), situated in the Campiña Norte, while

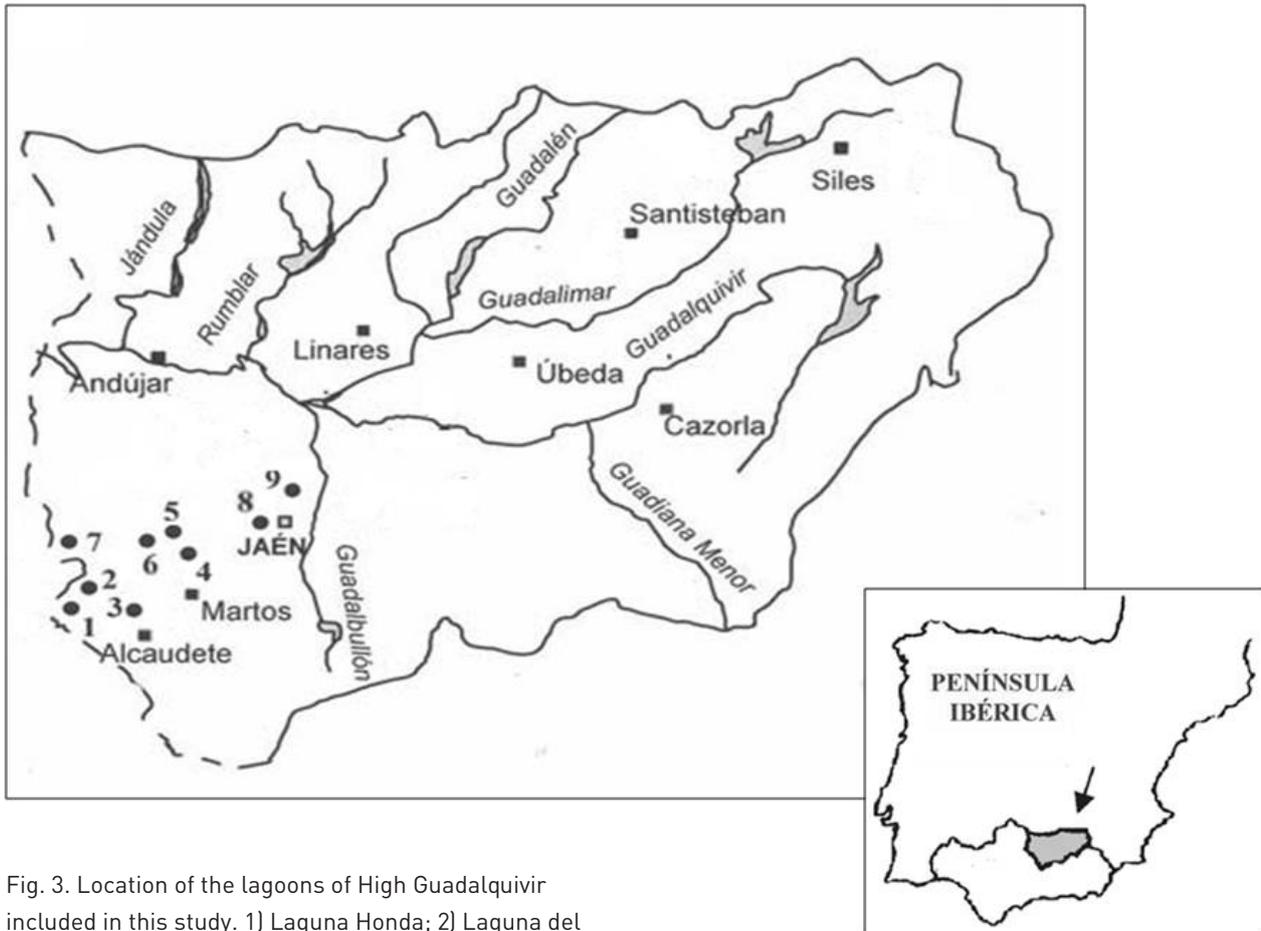


Fig. 3. Location of the lagoons of High Guadalquivir included in this study. 1) Laguna Honda; 2) Laguna del Chinche; 3) Tumbalagraja; 4) Laguna de Hituelo; 5) Laguna de Naranjeros; 6) Laguna de Rumpisaco; 7) Las Ceras; 8) Las Lagunillas 9) Laguna de Prados del Moral.

the Campiña Sur constitutes the area for *Aurgi* (Jaén), *Tucci* (Martos), *Sosontigi* (Alcaudete) and the *oppidum ignotum* of Alcalá la Real (fig. 4).

Recent bibliography provides significant information on this territory during the period of Roman rule (Castro López, 1984; 1988; 1996; Castro López & Choclán Sabina, 1986-1987; 1988; Guerrero Pulido, 1988; Salvatierra Cuenca, 1995). Most of these studies have the traditional archaeological-historical approach, which is very useful for knowing the forms of occupation, the use of the soils and the types of crops. Nevertheless, these studies almost entirely lack aspects of environmental landscape reconstruction.

Unlike other neighbouring areas of Eastern Andalusia, such as Granada and Almeria, nowa-

days there are few paleo-environmental reconstructions which illustrate the landscape of the Alto Guadalquivir. Nonetheless, it is possible to get an approximate idea by considering the evolution of today's climatic values – cold winters and very hot summers; 16° Celsius of annual mean temperature; more than 2,800 solar hours and a mean rainfall of 550 mm- (Fernández Cacho et al, 2010), the agricultural suitability of its soils and also taking into account some isolated archaeological works based on Anthracology recently carried out in specific sites of the Campiña or La Loma (Rodríguez Ariza, 2011; 2012; Rodríguez Ariza & Pradas Ballesteros, 2012). In this respect, it can be said that the climatic transformations, which these areas have gone through since Recent Prehistory until the present day, have not been significant, except for the fact that the climate must have been slightly colder and rainier than today's, with a greater and more stable hydrological flow in

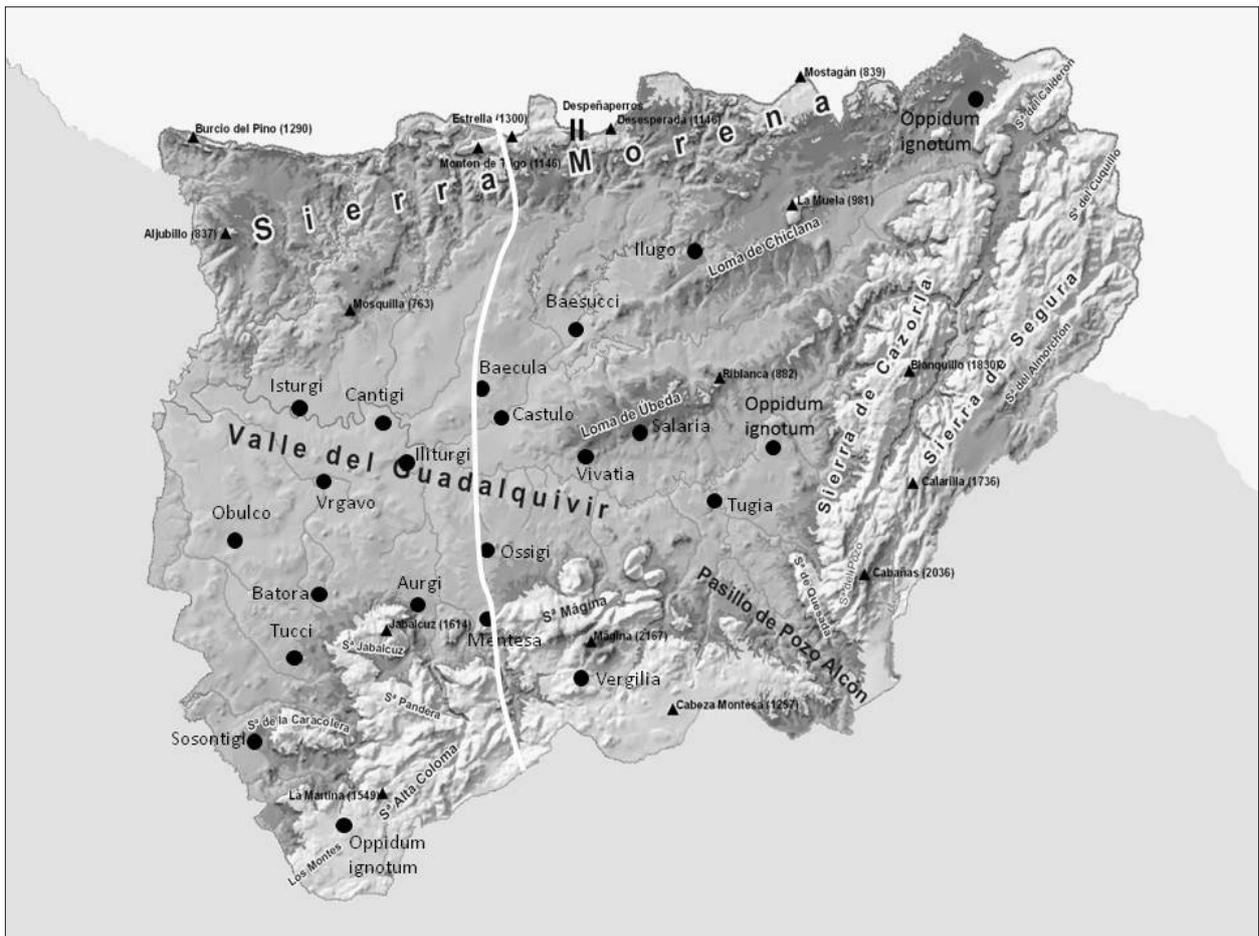


Fig. 4. High Guadalquivir. Ciuitates and boundary between the Baetica and Tarraconense.

ivers, therefore resulting in more abundant water resources.

A gradual loss of tree cover can be observed from the second millennium onwards, due to the progressive dryness of the climate and a greater interference of human activity upon the environment such as the use of fire for clearing crop fields and pastures for grazing. The gradual loss of forest mass and natural vegetation derives from the decrease of humidity and hydrological flow of rivers and washes, together with a gradually-increasing anthropic action. According to the anthracological analysis, the vegetation might have been thicket dominated by wild olive trees together with a notable presence of mastic trees, rockrose, heather, rosemary and legume. It can be

observed that this vegetation belongs to the vegetal community *quercus lentiscus*, which nowadays appears just marginally (Rodríguez Ariza, 2011; 2012).

Together with the gradual climatic aridity, the most important alteration which this highly anthropically-influenced area has suffered, resides in the fact that it constitutes a rural landscape turned to single-crop farming (olive plantations) since 1950s.

In short, the transformations of the climatic values in the Campiña since Recent Prehistory until today would not reflect important changes except for the tendency to gradual aridity which has been hurried by human action in the last centuries. If the then-climate showed a higher degree of humidity and milder temperatures, and the anthropic activity upon the environment was not as intense and aggressive as it is nowadays, then it could be inferred that hydrological resources

during the Roman period might have been more abundant. The latter entails that the hydrologic flow of rivers might have been higher and more stable; there might have been a greater and larger amount of wetlands with a higher hydrologic flow. Consequently, the flora, the vegetation and the natural fauna associated with them might have been a little denser than today, though not much more diversified. For instance, there might have existed vegetal species of bigger size than species of shrub or thicket, such as riverside trees (ash, elm, poplar and willow), as the forest possessed a predominance which it has lost.

The Roman presence in the territories of the *High Guadalquivir* led to a change in the indigenous economic infrastructure long since the Republican period. Rome only planned to exploit the natural resources in this first stage. Therefore, the new economic basis was constructed through the combination of two sectors: agriculture and mining.

The characteristic forms of organisation and the new economic needs which entailed the Roman occupation, would have led to the settlement of the *civitas*, which would have resulted in the immediate allocation of lands among citizens, the introduction of the Roman exploitation system called the *villa* and the creation of a new agrarian landscape. The first Hispanic *villae* must have been settled during the Republican period in the areas earlier incorporated into the Roman domains, among which stands the Valley of the Guadalquivir. Nevertheless, the gradual spread of the *villae* started during Augustus and Vespasian's rules and they definitely took possession of the peninsular South in the second half of the first century AD in obvious correlation with the intensification of the urbanization process (Fornell Muñoz, 2007).

According to M. Castro López and C. Choclán Sabina, the coexistence between olive plantations and cereals (wheat) can be observed in most *villae* of the Campiña, though there can be speculation about the existence of other crops and exploitations, not recorded in the scarce archaeological surface register, such as vines, legume and the livestock associated with crops (sheep, goats and pigs). This evidence leads us to recognise that the

majority of the territory was not involved in the specialised agriculture trading-oriented which was known in the Low Guadalquivir, meaning that its production was diversified and was not guided by any clear criterion of competitiveness (Castro López, 1996; Castro López & Choclán Sabina, 1988).

## Wetlands according to Ancient Texts and the Archaeology

In order to answer the question of how wetlands were used during the Roman period, Latin written resources and archaeology must be reviewed. Despite the undeniable relevance of wetlands and lacustrine areas in the Baetic territory, the ancient written texts on this matter are insufficient and contain little detail. Thus, this matter must be first approached under a generic perspective and then in detail.

In previous studies, we have suggested a possible use of wetlands as a reference in the territorial demarcations carried out by Roman land surveyors (Cañizar Palacios, Fornell Muñoz & López Medina, 2014; Fornell Muñoz, 2015). Apart from this demarcation purpose, in the Roman rural environment, the lagoons were part of the uncultivated lands situated in the *territorium* belonging to the jurisdiction of a *civitas* for its exploitation, specifically within the *loca publica agrestia* marked by land surveyors (Castillo Pascual, 2011), although there is no legal category for lands on surveyors' works specifically dealing with flood areas and their exploitation (Cañizar Palacios, Fornell Muñoz & López Medina, 2014).

If lagoons and lacustrine areas belonged to a *civitas'* ascribed territory and if they might have played a role in territorial demarcation, then relating these flood areas to ancient settlements situated in their surroundings might enable us to approximately establish the extension of their *territoria*, for which it is impossible to give an exact definition due to the absence of regulations. Applying this premise to the territory subject of this study, it can be observed that the lagoons Chinche,

Tumbalagraja (now dry) and Honda, belonging to the Guadalajoz basin and situated between 5 and 6 km northeast of Alcaudete (*Sosontigi*) (González Román & Mangas Manjarrés, 1991), all constitute, together with the river itself, the border line which separated the northeast *territorium* of *Sosontigi* from the Flavian town of *Iponuba* (Baena, Córdoba) (Castillo & Ruiz-Nicoli, 2008), an urban settlement situated 21 km from Alcaudete. We have also documented another example in Martos, a town which has been epigraphically and archaeologically identified with the colony *Augusta Gemella Tucci* (González Román & Mangas Manjarrés, 1991), situated 5.6 and 8.5 km from the lagoons of Rumpisaco, Naranjeros and Hituelo, respectively, and practically following the northern border line separating Martos from Torredonjimeno, the ancient *Batora* (González Román & Mangas Manjarrés, 1991). Therefore, it seems probable that the *territorium*'s northern boundary of *Tucci* was marked by these wetlands.

There are no regulations regarding the definition of the *territorium*'s extension of a *civitas*, nor is there knowledge about the existence of a relation between the legal status of a city or the size of its territory. On the contrary, what seems to be logical is the fact that the geography of the area must be considered as a central factor for its delimitation. This way, different ecosystems can meet in the same territory so as to ensure, not only an adequate exploitation, but also their inhabitants' survival. For that purpose, the availability of natural resources, particularly water, must have been fundamental. In the Campiña Sur of Jaén, further from the Guadalquivir and closer to the mountain range, the tributaries of the great river (Guadajoz and Guadalbullón), brooks and lagoon areas must have played a key role as hydrologic resources of its *civitates*.

The principles which land surveyors generally indicate when establishing a *civitas*' territory for the economic sustenance of its inhabitants including the existence of an area intended for, on the one hand, hunting and timber and on the other hand, for livestock feeding and breeding; and next to them, water-supply areas, coincide with those

indicated by agronomists in relation to the ideal characteristics which an estate (*villa*) must possess, that is, the existence of one area of farming lands and another of wild lands (Columella, *Rust.* 1.2).

Treatises on agronomy in general, and the *De re rustica* by Columella in particular, constitute a valuable resource for our objectives considering the profusion of terms associated with flood areas and their relation to the *villae* (agricultural production units linked to the medium-size or great property). In the work of Cádiz's agronomist we often find words related to water currents and natural flood areas which can be included within agricultural estates but not in the farming areas and the place where houses were built. In this sense, the excerpt in which the author points out the convenience of an existing river or lake within the estate, as well as abundant grass, is particularly illustrative. On the other hand, in the same excerpt it is mentioned that cereals must not be sown on its surroundings (Columella, *Rust.* 8.13.2-3). These areas, which could be found in the outskirts of farms, could have been used as watering points for livestock and as a place for aquatic-bird hunting and fishing (Columella, *Rust.* 6.22.2; 6.27.2; 7.9.6; 8.13.2-3; 8.15.1; 8.16.1-2).

In this regard, it should be remembered that the lagoons analysed in our field of study are still habitats for a certain number of aquatic birds, among which some were mentioned by Columella, such as mallards and moorhens (Columella, *Rust.* 8.15.1). The same author also provides us with information about the practice of putting fish roe taken from the sea into natural lakes to use those lakes as fish farms (Columella, *Rust.* 8.16.1-2).

Similarly, we know that some lagoons, such as Hituelo, Naranjeros and Rumpisaco, were used, at least until the early 20th century, as watering points and overnight cattle camps of old livestock trails which surrounded them. Thus, it is not impossible that this use dated back to Antiquity (Fernández Otal, 2006; Madero, Ortega & Guerrero, 2004), since the livestock trails must undoubtedly have been very important, though now they are difficult to track as they have been removed by

agriculture. In the analysed territory, the relation which appears in ancient texts between the *villae* and the existing flood areas within uncultivated public space of a *civita's territorium* has archaeological evidence. Even though there are still gaps due to the lack of continuous studies, and also owing to the fact that most of the ones that have been carried out base their results on superficial research, the analysis of the existing settlement within a radius of 2-4 km surrounding the selected lagoons (reasonable distance of a settlement with respect to the lagoons for their hydrologic use) provides twenty Roman sites of agricultural use. In the area of the lagoons of Honda and Chinche (Alcaudete), several sites are situated which are considered *villae* (Montilla Pérez 1990): "Fábrica de Escayola", "Sierra Yecosa" and "Laguna Honda". These sites might have made different water uses of the lagoons. Similarly in Martos, the lagoons Hituelo and Naranjero are associated with the sites "Carril del Puerto" and "Cerro de las Ánimas", respectively. Additionally, the ones linked to Rumpisaco are "Cortijo de la Torre del Moral", "Cortijo and Fábrica de Motril", "Cortijo de los Yesaes" and "Cerro de las Canteras". Finally, in the area of the lagoon of Las Ceras, the possible *villae* "Las Peñuelas" and "Cortijo del Pedroso" can be found (Carrasco Rus, 1984; Cano & Serrano, 2005).

As in the treatises of land surveyors and agronomists flood areas are conceived as water-supply resources, it is not preposterous to think that they were used for field irrigation. It is difficult to prove the latter, since there is no express reference to that respect in literary resources. It is also complex to demonstrate the use of irrigation in Roman times within the entire territory analysed, though the number of works which show the practice of irrigation in the *Baetica* is increasing (Beltrán & Willi, 2011; Cañizar Palacios, Fornell Muñoz & López Medina, 2014; Fornell Muñoz, 2011; López Medina, 1998-1999; Prieto Arciniega, Arrayás Morales & López Medina, 2011) as well as specific studies particularly on the *High Guadalquivir* (Barba Colmenero, 2007; Serrano Peña, 2004a).

The best-documented example of irrigation in the High Guadalquivir is found in Jaén, the Roman

*Aurgi*, and centre of gravity of Guadalbullón's left basin (Choclán Sabina & Castro López, 1986-1987). Recent studies on the paleomorphology of Marroquíes Bajos (Serrano Peña, 2004a; Serrano Peña et al, 2002; Zafra Sánchez, 1997) highlight the existence of several areas of stagnant waters since Prehistory in this zone today occupied by the urban area of Jaén. The largest area of stagnant water is Las Lagunillas (from the Bulevar to the ring road) whose surroundings have seen human settlements since the second millennium BC. The intense archaeological works carried out since 1995 have enabled us to find evidence of water distribution and storage systems including large cribs, canals and irrigation ditches from the Roman Republican period spread along hundreds of metres in Marroquíes Bajos and the depression of Magdalena, which could indicate how lacustrine areas suffered from a drainage process while they received material deposits for their use as cultivation areas. These early rural exploitations of peasant character linked to irrigation methods were maintained until the Augustan Age (Barba Colmenero, 2007), when most of the depression was allocated for cereal crops and olive plantations (Rodríguez Ariza & Pradas Ballesteros, 2012; Serrano Peña et al, 2002). Examples of these *villae* associated with Las Lagunillas are "Cortijo de los Robles", "Fábrica de Cuétara", "Los Prados" and "Zona F de Marroquíes Bajos" (Serrano Peña, 2004b; Serrano Peña et al, 2011) (fig. 5).

Another lagoon situated in the *territorium* of *Aurgi* is Prados del Moral, clearly related to a neighbouring salt exploitation of Roman origin, which constitutes an archaeological site of importance joined to the settlement from the same time situated on the wetland basin represented by the sites of "Marrache", "Mollina" and "El Regordillo" (Inventario, 1988-1993).

In conclusion, lagoons must have been of fundamental importance for the development of the human groups living in their surroundings. Thus, they were a key factor for the survival of parts of their population. Their use as a fishing and hunting areas, watering points and places for grazing livestock played a significant role in these com-

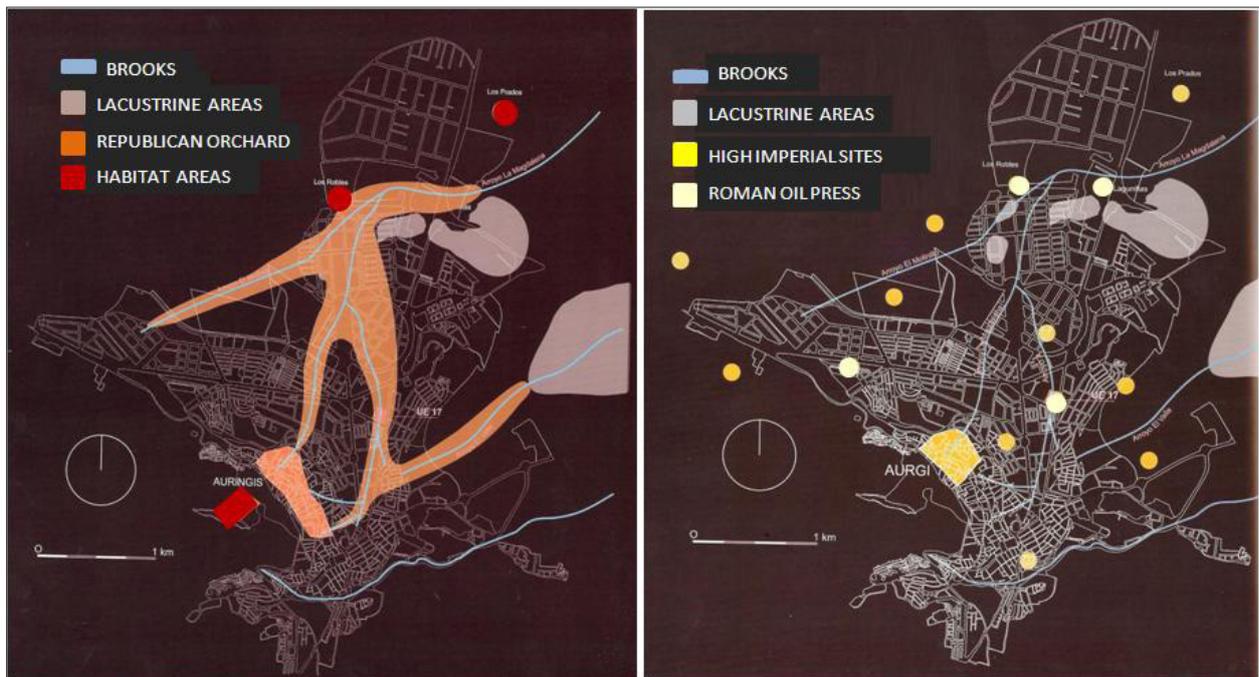


Fig. 5. *Territorium of Aurgi* during the Republic and High Imperial periods (Serrano Peña et al, 2011).

plementary economic activities. The importance of the use of their hydrologic mass can be observed in the settlement structure, as the settlements of agrarian use located in their surroundings are considerable, leading to the possibility of the intake of its waters for agricultural use; not strange at all, considering that agriculture in Antiquity was the predominant economic sector and most of the population lived in the countryside. Consequently, we consider that the use of wetlands in the *Baetica* during the Roman period deserves serious reflection, though this matter has been confined to superficial approaches so far.

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