



Contents lists available at ScienceDirect

Journal of Archaeological Science: Reports

journal homepage: www.elsevier.com/locate/jasrep

Managing the marshes: An integrated study of the centuriated landscape of the Pontine plain

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ARTICLE INFO

Article history:

Received 29 October 2015

Accepted 9 July 2016

Available online xxx

Keywords:

Centuriation

Wetlands

Roman period

Pontine marshes

Roman colonization

ABSTRACT

The study of Roman centuriation has a long and rich tradition, and the past decades have witnessed the rise of new perspectives on these field systems. Even though these systems were considered for some time as static structures studied through metrological analyses, they are increasingly considered as dynamic elements in the management of landscapes and the reclamation of wetlands, that should be studied from a long-term perspective. Methodologically, this development has gone hand in hand with an integration of GIS-based archaeomorphological approaches, historical, geo-archaeological and, less commonly, ecological data. This paper builds on such approaches in order to study centuriation as a complex socio-economic, political and ecological phenomenon. It aims to show that the changing roles of centuriation in human engagements with the environment can only be understood by applying a framework that integrates perspectives and approaches from different disciplines. After introducing the characteristics of this integrated framework, the paper presents a case study that synthesises recent work on the centuriated landscape of the lower Pontine plain (Lazio, central Italy), an infamous marsh with a long history of (failed) reclamation projects.

A GIS-based analysis of cartographic and remote-sensing imagery, including geophysical prospection data, shows that this centuriation covered an area of some 120 km² and consisted of a hierarchical system of in-field and field-bounding ditches as well as larger collectors that drained towards the sea. Palaeoenvironmental reconstructions suggest that the centuriation and several associated canals improved the hydrological structure, although such improvements may have started before.

Archaeological prospections and geo-archaeological data allow us to consider both when the centuriation was established and how its role in managing and exploiting the Pontine wetland changed through time. It probably dates to the late 4th or early 3rd century BCE and presumably is one of the first of its kind. It was established in the context of Rome's territorial, economic and demographic expansion and represented a large-scale reclamation that expanded Rome's agricultural hinterland, providing dwellings, farmland and a new life for numerous colonists. But the exploitation of the Pontine wetland by a system of small farms that occupied the centuriated area proved not to be sustainable: within two centuries settlement had decreased significantly and by the Imperial period only a few sites remained, some of which represent elite-controlled estates. The decline of settlement and its associated land use system can be explained by a series of socio-economic, political and environmental factors, including Rome's on-going territorial expansion, changing elite interests in the area as well as environmental change. Individual features of the centuriation, however, remained in use for considerable time. Even though medieval and post-medieval reclamations used parcelling systems with a different orientation, the main channels associated with the centuriation remained the basis for later attempts to drain the Pontine wetland.

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1. Introduction

The study of centuriation¹ in Roman Italy has a long and rich tradition, in which due attention has been paid to metrological (the measures that

have been used) and chronological (date of construction and link to Roman colonization) issues. Over the past decades new perspectives have developed, using more integrated methodologies and seeking to understand centuriation as landscape management projects as well as wetland reclamations that transformed the structure and use of landscapes in the long term. However, few attempts have been made to understand how centuriation transformed the natural environment and conditioned the ways in which people and institutions involved in their creation, maintenance and exploitation actually interacted with and modified the environment.

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¹ With the term centuriation I here refer to Roman cadastral systems in general, although strictly speaking centuriation are only those systems using square land division units, usually of 20 by 20 *actus* in size.

This paper contributes to the development of such a perspective and aims to study centuriation not only as static, centrally organized management structures that mainly had economic purposes, but also as dynamic landscapes where people lived their daily lives and, intentionally or not, contributed to environmental change. To this end, I discuss a case study, drawing on recent desktop and field research in the Pontine Marshes, an infamous wetland situated in south Lazio (central Italy), and evaluate this case study in light of long-term human–environment interactions. But before turning to the Pontine case, I first briefly review current approaches to centuriation and introduce the assumptions that underpin the framework I use.

2. Centuriated landscapes: past and current approaches

Within the rich and long-standing tradition of research on Roman landscapes, the study of centuriation has an important place. The widespread availability of aerial photographic imagery has since WWII provided ample evidence for the existence of such systems all over the Roman World.² From the 1980s on it were especially Italian and French scholars that elaborated morphological approaches to identify centuriation and understand their functioning in relation to the works of the Roman land surveyors.³ Such work has been very successful in mapping centuriation; to some extent it has also contextualised them as management programs that were part of Rome's territorial and agricultural expansion and involved complex engineering operations and administrative and legal organization.

However, on-going scholarship has identified several weaknesses in exclusively morphological approaches. First, many of the hypothesised centuriation schemes have not been verified by alternative sources of evidence, and some have been exposed as erroneous.⁴ Second, remote sensing data by itself does not allow dating of centuriation and thus leaves open the question in which historical context they should be placed. Third, focusing on reconstruction does not necessarily help us understand how they functioned as cadastres and/or wetland reclamation projects. Thus, while morphological approaches allow the reconstruction of centuriation, they do not allow us to properly assess their historical context and functioning. In this light, it is not surprising that the prevailing image of centuriated landscapes is still that of a natural landscape that has been transformed rationally and radically into a uniform, agriculturally productive territory – a display par excellence of Rome's conquest over nature and indigenous societies.⁵

Over the past decades, more integrated GIS-based approaches rooted in landscape archaeology have been developed that are much more sensitive to issues of dating, function and historical context.⁶ Such research uses archaeomorphological approaches to reconstruct the long-term development of landscapes. In some cases they include excavation to test reconstructions, use geo-archaeological and/or ecological data to better understand the chronology and impact of centuriation, and survey data to relate them to changing patterns of settlement and land use.⁷ Such approaches have also been applied in recent work in northern Italy,

particularly the Po plain. They provide increasingly sophisticated reconstructions of centuriation and apply geoarchaeological approaches to understand the palaeogeography and/or use archaeological settlement evidence and ecological data to assess the diversity in settlement, land use and vegetation within centuriated areas.⁸ Additional field methods such as geophysical prospections and excavation are occasionally applied to investigate in detail traces of these systems.⁹

These integrated approaches are improving our understanding of how the Roman State and its engineers engaged with the Italian landscape. They show that centuriation were indeed not just rigidly designed cadastres that in conjunction with roads and rivers structured the landscape: they adapted to the landscape, drained wetlands and may to some extent be considered as reclamation projects.¹⁰ Long-term contextualisation and historical comparisons show that their scale and impact surpassed that of many medieval projects; they were resilient structures that profoundly influenced the subsequent development of landscapes. At the same time, centuriation should probably not be considered as integral reclamation projects in the sense that the entire landscape was drained and rendered cultivable in a uniform way. Rather, drainage conditions and land use varied within them, with marshlands and well-drained arable farmland existing side by side.¹¹ This makes a re-assessment of persistent, idealised conceptions of centuriated landscapes all the more important.

Despite increasing interest in the environmental context and functioning of centuriation, integrated approaches have so far not been applied in other parts of the peninsula. Also, the issue of how to date centuriation still poses challenges: consisting of ditches, canals and roads, they are extremely difficult to date directly, and archaeological settlement evidence to date them indirectly or to understand how centuriated areas were actually settled and exploited is not regularly used.¹² It is therefore not surprising that the ideological role of centuriation in Rome's expansion over the Italian peninsula has featured much more prominently in recent scholarship than their economic and ecological impact.

Elsewhere, however, current approaches still primarily consider centuriation from an economic perspective and pay less attention to the social and ecological dimensions.¹³ Centuriations are regarded as physical manifestations of top-down, large-scale management projects intended to structure landscapes and increase agricultural output. But dealing with centuriated landscapes that included reclaimed wetlands and could be quite hostile and unhealthy environments was part of the lives of many, including peasant farmers working small plots of land, slaves working on estates, elites that controlled such estates, and pastoralists seasonally exploiting wetlands for pasture. Whilst it was institutions such as the Roman state that initiated centuriation, the varying interests and actions of these agents exploiting centuriated areas would have a major impact on their subsequent development. Understanding their actions and the impact of these actions on the landscape is thus important for our understanding of the history of centuriated landscapes.

3. An integrated the study of centuriation: underlying assumptions

Centuriated landscapes are thus shaped by complex interactions between humans and the environment. To understand the development

² Pioneering work was done by scholars such as Castagnoli (1956) and Bradford (1957); see also Dyson, 2003: 58–60.

³ For Italy, the *Misurare la Terra* volumes remain a fundamental source. For French work in Italy, see in particular Chouquer et al., 1987; Ceraudo and Ferrari, 2010, building on pioneering work by Bradford and others. On the agrimensores and the *corpus agrimensorum romanorum*, see Dilke, 1971; Campbell, 2000. For work on the juridical aspects of centuriation as part of landscape management, see also contributions in *Agri Centuriati* 6 (2009).

⁴ Palet Martínez and Orengo, 2011: 383/84 with references.

⁵ See Stek, 2014, discussing the iconic image of a centuriation system as an expression of Rome's power to transform the lands of the conquered peoples of Italy and to impose order on nature, originally drawn by Moscara (Settis, 1984, Fig. 129).

⁶ See contributions in *Agri Centuriati*, the founding of which is a clear reflection of the increasing interest in the subject (Dall'Aglio, 2004).

⁷ For archaeogeographical or archaeomorphological approaches developed in Spanish and French scholarship, see Orengo and Palet Martínez, 2009; Palet Martínez and Orengo, 2011; Chouquer, 2008; Chouquer and Watteaux, 2013.

⁸ For case studies, see Franceschelli and Marabini, 2004; Franceschelli, 2008; Dall'Aglio, 2009; Marchesini and Marvelli, 2009; Franceschelli and Trément, 2010; Matteazzi, 2014. On centuriation and transhumance, see Camerieri and Mattioli, 2011.

⁹ Mete, 2011.

¹⁰ Dall'Aglio, 2004.

¹¹ Dall'Aglio and Franceschelli, 2012; Palet Martínez et al., 2011; Frassiné, 2013.

¹² See also Pelgrom, 2008. In many cases processes of erosion and deposition pose limitations on the available archaeological evidence; in other cases it is rather a lack dedicated research. For statistical approaches to measuring association between sites and cadastral traces, see also Peterson, 1993 and <https://www.uea.ac.uk/~jwmp/compmethods/cadks.html> (accessed August 18th 2015).

¹³ Palet Martínez and Orengo, 2011.

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