Abstract

The aim of this study is to detect the patterns of olive oil production that link amphora workshops and amphoric stamps. Roman provinces such as Baetica became important production and distribution centers during the Roman Empire. However, it remains under debate how this province was organized and whether it is possible to identify patterns in the olive oil market.

Our case of study has been focused on the production processes located in Baetica province (currently Andalusia) from 1st to 3rd AD. In particular, we want to explore economic dynamics that include the production and distribution of olive oil trade. Amphoric stamps are used to identify the presence of different producer groups that might share similar stamps. To achieve this goal, we analyse a set of stamps from different workshops in Baetica province in order to detect a relation between the distribution of amphoric stamps and the economic structure in this province. Here we use methods borrowed from Ecology that allow us to identify if amphora workshops share similar amphoric stamps depending on the spatial distance.

The analysis explores how quantitative approach provides a useful tool for the interpretation of the economic processes. Finally, results pretend to highlight the organization of olive oil production in the Roman Empire linked to the differences observed in the archaeological evidence.

1. Introduction

Material culture allows us to understand a part of mechanism of production... (aquí creo que me repito como siempre)

The economy of Roman Empire have been an object of study in the last centuries. (cambiar)

This paper aims to highlight the production dynamics in relation to a specific area within Roman Empire. We want to detect the pattern of olive oil

production that link amphora workshops and amphoric stamps. We focus here on exploring the economic relation between stamps and amphora production centres.

Roman provinces such as Baetica became important production and distribution centers during the Roman Empire. However, it remains under debate how this province was organized and whether it is possible to identify patterns in the olive oil market.

All the amphora stamps belong to Dressel 20 types. Dressel 20 was used to transport olive oil along the province during the Roman Empire. There is evidence that stamps were used from three centuries. (economía oleica betica). Frequently, stamps were marked mostly in handles but rarely in rims and body. The information of the stamps is known as *tria nomina* (HABLAR SOBRE EL DEBATE DE LOS INDIVIDUOS DE ACEITE O YO QUE SE). *Tria Nomina* was mostly formed for a code three of letters. These letters can appear in a abbreviated form or complete (Berni Millet, 1996)

The meaning of the amphora stamps is still under debate. Some authors suggest that they were identified as the owner of the olive land (Remesal, 1977). Other authors propose that stamp could be the owner of the amphorae workshop. In any case, the use of these stamps defined somehow the system of working in the workshops.

2. Material and Methods

2.1. Case study

Our case study examines the relation between the distribution of amphoric stamps and the workshops. We analysed a dataset of 990 stamps from 81 workshops. A sample of 131 different stamps were identified and collected from CEIPAC database (citar). The workshops were situated in different locations in Baetica province, along the river Guadalquivir and its tributary Genil in order to detect similarities between stamps from workshops and spatial distance. The chronology in the workshops is widely diverse from I-III B.C. However, some

stamps show a more specific chronology while the majority of them display a large activity of production being difficult to specify an accurate chronology. A reason can be that most of them were partially excavated focused on archaeological surveys to collect the maximum stamps as possible (CITAR)

2.2. Dissimilarity correlation

We use the statistical technique Morisita-Horn index. This method was performed to measure the overlap between different samples of sets (Horn, 1966). In Ecology, it describes the dissimilarity between the system of two communities.

Considering our dataset as non-uniform sample, this method provides a useful tool to handle large samples with different sizes and diversity (Wolda, 1981). Morisita-Horn index can be expressed considering 0 as total presence of similarity of stamps and 1 a totally dissimilarity between stamps. In our case, it will be calculated the number of times that one stamp appear in a amphora workshop. This method allows to bear in mind the similar number of times for each repeated stamp per workshop.

3. Results

3.1. Dissimilarity correlation

4. Discussion and Conclusion

No similarity between stamps and amphora workshops were founded.

There is not connection between stamps and amphora workshops

There is not similar stamps in closest workshop

Similar stamps were not found in closest amphorae workshops so it could be interpreted as no direct connection between stamps and the location of amphora workshops were found.

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6. References

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