The EPNet Project.
Production and distribution of food during the Roman Empire: Economics and Political Dynamics

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Summary

The EPNet project aims to examine the framework of the Roman economic organisation and its networks, by analysing epigraphical data from *amphorae*.

This aim is to be realised through **complex network analysis, model building and computer simulation**.

The objective is to create an experimental laboratory for the exploration, validation and refutation of historical theories, and the formulation of new ones.

1. Setting the focus

The EPNet project, which recently started on March 2014, aims to apply an innovative framework to shed new light on the ongoing debate over the political and economic implications of the Roman trade system, its organization and dynamics.

In this context, the study of food management still represents one of the main debates among the field specialists. However, the existing theories continue to be speculative and difficult to falsify, especially due to the lack of a formal framework for the analysis of the available data.

Our approach is made possible by (among others) a large dataset of Roman amphorae and their associated epigraphy, i.e. stamps and tituli, created by the CEIPAC (Centro para el Estudio de la Interdependencia Provincial en la Antigüedad Clásica) in the last 22 years (see Figures 1 to 3), as well as by front line theoretical research done by José Remesal and his group in the political and economic aspects of the Roman trade system.

The current version of the CEIPAC database is available at http://ceipac.ub.edu/
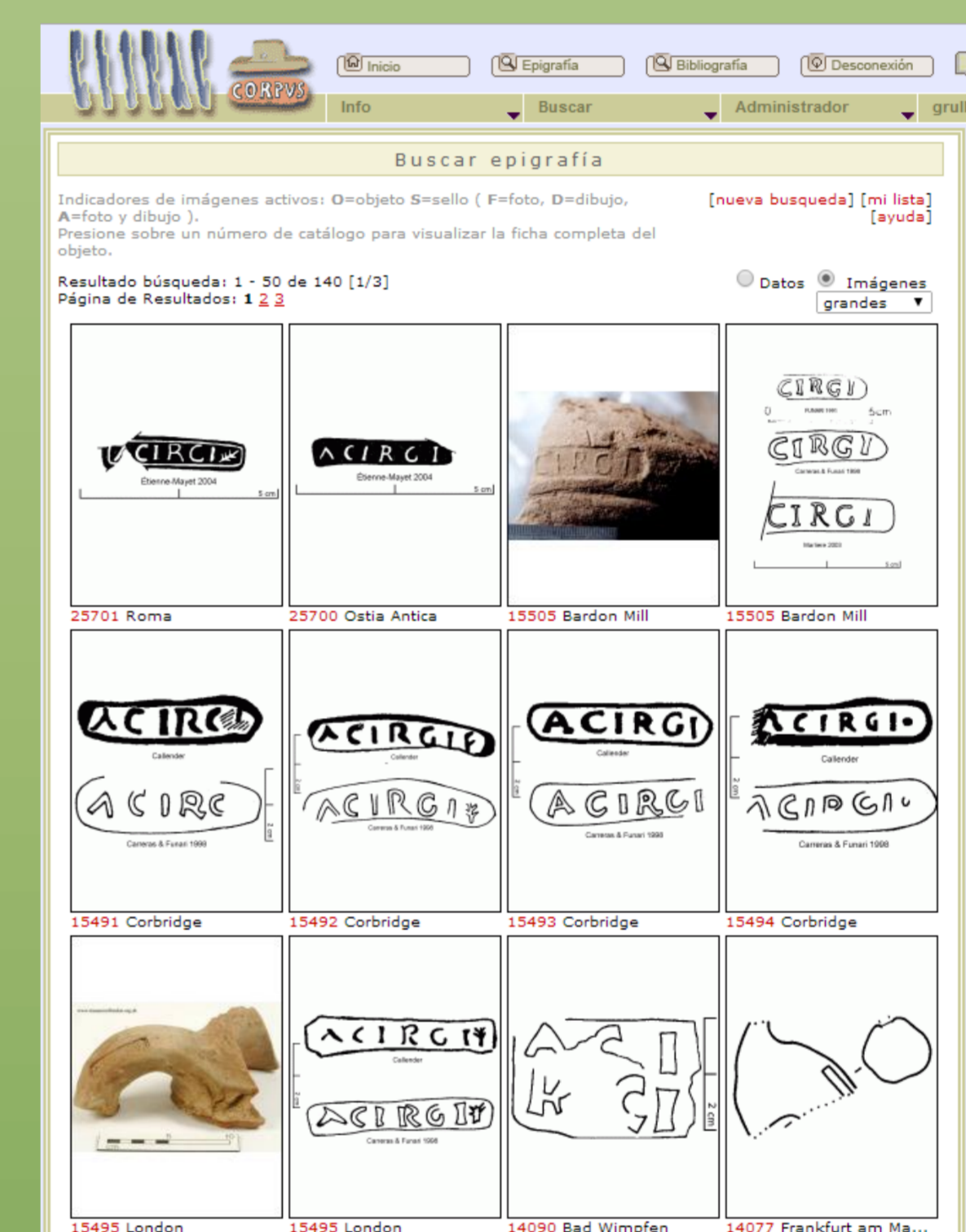

Fig. 1. The result of searching for the stamp ACIRGI in the current version of the CEIPAC database. The first 12 occurrences of the stamp are shown (out of 140).

Fig. 2. Stamp over Dressel 20 *amphora* that belonged to Septimius Severus and his sons.

2. Innovation

The project is articulated through three main innovative aspects. None is "new" by itself, but the combination of them represents an unexplored aspect, determining the originality and also the risk of this research.

- **Explore our dataset using an exhaustive semantic approach.**
- **Apply network theory to the analysis of existing data.**
- **Use agent-based simulation to analyze the structures and dynamics of the Roman Empire trade network.**

3. A groundbreaking vision

EPNet aims to use computer simulation as a virtual laboratory in which different techniques are exploited to encourage the formalization and falsification of scientific hypotheses about economic and political mechanisms of the Roman Empire trade network.

Existing datasets and new data gathered during the project provide the opportunity to validate the simulation experiments with empirical data.

Correlation between simulation experiments (driven by existing theories) and empirical data allows a more critical evaluation of the existing explanations as well as the possible discovery of the role played by underestimated values.

Computer simulation of social phenomena allows to detect important relations between parameters and behaviour that can be hidden if the system is studied by classical approaches.
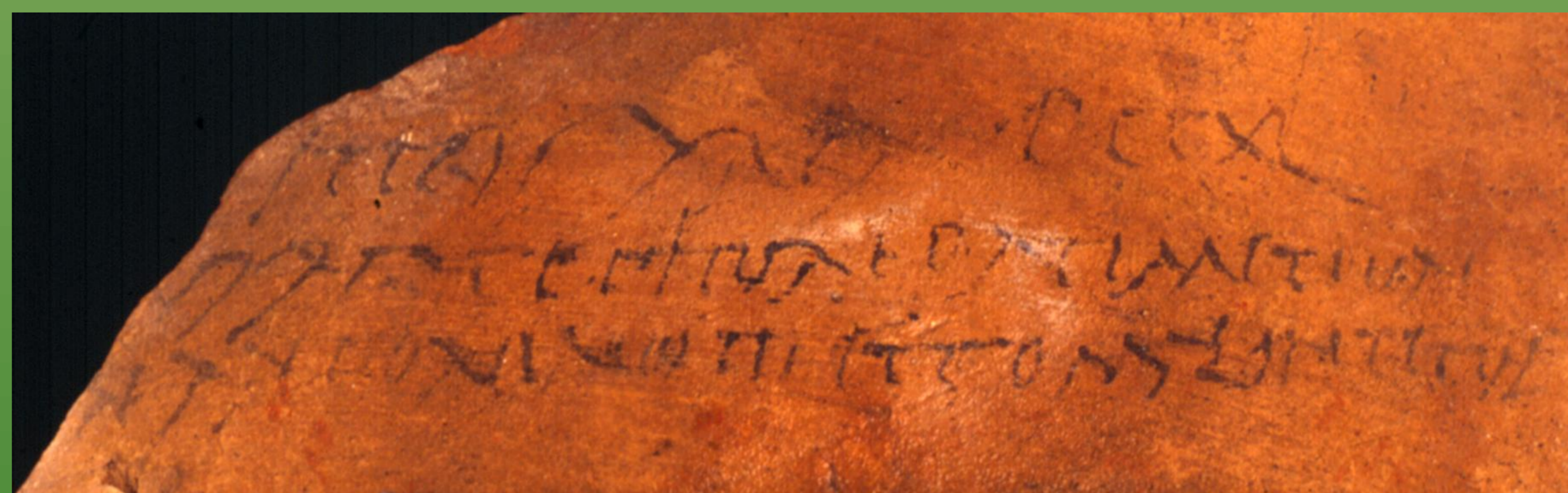
Using a semantic model (which consists of a network of concepts and the relationships between those concepts) enables users to ask questions about the information in a natural way, and helps identifying patterns and trends in this information, and discover relationships between disparate pieces of it.

The extensive data provided by the CEIPAC database is to be connected and subsequently interpreted in a variety of levels that will give new insight to the complexity of exchange relations in the Roman Empire, moving beyond the limitations of a simple relational database.

[R A]stigis arca p(endo) ccxl
[act]us agatephori · p(ensit) · atimetion
[d(omino)] n(ostro) antonino iii et comazonte co(n)s(ulibus) [year 222 A.D.]

Fig. 3. *Titulus pictus* in *delta* position over Dressel 20 *amphora*.

4. Where we are

In the current initial phase of the project, we are exploring and adapting existing ontologies from the domain of epigraphy with the aim to develop a semantic model for the CEIPAC database.

In this direction, the work done by the Eagle project is being very helpful. We intend to reuse as much of the Eagle's ontology as possible, not just because it is already based on solid standards such as CIDOC-CRM and Epidoc, but also to leave open the possibility of a future incorporation to the Eagle federation of epigraphy databases.