

An User-Friendly Approach to GIS-Application: An Utility for the Study of Etruscan Cemetery of Pontecagnano (Italy)

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Abstract. The data gathered during the excavation of the cemeteries of the Etruscan-campanian settlement of Pontecagnano (Salerno, Italy) has been stored in a GIS implemented using Mapinfo. In the paper we are going to present an interface developed in Mapbasic language (Mapinfo environment) for the analysis of the funerary contexts. Through this solution, it is possible to manage some thematic maps (diachronic, typological, anthropological, etc.), to make interactive queries of the graves and of their grave-goods. Using a simple forms it is possible to visualize the spatial distribution of the tombs starting from topologic criteria. The results obtained with our utility can be viewed immediately on the map, also crossing data with different criteria. This permits to analyze not only the archaeological evidence digitized on the map, but also to explore and visualize multiple information stored in the graphic and alphanumeric archives.

Keywords: G.I.S. tool, funerary context, Pontecagnano, etruscan-campanian settlement

1. Introduction

The project of an user-friendly utility for the visualization and the querying of the G.I.S. data of the cemetery of Pontecagnano started in 2002. It answers to a requirement of the site-researchers to visualize in a more direct and simpler way a great number of archaeological information (alphanumeric and cartographical and graphical documentation) concerning the cemetery of the etruscan-campanian settlement of Pontecagnano (South Italy).

So far the results of the excavations are about 8.500 graves dating since First Iron Age (IX century BC) to roman period. This allows to analyze the ancient community and highlight the processes of transformation in a long period.

The utility "Pontecagnano.mbx 1.0" has been customized for the study of the western cemetery, in particular the funerary area of Piazza Sabato, in its development from Orientalising Age to Archaic Period (last quarter of the Eight Century-first quarter of the Fifth Century BC) (Cuozzo, D'Andrea and Pellegrino 2003).

Using the programming language MapBasic for MapInfo, according to specific requirement of the archaeologist, five tools have been developed ("Query form", "Thematic Maps", "Change scale", "DB form" and "Density Grid"). This utility is changing the way in which archaeologist can use a Geographical Information System, they have used that utility to understand some different aspects of the funerary customs. This paper wants to show the features of this utility and the first scientific results acquired.

2. The Utility "Pontecagnano.mbx 1.0"

2.1 The "Thematic map" Tool

The "thematic map" tool creates predefined dynamic thematic maps, simply accessing by a click.

It allows to visualize in a simple way the data of the DB, filling by different colours the grave objects according to the value of some fields of the grave record.

This tool recalls a list of predefined thematic maps (for example: Property = excavation area, Gender, Period with its different phases, Burial Ritual, Orientation, Chronological intervals, etc.).

2.2 The "Query Builder" Tool

In order to perform specific and complex searches, it has been created a query builder that can cross many parameters of search (with "And" operator), not only concerning the grave data, but also grave-goods (fields "Family", "Shape", "Type"). In fact, the first task of the utility was to allow an immediate access to the structure of the database¹. The main relation of this RDBMS is the relationship 1:n between the grave table and the grave-goods table (the join between alphanumeric and graphic data is realized through the "number of the grave") (Fig. 1). Through a check-box of the Query Builder tool it is possible to choose, for example, if you want to use a more generic key of "Period" (with its relative phases, that appears sequentially), or the most punctual one of the numerical dating (expressed in BC). On this last point, we particularly concentrated the methodological reflection.

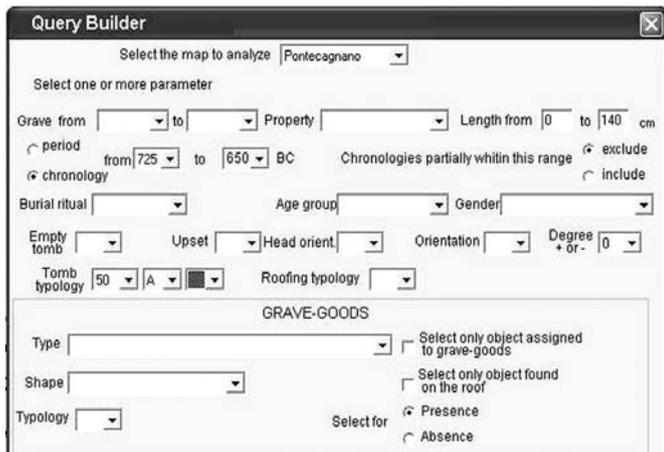


Fig. 1. Query form crossing more parameters.

By the way, it is possible to choose, with a flag, if to include or exclude all those chronologies that are only partially within the range between “chronology ante quem” and “post quem”. So, for example, if you are searching for the interval 700–675 BC, you can choose if you want to search with the operator “AND” or with the “OR” one. This option has been created because it is very important to know if a grave dated in a larger way is included or excluded from the search. It will be excluded if the first option (operator “AND”) is chosen.

The utility allows the archaeologist to choose between these types of complex selection by simply activating that flag. For example, if we include also the graves partially external to that chronology, it results that only 25 graves dates completely within this range, while on 206 tombs, 171 are external between the 60% and 40%.

It is possible to query the typology of the tomb. The tomb structure is divided into two typologies (“tomb” and “roof”), that are articulated in more levels, that appears sequentially, for general or more specific examination. For example, the type 30 is “fossa-grave” and the type 30B1 is “fossa-graves with inner side covered with pebbles”. To simplify the visualization of the selected objects, the utility fills the objects in red and automatically “zoom to query”. But, for the extension of the cemetery, the visualization of the pattern is still difficult. For this reason the “grid density tool” has been created.

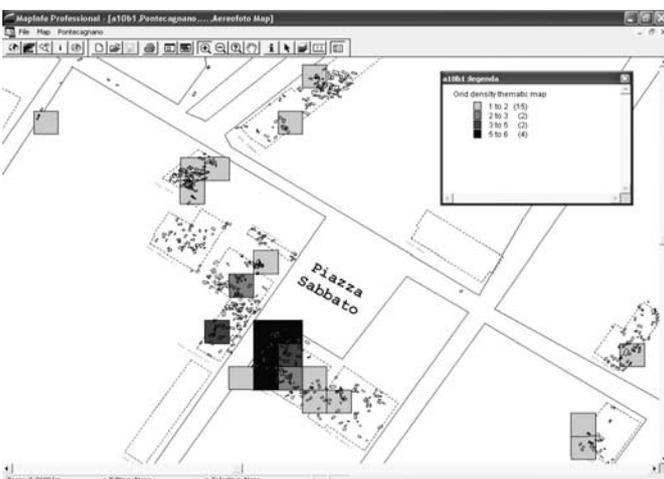


Fig. 2. Grid density thematic map: distribution of tomb typology 30B1.

2.3 The “Grid density” tool

With this tool, it is possible to visualize with chromatic scale the different density of the objects. It uses the topological function of the “Contain” and realizes a “Count” of the objects within a grid of 5 x 5 meters. The squares are filled with different blue in order of the number of tomb that are within. This topological instrument can be used also in order to carry out distribution analysis. In this case, it shows that this specific type of tomb, 30B1 (Fig. 2), is not distributed in a uniform way in the site of the cemetery, but it is concentrated in a particular sector, southern, suggesting a preferential relationship between this type of grave and a burial group.

Another relevant example of results achieved using this two tools concerns the analysis of the demographic representativeness.

Between all the tombs dating between 725 and 650 BC, we searches those whose length was no more than 140 cm., therefore certainly belonging to non-adults individuals. It is emphasized first of all their high percentage compared with the whole of the cemetery (50%)². Their distribution seems to be homogeneous in the interior of the cemetery (Fig. 3), but

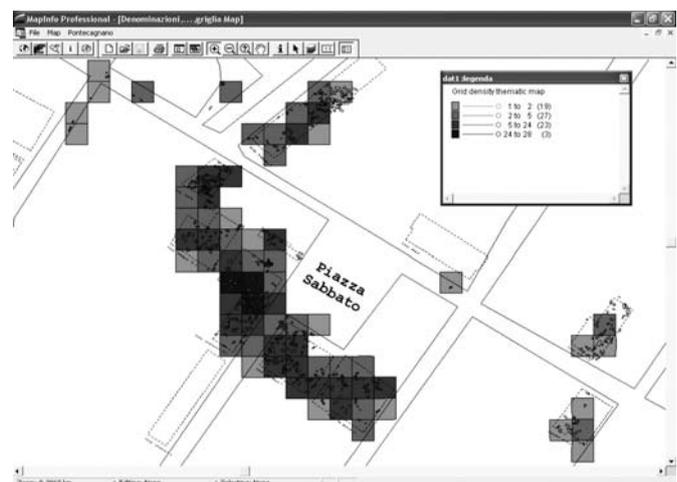


Fig. 3. Grid density thematic map: distribution of tombs dating 725–650 BC, no longer than 140 cm.

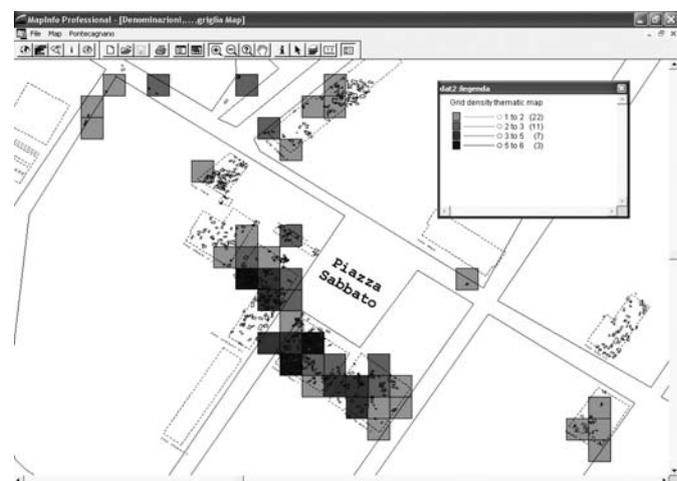


Fig. 4. Grid density thematic map: distribution of tombs dating 725–650 BC, no longer than 140 cm, with tomb typology “travertine-chest”.

re-processing this map querying “travertin-chest” (tomb typology 50A) (Fig. 1 show that query), we observe a less homogeneous distribution (Fig. 4).

In some areas there are few travertin-chests (for example property “Gaeta”, Sabato II.1), while in other areas they are present in a remarkable number, as in the southern sector of the western cemetery (property “Granozio III”, “Del Mese I”, “De Santis I”). This last area can be considered an elite funerary area also because it shows a remarkable concentration of cremations, presence of weapons, etc.

In addition to that, processing this map by thematic map “period with his phases”, it is possible to understand the distribution of the travertin-chest in the time, particularly its disappearing in the archaic period.

2.4 The “Change scale” tool

This tool was created to directly insert the scale requested for the visualization of the map.

2.5 The “DB Form” tool

This form shows alphanumeric data of the clicked object (stored in Access DB, linked by ODBC), and allows to simply access to primary table data (grave) (Fig. 5) and related (grave-goods table) (Fig. 6).

Fig. 5. DB form: data concerning a tomb (number 1715).

The application calculates how many records grave-goods are related to the principal record (the clicked tomb) and it is possible to show previous and next by two buttons.

The form visualizes also “memo” Access fields (defined without character limitations), that was not possible within the default software tool.

3. Conclusions

The various phases of the research have taken advantage from the possibility of performing a plenty of quick and different queries. Through the utility has been possible to analyse and spatialize the alphanumeric data in which have been separated the main aspects of the funerary context. In this

Fig. 6. DB form: data concerning a grave-good (object number 14 of tomb 1715).

way, it has been possible to acquire a better understanding of the internal structure, links and dynamic development of the ancient community.

Notes

- 1 The structure of the database is presented in Cuozzo, D’Andrea and Pellegrino 2002, Cuozzo, D’Andrea and Pellegrino 2003.
- 2 This is a theoretic percentage because the body does not occupy usually all inner surface of grave. According other information- anthropological data, ornaments and other grave-goods position-, in the orientalisng period adults are little more than 20% of burials, Cuozzo, D’Andrea and Pellegrino 2003, Cuozzo 2003, note 21.

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