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In search of a lost village. Prospecting techniques at the site mariano miró (la pampa, argentina, early twentieth century)

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ABSTRACT

Archeological research started in Mariano Miró (Chapaleufú, La Pampa, Argentina) site in 2011. In this site there are remains of a rural village, founded in 1901 by the railway station under the same name of the Ferrocarril Oeste, with its header in Buenos Aires city. This village was inhabited by nearly 500 people and there was a series of shops typical of an agricultural-livestock occupation (stores, a baker's shop, a smith house, etc.). Towards 1911 it had to be abandoned forcibly because its inhabitants could not renew their lease agreement over the lands they settled in. As from that moment, its owners destined that space to agricultural exploitation, and therefore no village structures were left standing.

The Mariano Miró archaeological study is included in an investigation that aims at learning population dynamics in the late nineteenth and early twentieth centuries. During those times, lands were incorporated to the national territory after military campaigns against indigenous populations. This study presents results obtained through different prospecting techniques applied to delimit the old village common land. Although nowadays no surface structural remains are seen, the presence of a great number of vitreous, ceramic and metallic fragments was recorded, from which a 240 × 140 m study area was set. Over the whole surface of that area, covering 39,200 m^2, transects were laid out; prospecting was conducted with a metal detector and a systematic collection of surface material was made. The diversity of data obtained was processed by Geographic Information System (GIS) which, together with ARCGIS10 software, enabled us to correlate multiple variables. The use of documentary sources (aerial photographs, cartography and village layout blueprints) helped identify site formation processes, old buried structures and areas associated with specific social practices. The prospecting design applied let us guide archaeological interventions in such a large area and, based on the distribution and density of these findings, it helped differentiate sectors that would respond to deliberate social practices during village occupation (e.g. dumps), from those that would be the result of post-depositional anthropic and natural processes.

1. Introduction

Mariano Miró was a rural village that was founded in the beginning of the twentieth century. It was located in the then so-called *national territories*, in the current Chapaleufú Department (35° 01′ 31.1″S and 63° 48′ 71.1″W), La Pampa Province, Argentine Republic (Fig. 1). Argentina's *national territories* were territorial political delimitations in regions within the national territory where historically the provinces created during colonial times had no jurisdiction. In practice, national territories were intended to exercise tutelage over indigenous peoples or/and send a message from bordering countries or former owners of those territories about the will to occupy and integrate them to the Argentinean nation.

The site is located on a sandbank plain formed by sandy deposits of aeolian origin during the late Pleistocene. However, the advance of the agricultural frontier by the end of the nineteenth century and the caldén forest clearance in the first decades of the twentieth century, modified the landscape significantly in less than a hundred years. Some sandy formations are still preserved today, but in most

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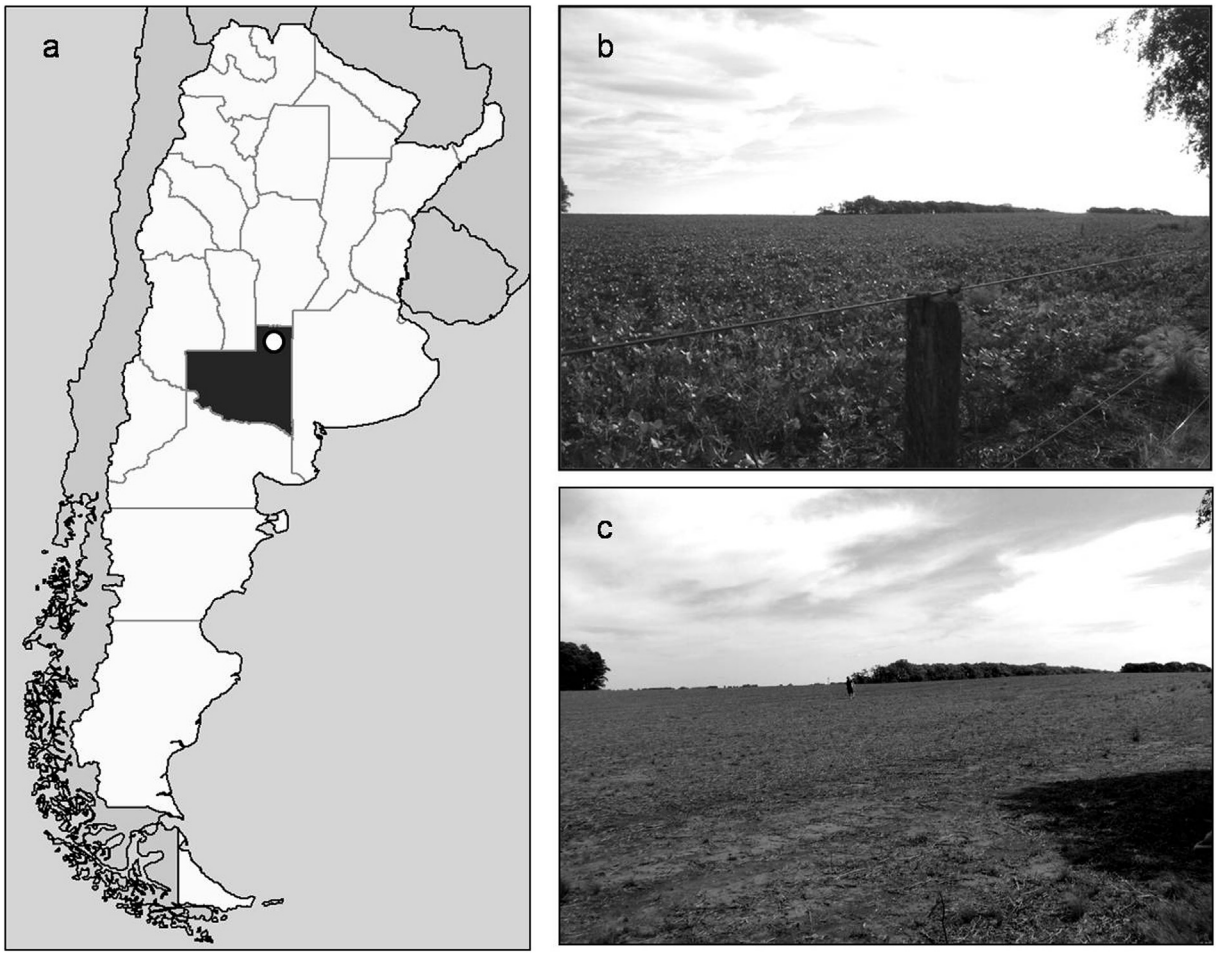

Fig. 1. a- Location Mariano Miró site in the province of La Pampa, Argentina; b-view of site extension during of soybean cultivation period (January 2011); c-view of site extent after the harvest (October 2012).

cases they are fixed by vegetation and Mollisols (according to Soil Taxonomy) that allowed the development of intensive agricultural-livestock activities. Molisols are soils developed from organic materials and mineral sediments under wet weather, semi-arid conditions and also in some colder patterns and warm patterns with a graminoid cover, with a dark surface horizon (mollic horizon) with moderate to high organic matter content. Ph testing of soils in the area shows values ranging from 5.2 to 6.2, i.e. slightly acid (Landa et al., 2014).

In Argentinian historiography, the so-called "*Conquest of the Desert*" was set up as a series of military campaigns and actions carried out by the Argentinean Army, against diverse indigenous people between 1878 and 1885 in the Pampean and Patagonian regions. Its outcome was the conquest of the territory and the control and reduction on those latitudes' inhabitants. After the Conquest of the Desert, thousands of hectares of productive lands in the southwest of Buenos Aires province were incorporated to the national territory. Lands were divided into lots and awarded to individuals, thus creating large latifundia (Guerín, 1980; Marre and Laurnagaray, 1987). Exploiting those lands made a great contribution to Argentina's insertion in international markets, by means of economic expansion and the consolidation of the Nation State (Aráoz, 1988; Maluendres, 1995; Di Liscia et al., 2007). As time went by, different social actors started to occupy rural space —settlers, tenants, migrant workers, farmers and merchants— and the first rural villages and other types of settlements started to develop, such as "estancias," outposts, rural business and agricultural colonies (Scobie, 1968; Guerín and Gutierrez, 1983; Maluendres et al., 1995). This process was accompanied by railway expansion that helped connect distant areas, people, ideas, and merchandise on different levels (Mayo, 1980). Whereas some population nuclei prospered and became currently existing villages, other settlement attempts were not successful. From these failed experiences, which also form a meaningful part of the regional identity's framework, there are still remains of their ephemeral existence, as in the case of Mariano Miró site (Pineau et al., 2014).

The settlement was initially raised by a Ferrocarril Oeste station under the same name as the village in 1901 and it once reached around 500 inhabitants. There was a series of stores typical of a business and agricultural-livestock occupation in the common land: a general store, a smith house, storage structures or sheds. It is estimated that the surface occupied by the village main nucleus comprised 3ha in the south and, although there could be some occupation in the northern area, it has not been detected yet. Initially the lands where the occupation settled were leased by many colonists from the Santa Marina family, but after ten years these owners ceased use of their lands. After terminating the lease agreement in 1911, settlers started a forced abandonment, founding new villages in the region, Alta Italia and Aguas Buenas (now called Hilario Lagos). Mariano Miró was abandoned gradually, as shown

by the National Census of National Territories taken in 1912 that reveals the presence of 254 inhabitants and the persistence of activity in the railway station (INDEC, 1914).

The goals of the Mariano Miró site study are included in an archaeological research project of a larger scope about the settlement process in the north of La Pampa province after the Conquest of the Desert. This issue is treated from a Historical Archaeology perspective and it emphasizes the study of practices of different social actors settled in the area through material remains, documentary sources, and oral memory. Mariano Miró is one of the sites that, owing to its characteristics, have relevance to understand those matters as well as to apply methodological and technical procedures for the recovery of materials in the field. In that sense, in this study we specifically intend to expose the different forms of prospecting that we have applied in Mariano Miró, considering the interaction between different methods such as topography analysis, spatial distribution of artifacts and taphonomic processes that would have intervened in the site formation.

2. Analysis of written, graphic and oral documentary sources

Throughout the research process, diverse written and graphic documents of different repositories were analysed, such as the Historical Archive of Santa Rosa city (La Pampa), the Railway Friends' Association and the "Raúl Scalabrini Ortiz" Railway Museum in Buenos Aires city. We were able to access information provided by the 1912 National Territories Census (INDEC, 1914) and the railway guide, where Mariano Miró was mentioned as a typical rural village with smith's, butcher's and general store services (Dirección General de Territorios Nacionales, 1914; INDEC, 1914). Both documents highlight that in 1912 some inhabitants were still settled and railway activity continued (with entry and exit of goods and arrival and departure of passengers). We also consulted national agricultural censuses, from the beginning until establishment of soybean (*Glycine max*) monoculture, in order to record activities carried out in the area and the types of machines used for field working (INDEC, 1914). At the time of evaluating taphonomic processes that affected the terrain under study, the information provided by censuses was relevant (Landa et al., 2014). In that zone, livestock was predominant (one of the largest cattle producers in the whole province), although activities would rotate seasonally with wheat (*Triticum* spp), maize (*Zea mays*), barley (*Hordeum vulgare*), wild oat (*Avena fatua*), and sunflower (*Helianthus annuus*) growth, among other crops. As regards machinery used for farming duties in the terrain, there would have been successive application from the oldest technologies like the chisel or the coulter and animal-drawn ploughs, to the most recent equipment with tractor and disc (Fig. 1 b, c).

In the railway museum archive, we found the only blueprints known of Mariano Miró (1902–1912) (Fig. 2). In the blueprints, the railway station (currently visible) is seen as well as a series of buildings in the northern sector, with masonry, iron and mud that would correspond to the first constructions in the village (they do not exist anymore). Although these blueprints were intended to register the station and its structures, they let us observe part of the village common land located exclusively on the southern sector. The first blueprint, drawn with graphite pencil, corresponds to April, 1902, over which modifications were made in 1906, 1908 and 1912 in connection to the enlargement of railway sheds and stalls (Museo Nacional de Ferrocarriles Argentinos, 2012). None of those modifications registered changes in the constructions located in the village. Having this blueprint (although after the first fieldworks were conducted) has been extremely relevant to planning prospective and excavation activities carried out in the terrain.

We also consulted a bibliography produced by local history amateurs, that capture events that took place in Mariano Miró through the documentary sources and memoirs that could be collected (Fernández, 1985; Giorgio, 2008). As a complement to the analysis of written and graphic sources, oral information provided by inhabitants in the area was registered by means of open, semi-structured interviews with elderly adults. A corpus of data was built through oral history that enabled us to make methodological decisions to determine the sectors to prospect in the terrain. For instance, Walter Moyano (a miller from the area) told us about and pointed at different sectors where, due to the removal of sediment related to his work, he found house materials or foundations. Up to now, only the interview made with 80 year-old Ramón Campagno, son of a Mariano Miró inhabitant, produced interesting data about some activities performed in the old village. Nevertheless, we plan to continue this oral information survey.

Different actions of transference to the local community were taken to share the archaeological research undertaken in Mariano Miró, especially in educational facilities in the area. Spreading the works done by the archaeological team worked as a trigger for settlers to come and share their memories of the old village, its extent and characteristics. Some provided photographs of their ancestors, who inhabited the ephemeral village of Mariano Miró. Consequently, feedback between archaeological activities and community participation with the contribution of their individual and collective memories, have not only enriched site prospecting design but also invigorated building a local and regional identity.

3. Prospecting and analysis activities of surface findings

For activities design and performance, we considered theoretical concepts and methodological tools that started to develop under the influence of the New Archaeology, from the beginnings of the 1970s. From that moment on, in Anglo-Saxon archaeological investigations prospecting studies and surface material collection started to gain relevance (García Sanjuán, 2005). That trend was adopted afterwards by Ibero-American countries, and in the following decades systematic prospecting designs, both intensive and extensive, started to develop, within different archaeological positions or theoretical tendencies, such as Landscape, Spatial or Distributional Archaeology, among others. According to Ruiz Zapatero,"*surface prospecting has a high research potential capacity, it has led not only to lay out prospecting techniques rigorously, but also to consider formation processes as well as site alteration*" (Ruiz Zapatero, 1996:9). Concerning taphonomic agents that disperse archaeological material over the surface, Reynolds (1989) pointed out that the data originated in surface prospecting should be evaluated in order to control material shifting specifically over soils under the action of agricultural machinery (Mayoral Herrera et al., 2009; Landa et al., 2014).

Nowadays, the land where the village of Mariano Miró was set is a field where seasonal agricultural activities are performed, mainly soybean culture. This situation forces us to access this site at times after harvests and sowings, when vegetal cover and visibility conditions are optimal. These fields could have been subject to livestock and agricultural exploitation since the village was vacated, which led to propose a new scenario of the use of space and, thus, the modification of the archaeological record and its context.

To date, no surface structure remains were seen: there is only the railway station surrounded by lands used for agricultural exploitation. On the surface, and as a consequence of the action of agricultural equipment, a large number of vitreous fragments are observed and, to a lesser extent, metal fragments. The absence of visible structures as well as of documentation on the village common land in the initial time of our research was the reason to

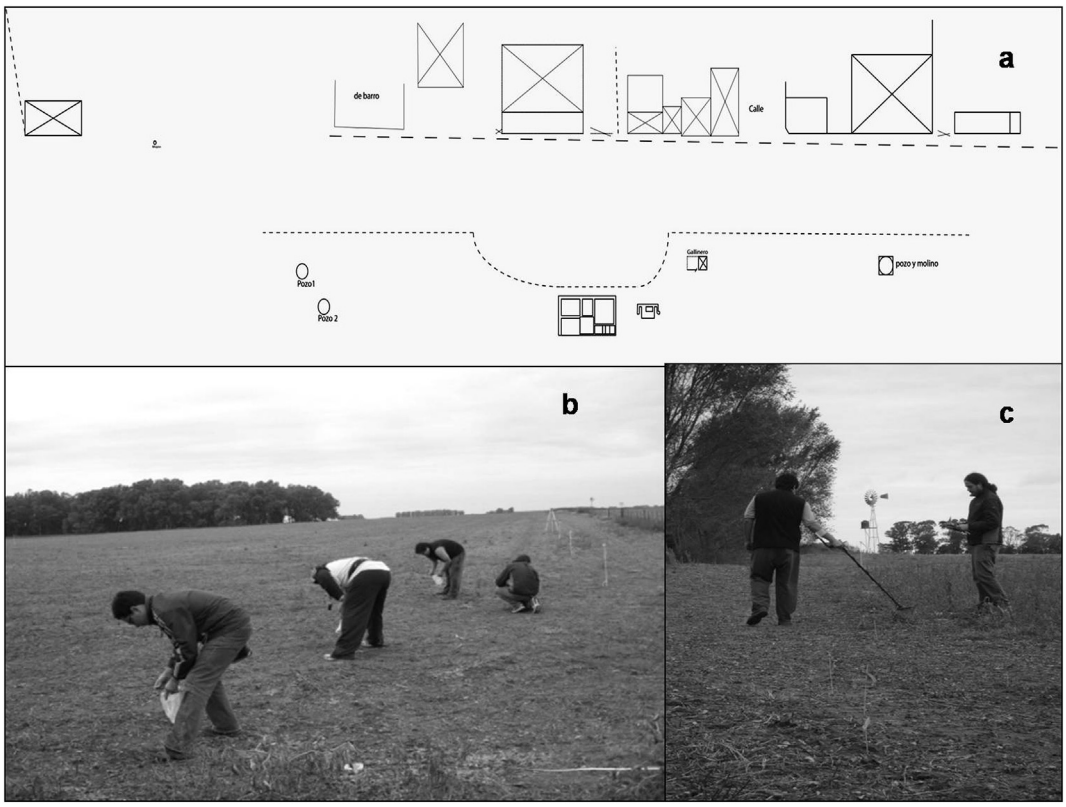

Fig. 2. a- Carbon copy of the 1902 original map; b-transect layout and gathering of surface artifacts; c-site prospecting through traced transects with metal detector.

develop a design based on systematic surface prospecting according to material dispersion (vitreous, metals, bones, pottery, among others), together with the use of metal detectors to record concentrations.

The extensive material dispersion over terrain surface led us to propose a systematic and intensive prospecting design (Ruiz Zapatero, 1996; Morales Hervás, 2000). On the other hand, systematic collection of materials made in Mariano Miró is within what Gándara (1981) defined as *direct collection*, when visible materials are collected manually in different extraction units determined during prospective tasks. We deem it necessary to carry out a coverage strategy of intensive nature at site scale, as it has easy access conditions, scarce vegetation cover, and consequently high visibility of the archaeological record (García Sanjuán, 2005).

Prospecting was made in two stages and during several field work campaigns. During the first stage, and with the aim of determining the probable extent of the settlement, a 280 m by 140 m area was delimited, located south of the railway station (39,200 m^2). Then, a topographic survey of the terrain was made using a Pentax Ap-124 optical level, oriented to true north at 0°. For that purpose, the datum was set in one of the highest points in the terrain and points were recorded by radiation method measuring angle, distance, and altimetry from that point (Domínguez García Tejero, 1998). In addition to this, burrowing animals' (*Chaetopractus villosus* and *Dasypus hybridus*) caves were recorded to evaluate their influence on material accumulation.

Bearing in mind the techniques described by García Sanjuán (2005), it was decided to carry out a general recognition strategy, to cover all of the vast prospecting area (Figs. 2 and 3). For this purpose, 14 parallel transects were set out from west to east divided into seven 40 m sectors called A, B, C, D, E, F and G. Pedestrian survey was conducted in each transect using a Garret 1500 metal detector set in middle level of sensitivity and 'all metals' option. The metal detector was operated by an individual highly experienced in its use, accompanied by an assistant. Its use let us delimit sectors where there are surface and sub-surface metal concentrations. The total number of concentrations found was 402 and each was recorded in planimetry with bidimensional measurements.

Different types of materials found on the terrain surface (glass, metal, pottery, wood, earthenware, bone, among others) were collected considering the initial registration. Four operators were in charge of this task, each one located 2.5 m away from the others, covering a 10 m space between each transect. These operators had previous experience in collecting surface material in sites with similar characteristics, though at a lesser scale (Landa et al., 2010a, b; Montanari et al., 2013). Transects were oriented alternatively, starting from west to east, inversely in the following transect. Operators walked simultaneously in parallel, collecting findings in an individual bag (labelled including transect, section and operator's position, e.g. transect 1 A op1). The information provided by the survey conducted in the transects, both by the metal detector and the collection of surface material, allowed drawing of a map of surface artifactual densities and sub-surface concentrations of metal artifacts (Fig. 4).

Topographic survey helped determine the existence of low sectors and higher ones. Taking into account these terrain slopes, at this first stage, when the railway blueprint with some of the village plans was still unknown, we decided to set out two excavation areas. The first area called "trench 1" (4 m^2) was laid out by cutting perpendicularly a circular hollow-shaped trace observed in the terrain; it was deepened 165 cm down from the current terrain, with few findings. However, in a space extending towards the northeast of this trench, a *Prosopis caldenia* (caldén) post was found. and an area plentiful of archaeological material, carbons and a bonfire lens 10 cm below the current terrain. This sector could be

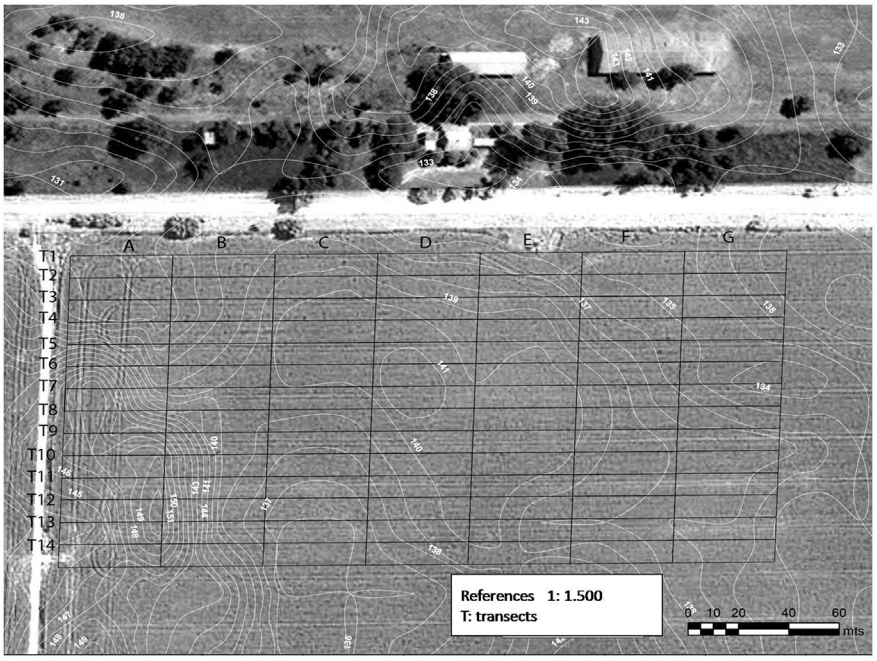

Fig. 3. Site topography: depressions and elevations.

related to a discard activity or dumping area. To date, 2200 archaeological remains coming from this section have been processed, among which a large number of decorated pottery, bone remains with butchering marks, metal objects, glass containers and leather residue, among others, stand out.

Grid 1 was laid out in a section where a local informant (Mr. Walter Moyano) mentioned he had observed a brick wall when he set up the mill framework in that field. We set out a 2 × 3 m area where between 50 and 55 cm deep a layer of highly fragmented building materials was found (bricks and clay, sand and lime mortar) caused by tumbling walls and, underneath this layer, a 60 cm wide brick wall was found with SE–NW orientation. Probably associated to this wall, the trace of a post was found, a longleaf pine (*Pinus palustris*) post, and floor remains of the same wood. According to what the eldest local settlers mention, this structure would correspond to a general store.

In 2013, after the works described above, a second prospecting stage was designed. Firstly, the blueprint found in the Railway Museum "R. Scalabrini Ortiz" Archive in the Buenos Aires city was digitalized with Autocad 2010 software. The ancient blueprint was geo-referenced using GIS techniques by means of ArcGis 10 software. For proper adjustment, these data had to be complemented using a 1951 aerial photograph (IGN 1:50000) and setting new reference points with Garmin E-trek GPS. The resulting product

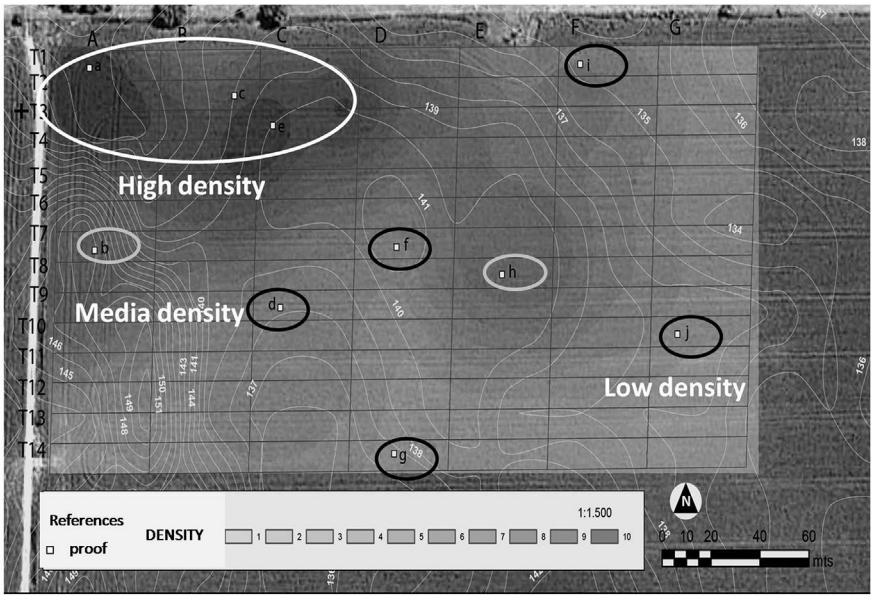

Fig. 4. Distributional density of artifacts found in surface and sub-surface: the white mark indicates high density, the grey and black markings indicate medium density and high density respectively.

was superimposed with topographic survey data, the surface remains density map and excavated sectors. Thus, we verified concordance between the ancient blueprint structure outline and the two terrain sectors where excavation units were set. The dump in trench 1 is located behind a structure, whereas the wall found in grid 1 matches the wall of another structure.

At the same time, the materials resulting from surface collection were inventoried, reaching a total of 11,407 material remains. According to the analysis performed in the lab, most of the artifactual set presents morphological and typological characteristics typical of the late nineteenth and early twentieth centuries, pertaining to the chronological context of Mariano Miró's site occupation. Materials were classified within categories where, in the first place, raw material was prioritized and, secondly, artifact functionality. The richness of the different materials found was vast (N = 22″), although glass (N = 8324) and pottery (N = 1125) clearly prevail. Later, they were entered in a database using different analysis variables (quantity, raw materials, function, size and surface alterations). This database was worked on by means of ArcGis 10 software and complemented by MapAnalyse 1.6. Maps were created under Gaüss Krüger projection (WGS84) zone 4. Based on that, different coverages were created where artifactual distribution and density were presented according to the categories. The Kernel method was used for this purpose, calculating point density around each raster cell as a circular neighbourhood. Thus, the density value is ten at the location of the point and it diminishes to zero as distance increases (Silverman, 1986). Using GIS helped us integrate diversity of data in order to evaluate the incidence of each variable in the real model (Kvamme, 1999).

The spatial distribution of artifacts shows a clear pattern where materials are more abundant in northern transects (closer to the station), whereas material frequency significantly decreases southwards. Frequency is higher in western sections and diminishes eastwards. In addition to this, certain high-density loci and sections with almost null concentration are seen. Medium-size (55%) and small (46%) objects prevail, whereas large objects only show low frequency (9%). This proportion of the size category is similar in all types of material in the set. Sections B and C have higher concentrations of larger fragments. Sections A and E have similar small and medium-size object distribution and density.

Only 164 objects (1.48%) out of the total artifacts show signs of igneous action (different levels of alteration) and they are found in a higher density in sections C, E and F. The materials that have been more altered are glass (79%), pottery (9%), and bone (8%). We were able to verify that surface distributions and accumulations were not the result of the existence of slopes or mounds in the terrain or of the action of burrowing animals. Sub-surface metal material concentrations (N = 402) show a distribution pattern similar to surface materials. All these elements let us establish archaeological expectations so as to decide which areas are more appropriate for intervention and which are not.

Taking into account the new information corpus, the third prospecting stage was designed. In 2014, according to the distribution of surface materials and the map with the 1902's structures, ten surveys, 1 m2 of test each one, were outlined designated with letters A to J) in order to establish correlations between both types of information. These explorations were proposed taking into account the material density map created based on the prospecting conducted with a metal detector and the systematic collection of surface material. Especially, areas of material high-density located in different topographic positions were chosen: high, low and slopes (A, C, E), medium density (B and H) and low-density (D, F, G, I and J). The purpose of these explorations was to test the presence of archaeological material in different situations regarding surface and sub-surface densities of metal artifacts and the existence of structures (as indicated in the blueprint). Explorations A, C, F and I showed positive results as regards material findings. Three match the area where possibly there are masonry structures (A, C and I), whereas F can be attributed to a discard area. Explorations B, D, E, G and J provided no findings. Exploration H presented scarce findings concentrated in the first 10 cm, corresponding to the plowzone. From the results obtained, explanatory alternatives were created about the distribution of materials that were buried and on the surface, connected to the incidence of ploughing and animal or human trampling (Landa et al., 2014). In this regard, in 2013 and as a complementary study, experimental archaeology activities were initiated in the terrain by setting up different tracks as control tests, with whole and fragmented glass objects (Borrazzo, 2011).

4. Conclusions

The prospecting work conducted in Mariano Miró site has allowed us to control several archaeological difficulties that arise when dealing with large area sites (methodological, economical, human resources, etc.) involving traces and structures that are completely hidden under the current agricultural production. In this sense, planning methodological, technical, and logistical prospecting aspects in various stages was essential for fieldwork success.

Site prospecting was divided into three stages, where clear and feasible objectives were proposed to carry out both in the terrain as well as in the lab. During the first stage, prospective work was done so as to define the possible borders of the old village and its archaeological potential. These tasks focused on topographic survey, land survey, pedestrian survey with metal detectors, and systematic surface collection. All these activities were carried out applying strict data geo-referencing by means of GPS and optical level. In a second stage, the data obtained were processed and integrated with the information gathered from bibliographical research and the documentary sources found in different repositories consulted (e.g. Mariano Miró station blueprint). GIS became an essential tool when integrating the enormous data corpus created, providing an understanding of the site in multiple analytical scales by producing different coverages. In a third stage, density maps created in the lab were used to plan the first subsurface sampling instance by means of 1 m^2 explorations. The criteria employed in laying out those excavation units were based on the integration of data created in previous prospecting stages, either artifact distribution maps or analysis of artifacts found on the surface, interviews of settlers, and the old station map.

Because of the specific characteristics of Mariano Miró, it is considered that prospecting has been laid out as an autonomous activity, intrinsic and independent of other types of archaeological intervention. The different prospective activities have had great relevance, as the area to be surveyed presented large dimensions and, consequently, an extensive archaeological intervention was impracticable, considering it would have required numberless human and economic resources. Although it is a site barely over 100 years old, knowing the past of these first villages of colonists in the Pampean region becomes absolutely necessary to understand the social, self-defining and economic development that has moulded these zones of our country. In that sense, archaeological research of this site is closely linked to the goal of understanding populating this region in the last years of the nineteenth century and the first decade of the twentieth.

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