

## ***Landscape archaeology in the Ravenna hinterland: the survey at Cotignola (RA), 2018.***

*Marco Cavalazzi*<sup>1\*</sup> – *Michele Abballe*<sup>\*\*</sup> – *Alice Ferrari*<sup>\*\*\*</sup>

\*Department of History and Cultures, University of Bologna / Department of Classical Studies, University of Michigan

\*\*Department of Archaeology, Ghent University / Department of Cultures and Civilisations, University of Verona

\*\*\*Department of History and Cultures, University of Bologna

*The “Bassa Romandiola” project was promoted by the University of Bologna and the “Centro di Studi sulla Romandiola Nord Occidentale” with the aim of investigating the north-western part of the Ravenna region (Italy), the so-called Bassa Romagna. In this paper, we present the synthesis of the results of the 2018 field campaign, which focused on the area of Cotignola (RA) and included an artefact survey and five targeted manual auger cores. Despite the biases that affected the data collected, the results shed light on a general transformation that involved this part of the Ravenna region between the 12th and the 14th centuries CE, which caused a settlement selection process and the alteration of the rural landscape and its landforms.*

### **1. Introduction**

The “Bassa Romandiola” project is a landscape archaeology project started in 2009 by the University of Bologna and the “Centro di Studi per la Bassa Romandiola Nord Occidentale”<sup>2</sup>. The project aims to study the diachronic evolution of the north-western part of the province of Ravenna, the so-called Bassa Romagna. In particular, here we present the preliminary results of the 2018 field campaign that interested the area of Cotignola, a small urban centre approximately 25 km south-west of Ravenna, with an administrative circumscription of 35 sq. km (fig. 1). Its territory was never systematically investigated until this survey. Thanks to the research we carried out, we shed more light on two main aspects that were not completely clear before the beginning of the project: the characteristics of the medieval settlement pattern and the geomorphological evolution of this territory during the Middle Ages<sup>3</sup>.

---

<sup>1</sup> Corresponding author: [marco.cavalazzi3@unibo.it](mailto:marco.cavalazzi3@unibo.it).

<sup>2</sup> The centre has the objective of studying the history of the north-east part of Ravenna hinterland, the Bassa Romagna area, and it was founded in 1992 by several Italian historians and archaeologists, including Prof. Augusto Vasina, Prof. Gianfranco Pasquali, Prof. Leardo Mascanzoni, Prof. Mauro Bovoli, and Dr Norino Cani.

<sup>3</sup> The scientific director of the research was Prof. Andrea Augenti (University of Bologna) and the field coordinator Dr Marco Cavalazzi (University of Bologna); the archaeologists were: Michele Abballe, Marco Babini, Michela De Felicibus, Alice Ferrari, Celeste Fiorotto, Beatrice Ghiselli, Nicholas Giuliani, Desy Mazzetti, Luisa Populin Redivo, Anna Provenzano, Mirko Turchi.

## 2. Project history

The main objective of the Bassa Romandiola project was to define the evolution of the settlement patterns during the Late Antiquity and the Middle Ages in the area around the city of Ravenna. Here, this problem has previously been investigated mainly by historians<sup>4</sup>. Indeed, this area is characterised by a notable geomorphological dynamism, which causes a vertical growth of the ground layers, sometimes substantial (see further, paragraph 4), and has discouraged systematic archaeological approaches. We tried to overcome this complexity with a diversified, systematic, and integrated approach that included artefact survey as well as excavation, geoarchaeological, and archaeobotanical research.

Since the beginning of the “Bassa Romandiola” project, we have examined approximately 78 sq. km (i.e. 15% of the Bassa Romagna sub-region, namely 525 sq. km). So far, several field campaigns of intensive artefact survey have taken place (fig. 1)<sup>5</sup>: in 2009, in the area of Lugo; in 2011, in the area of Conselice; in 2012, in the area of Bagnacavallo and Fusignano; in 2016, in the area of Bagnacavallo and Lugo; and, finally, in 2018, in the area of Cotignola. The latter, whose results are presented in this paper, was investigated in six weeks of fieldwork between September and October 2018.

Moreover, in 2018, the project became part of more extensive research by the University of Bologna, the “Ravenna Landscape Project”, which includes two other ongoing landscape archaeology investigations, focused on the territory of Cervia (Cervia project)<sup>6</sup> and Faenza (Faventia project)<sup>7</sup>.

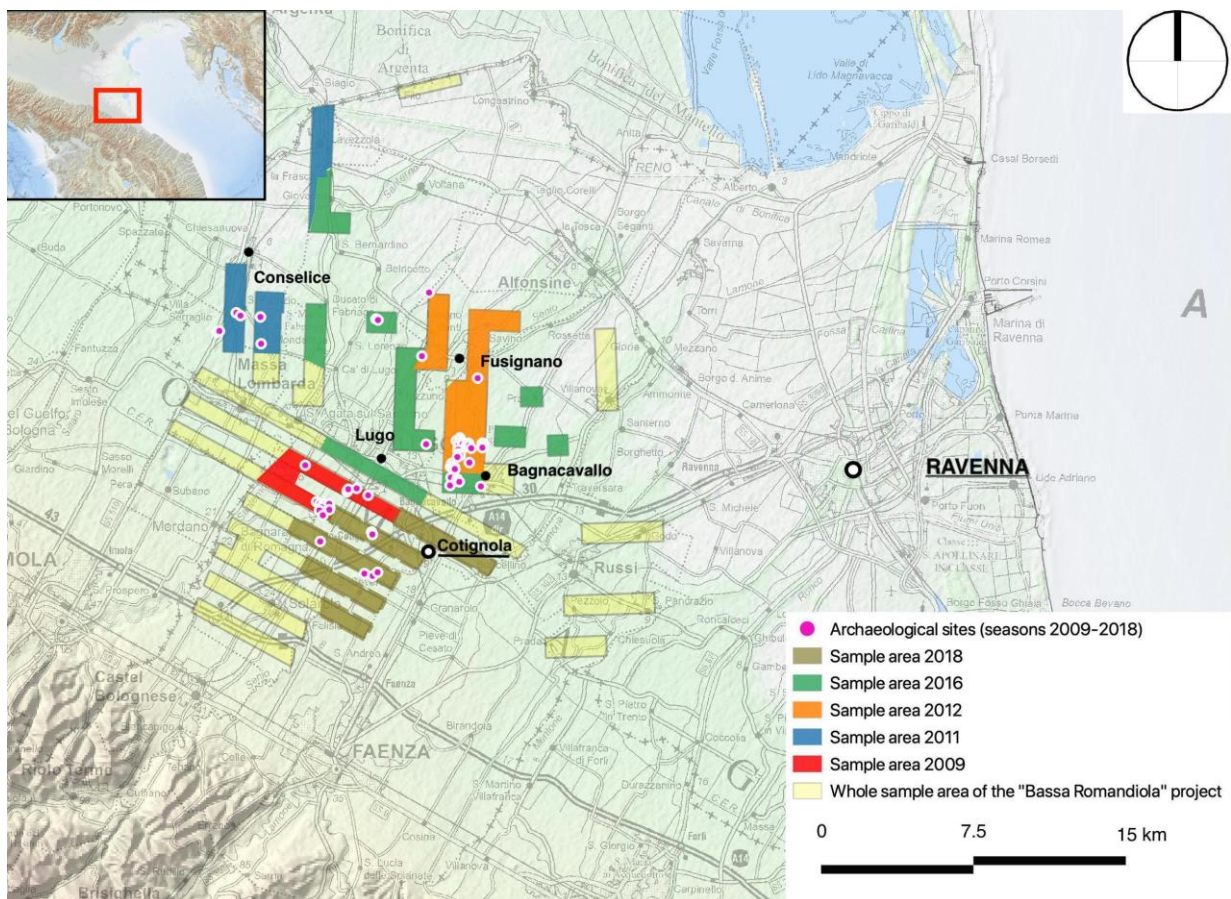


Fig. 1. Sampling strategy of the project “Bassa Romandiola”. In red the sample area investigated in 2009 (Lugo), in blue the 2011’s sample (Conselice), in orange the 2012’s sample (Bagnacavallo), in green the 2016’s sample (Lugo and Bagnacavallo), and in brown the 2018’s sample, in the territory of Cotignola (author M. Cavalazzi).

<sup>4</sup> A synthesis of these studies in CAVALAZZI 2022a.

<sup>5</sup> CAVALAZZI 2012; DE FELICIBUS 2017; CAVALAZZI *et al.* 2018.

<sup>6</sup> AUGENTI *et al.* 2020.

<sup>7</sup> For more information about the Faventia project please refer to <https://www.faventival.it/progetto-faventia>. For some of the results, see ABBALLE 2022.

### 3. Research methods

The research started with a review of the previously known data, analysing written sources archives, previous archaeological investigations (none of them systematic), and the geomorphological evolution of the area<sup>8</sup>.

The field research method consisted of a systematic survey in a sample area of 15.6 sq. km, equivalent to 44% of the territory of Cotignola (fig. 1); five parallel transects were defined<sup>9</sup>. In the sample area, every cadastral parcel with a minimal level of visibility (a Topographical Unit, T.U.) was systematically surveyed by the archaeologists, walking in parallel lines with a distance of 10 metres from each other (the “intensity” of the survey)<sup>10</sup>. Thus, the “Topographical Unit” was the box in which any archaeological find was located as well as the evidence on the ground of human and natural activities<sup>11</sup>. During the artefact survey, the position of every single find was recorded with an uncorrected GPS receiver, as in a siteless survey<sup>12</sup>. Any area of the Topographical Unit with a higher density of artefacts than the background scatter was interpreted as an archaeological “Site” (see below)<sup>13</sup>. In this case, the intensity of the survey increased and the distance between every archaeologist was set to 1 metre from each other, with the surveyors collecting every archaeological find, except the architectural ones (i.e. bricks or roof tiles). This double approach (site/siteless) allowed to map the *continuum* of the artefact distribution<sup>14</sup>, while still preserving the interpretative category of “Site”, which will be helpful for further archaeological analysis and local public bodies, like the *Soprintendenza* and the local *Comuni* and their instruments for heritage protection.

At the same time, a hand augering campaign was carried out to understand the geological settings of two archaeological sites identified during the survey (see further, paragraph 8)<sup>15</sup>. These investigations were part of a larger research project aiming to better understand the geomorphological evolution of the hinterland of Ravenna<sup>16</sup>. Using an Eijkelkamp auger set, 155 auger cores were carried out in total, targeting primarily areas with few or no archaeological sites to reconstruct any geomorphological evolution biasing our knowledge. The crossing of new and legacy geoarchaeological data has allowed shedding light on the post-Roman landscape transformations that occurred in Bagnacavallo<sup>17</sup>, Lugo<sup>18</sup>, Massa Lombarda, and Villafranca di Forlì<sup>19</sup>.

### 4. The palaeogeographical and geomorphological context

The local geological map classifies the whole area within the Unità di Modena (or EAS-8a), a unit with soils poorly developed because created only after the 5th century CE<sup>20</sup>. Generally, this unit is used for all those areas in the Po Valley where Roman palaeosurfaces and possible sites are not outcropping. Thus, according to the local geological map, the Apennine rivers’ aggradation formed the present landscape around Cotignola during and after the Middle Ages.

In order to understand how the landscape was shaped, reconstructing the channel diversions that happened in the last millennia is essential, especially for the Senio, a small river that represents the main watercourse in the area nowadays (fig. 2). However, its importance for the study areas dates back at least to the Middle Ages, when the same town of Cotignola was founded as *castrum* on its left bank (see further). Thanks to the written sources and historical cartography, it is possible to reconstruct the recent history of the Senio with some precision. However, it is challenging to follow the possible diversions during the late Holocene and understand if other rivers were flowing in this area before the Modern period (fig. 2).

<sup>8</sup> CAVALAZZI 2022b.

<sup>9</sup> BANNING *et al.* 2017; BANNING 2002: 89-90.

<sup>10</sup> CAMBI, TERRENATO 1994: 161-179.

<sup>11</sup> GATTIGLIA, STAGNO 2005.

<sup>12</sup> CAMBI, TERRENATO 1994: 256-257. The device was a GPS Garmin 64s.

<sup>13</sup> The threshold of site definition on fieldwork was related to every single Topographical Unit and subjectively defined by the field coordinator, Dr Marco Cavalazzi; further statistical analysis did not change this preliminary distribution.

<sup>14</sup> CAMPANA 2018: 31-42.

<sup>15</sup> The campaign has been coordinated by the geoarchaeologist Michele Abballe within his doctoral research at Ghent University.

<sup>16</sup> Additional information on aims and methodology can be found in ABBALLE 2022.

<sup>17</sup> ABBALLE, CAVALAZZI 2022.

<sup>18</sup> ABBALLE, CAVALAZZI, FIOROTTO 2022.

<sup>19</sup> ABBALLE 2022.

<sup>20</sup> PRETI 2002.

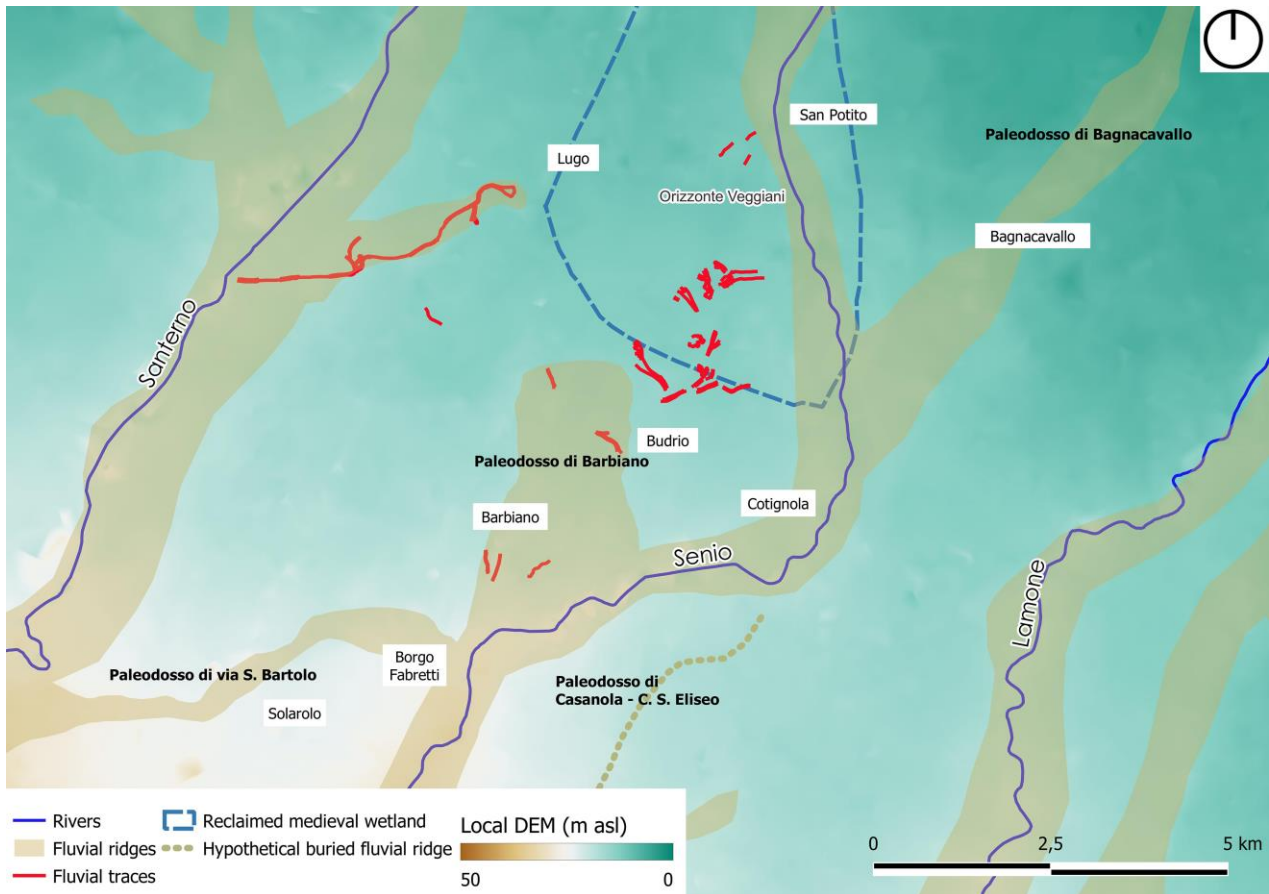


Fig. 2. Geomorphological map of the territory of Cotignola with rivers, fluvial ridges (Italian names in bold)<sup>21</sup>, hamlets and towns mentioned, the extension of the Orizzonte Veggiani and main fluvial traces mapped by remote sensing. Visualisation of a 10m resolution local DEM as basemap<sup>22</sup> (author M. Abballe).

The oldest data that can be used to reconstruct the palaeogeography of the study area comes from a recent archaeological rescue excavation carried out during the laying down of a gas pipeline. In 2011, remains of a possible large settlement were found in Via Agrippina (Faenza), just 600 metres from the border with Cotignola (fig. 3, no. 2)<sup>23</sup>. The settlement was occupied from the Middle Bronze 2 (1550-1450 BCE) to the Recent Bronze Age (1340/1330-1170 BCE), based exclusively on a preliminary assessment of the finds collected during the two excavation campaigns (2011-2012). In addition, the existence of a river flowing thereabout was also suggested, to which the settlement was probably connected<sup>24</sup>. This interpretation fits well with the previous hypothesis proposed by Stefano Marabini, who identified a mostly buried fluvial ridge, the so-called *Paleodosso di Casanola - C. S. Eliseo*, going from nearby Castel Bolognese to the south of Cotignola, that he proposed as the course of the Senio during the Bronze Age (fig. 2)<sup>25</sup>.

Later on, the Senio probably started to flow within the present territory of Cotignola, with a course quite similar to the modern one up to Borgo Fabretti, where it probably joined the river Santerno, which used to flow in correspondence with the *Paleodosso di via S. Bartolo*<sup>26</sup>. A confluence of these two watercourses is attested by some documents in the High Middle Ages<sup>27</sup>, while for the Roman period, a petrographic study on sandy deposits recovered in a quarry in Cotignola has proved that a similar conformation was likely occurring already at the time.

<sup>21</sup> We preferred to use Italian names since they are already attested in the literature, especially FRANCESCHELLI, MARABINI 2007.

<sup>22</sup> This local DEM has been created by interpolating elevation points manually recorded by the Emilia-Romagna region; for more information on data gathering and interpolation method please refer to ABBALLE, CAVALAZZI 2021.

<sup>23</sup> BUCCI 2011.

<sup>24</sup> MILANTONI 2012.

<sup>25</sup> FRANCESCHELLI, MARABINI 2007: 30.

<sup>26</sup> The name appears only since the Middle Ages, while it is still debated its association with the name *Vatrenus* known in Roman times; see discussion and previous references in FRANCESCHELLI, MARABINI 2007: 30-31, 125-133.

<sup>27</sup> The first mention dates to 1037 CE, edited in FANTUZZI 1801-1804: II, 369. The question has been long debated: GAMBI 1949: 31; CREMONINI 1994; FRANCESCHELLI, MARABINI 2007.

Indeed, sediments characterising both Santerno and Senio rivers were deposited in the area already before and during the Roman period<sup>28</sup>.

Further north, the Santerno-Senio river flowed towards Bagnacavallo, creating the *Paleodosso di Bagnacavallo* in post-Roman times<sup>29</sup>. Finally, the last significant modifications experienced by the Senio, affecting the territory around Cotignola, were the separation from the river Santerno, which occurred for sure before 1259<sup>30</sup>, and the avulsion from the course towards Bagnacavallo westwards of San Potito, dated in the literature around 1218 CE<sup>31</sup>. After these two significant modifications, the course of the Senio has remained stable up to the north of Cotignola<sup>32</sup>, also thanks to the construction of artificial embankments and the cutting out of many meanders naturally formed by its course. One of these palaeomeanders was investigated in relation to the geomorphological setting of the site of Cunio (see further, paragraph 8).

### 5. Previous archaeological data

As seen above, the territory investigated experienced intense geomorphological transformations until at least the Middle Ages, which greatly limited the chances to record through survey archaeological sites older than that period. What we present is a short review of the known sites in the area to give an idea of its archaeological potential.

Almost no evidence of prehistoric and even protohistoric sites is known to date. However, some stratigraphic layers with sherds of coarse and unturned pottery generally datable to this chronology were found within the “Fornace di Cotignola” clay pit at -7 m (fig. 3, no. 1)<sup>33</sup>. Furthermore, a few sites are known in the surroundings of Cotignola, including the almost outcropping Bronze Age settlement in Via Agrippina, Faenza (fig. 3, no. 2)<sup>34</sup>. Based on these few data, it is quite safe to assume that the lack of settlements may simply result from geomorphological biases.

When considering the Roman period, more data become available, but all remains seem to be deeply buried, even though the original discovery depths are not always known or clear. This is particularly true for funerary contexts discovered already during the 19th century, like the stele of the *Varii*, which was buried around -7/10 m from the present ground (fig. 3, no. 3)<sup>35</sup>, and the funerary urn of *Fuficia lucunda* whose depth is unknown (fig. 3, no. 4)<sup>36</sup>. These discoveries were followed in the last century by a series of other funerary findings: some Cappuccina tombs (i.e. tile-covered graves) near the local train station (fig. 3, no. 5)<sup>37</sup> and under the church of S. Stefano in Barbiano (fig. 3, no. 6)<sup>38</sup>, while both Cappuccina tombs and Amphora burials within the clay pit near Ponte Pietra in 1966, dated to Late Antiquity (fig. 3, no. 7)<sup>39</sup>. For all three cases, the original depths are uncertain but appear to be considerable: around -2.5 and -5 m for the tombs in Barbiano and Ponte Pietra, respectively. If we consider residential sites, we know fewer of them. For example, the remains of a possible Roman villa in the locality Baronzano discovered in the 19th century (fig. 3, no. 8), but whose depth is unclear<sup>40</sup>. A possible second settlement was discovered close to Cotignola, where marble floor fragments were found while digging a well in 1935, around 15 m from the embankments of the Senio (fig. 3, no. 9), at a depth of -1.8 m<sup>41</sup>.

Worth mentioning, although it does not fall within the territory of Cotignola, is the discovery of two Cappuccina tombs in Via Agrippina in 2011, during the laying down of the pipeline Castel Bolognese-San Potito, a few tens of metres far from the Bronze Age site (fig. 3, no. 10). In particular, one of the two tombs was dated to the 6th century<sup>42</sup>. The relevance of these discoveries is due to the identification of this *centuria*<sup>43</sup> as the *fundus*

---

<sup>28</sup> MARCONI *et al.* 2008.

<sup>29</sup> FRANCESCHELLI, MARABINI 2007: 32.

<sup>30</sup> When the river is mentioned alone; see ROSSI 1572: 425.

<sup>31</sup> BONOLI 1732: 372-373.

<sup>32</sup> Northern than this point, the course changed still several times often due to human interventions; for further information see GAMBÌ 1949.

<sup>33</sup> FRANCESCHELLI, MARABINI 2007: 112-113.

<sup>34</sup> See paragraph no. 4.

<sup>35</sup> CENERINI 2006: 38-40; FRANCESCHELLI, MARABINI 2007: 83-84, n. 191.

<sup>36</sup> CENERINI 2006: 40.

<sup>37</sup> FRANCESCHELLI, MARABINI 2007: 84-85, n. 166.

<sup>38</sup> TAMBURINI, CANI 1991: 109; FRANCESCHELLI, MARABINI 2007: 190, n. 173.

<sup>39</sup> FRANCESCHELLI, MARABINI 2007: 85-86, n. 171.

<sup>40</sup> SCAGLIARINI 1968: 52, n. 29A; CENERINI 2006: 42.

<sup>41</sup> SCAGLIARINI 1968: 51, n. 27A.

<sup>42</sup> BUCCI 2011.

<sup>43</sup> A *centuria* is a square unit of land whose measures are based on the Roman cadastre, of approximately 710 m per side.

*Panicale*<sup>44</sup>, where the original church of Santo Stefano in Panicale, known in the sources since the 9th century, is supposed to be located<sup>45</sup>.

Our knowledge is also quite fragmentary for the medieval period, with few excavations mainly carried out without a scientific approach. Most of the sites investigated so far are religious in nature, with the first excavation in 1869, when a rectangular building with an apse, orientated east-west was found near the border with Bagnacavallo (fig. 3, no. 11). This was interpreted as the remains of the church of S. Maria in Fabriago, known in the sources as *capella* for the first time in 1064<sup>46</sup>. According to the canon of the time, the church had a single nave (13.5 x 5.8 ms), a circular apse, polygonal in the exterior, and its walls, made of Roman reused bricks and decorated with marble slabs, were preserved for 1.6 m high<sup>47</sup>. In the last century, investigations were carried out also in the already mentioned *Plebs* of S. Stefano in Barbiano (fig. 3, no. 6), wherein also two column bases were found in the 1970s, probably connected to an older phase of the building<sup>48</sup>. Afterwards, also nearby the church of San Giovanni Battista, probably the “Hyerosolymitan *domus* in Cunio” known in the sources, four human burials were found in 1997 (fig. 3, no. 12)<sup>49</sup>. Lastly, on the site where the *Torre di Acuto* stood until 1944, restoration works brought to light several structures in 1970<sup>50</sup> (fig. 3, no. 13), later interpreted as the remains of S. *Joannis* church<sup>51</sup>.

Regarding residential sites, most archaeological data refer to castles, namely settlements associated with defensive structures, like those of Cunio and Budrio. Now we will summarise all the information connected to these two sites, before presenting the new data collected by our project.

The first person to give helpful information about the location of the castle of Cunio (fig. 3, no. 14) was Antonio Bedeschi, who placed it near the sluice of the River Senio, between Granarolo, Cotignola and Barbiano. Furthermore, he also reported the presence of some ruins, probably connected with the castle<sup>52</sup>. Apparently, some archaeological investigation took place in 1921, near a farmhouse called “Castellaccio di Cunio”, which was located on the left bank of the River Senio, that led to the discovery of a large outer wall divided into rooms<sup>53</sup>. A second important discovery was made in 1933 near via Ponticella, where a small portion of a 1.5-metre-tall structure was found, while the depth of the original floor was placed at -2 metres from the modern surface<sup>54</sup>. After this, according to the inhabitants of the area, the last visible ruins were completely destroyed during WW2 as a result of the bombings<sup>55</sup>. In 2001, some archaeological finds were collected about 100/150 metres away from the left bank side of the River Senio, including mainly Roman bricks and tiles brought to the surface during ploughing<sup>56</sup>. However, the sporadic discovery of these materials does not seem sufficient to attest to the presence of an outcropping Roman palaeosurface since building materials are often reused in later periods and the area was a war front during WW2, which may have led to intense anthropogenic disturbances. Finally, in 2011, an excavation for a pipeline crossed the site where the castle of Cunio once stood. Unfortunately, no archaeological remains were identified, except a dispersion of bricks that was interpreted as the ruins of modern structures destroyed during WW2, due to the presence of explosive remnants among these<sup>57</sup>. The events that occurred near the site during the War could have indeed damaged the archaeological deposits, but we cannot exclude that some could still be preserved and that they simply did not come to light during this trench excavation. During this preventive work, some archaeological evidence did come to light, but on the opposite side of the Senio, in Via Maremme (fig. 3, no. 16). Here, some ditches were identified and dated to the Roman period, albeit no finds were documented, making it impossible to confirm this chronology<sup>58</sup>.

Instead, regarding the site of the castle of Budrio (fig. 3, no. 15), we only know that some foundations were seen by Ferruccio Montanari near Ca' Montanari during ploughing, which he interpreted as the remains of the

---

<sup>44</sup> DONATI 2006: 31-32.

<sup>45</sup> See paragraph 5.

<sup>46</sup> BALDUZZI 1871-72; SCAGLIARINI 1968: 49, no 24B; FRANCESCHELLI, MARABINI 2007: 191-192, n. 179.

<sup>47</sup> BALDUZZI 1871-72; the church survived in elevation at least until the 14th century, less probably until the 15th/16th centuries, when it still appeared as owner of several nearby parcels (DONATI 2006: 29-30).

<sup>48</sup> TAMBURINI, CANI 1991: 18, 60, 108-109, 121-122.

<sup>49</sup> BANZOLA 2006: 69; CPA-UBR.

<sup>50</sup> MAZZOTTI 1972: 675-678.

<sup>51</sup> DONATI 2006: 59-60.

<sup>52</sup> BANZOLA 2006: 67.

<sup>53</sup> AUGENTI, FICARA, RAVAIOLI 2012: 142-143.

<sup>54</sup> AUGENTI, FICARA, RAVAIOLI 2012: 142-143.

<sup>55</sup> MONTEVECCHI 1970: 188.

<sup>56</sup> BANZOLA 2006: 69, n. 48.

<sup>57</sup> BUCCI 2011: 36.

<sup>58</sup> BUCCI 2011: 36.

castle<sup>59</sup>. However, in the absence of any dating material, this hypothesis should probably be rejected after the discoveries of our campaign (see further).

Finally, the last excavation worth mentioning is a small trench opened in 2013 in Piazza Vittorio Emanuele, the heart of the town centre (fig. 3, no. 17). There, although the results were preliminary and not yet published, the archaeologist Maurizio Montanari found evidence for the original foundation of the town or one of the earliest enlargements. Indeed, the original marshy area was reclaimed to build the first structures, using “bundles of wood” carefully placed to waterproof the clayey soil underneath. On top of these layers, traces of fire probably destroyed the structures possibly standing at the time: thanks to the written sources, the archaeologist dated the event to 1412 CE<sup>60</sup>.

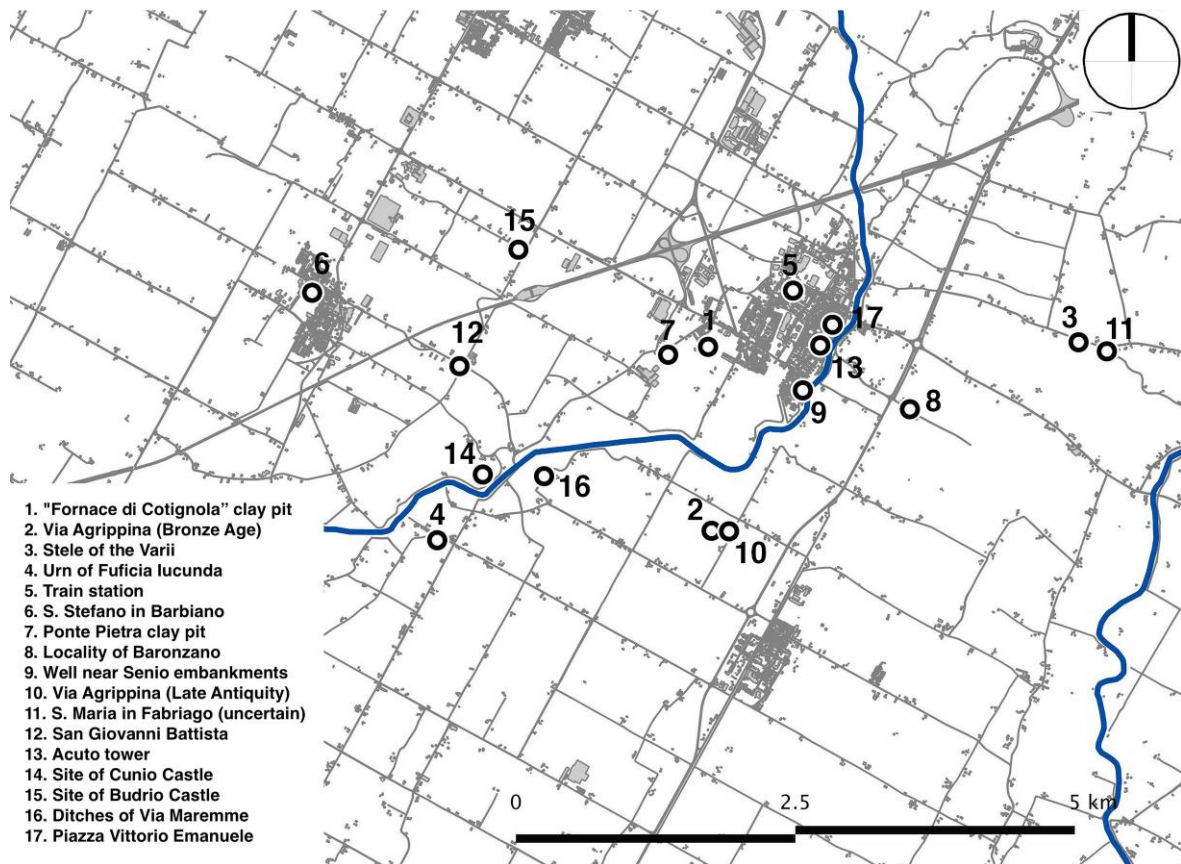


Fig. 3. Map with all the archaeological sites mentioned in the paragraph (authors M. Abballe, M. Cavalazzi).

## 6. Survey 2018: sample area and variables

As it is well known, different biases can affect the results of an artefact survey<sup>61</sup>, such as its intensity, the surface visibility, and the sampling strategy applied<sup>62</sup>. The sample of the “Bassa Romandiola” survey took into account previously known historical, archaeological, environmental, and geomorphological data<sup>63</sup>. We defined different landscape strata and we applied a stratified sampling strategy<sup>64</sup>. Indeed, to guarantee effective use of the resources, we decided to avoid investigating the stratum that includes the lands that were marshes until the Modern and Contemporary Age and were reclaimed recently<sup>65</sup>. Furthermore, we decided to sample the southern part of the context investigated with regular transects oriented approximately south/east-north/west, and aligned to the current agrarian division, still conserving the module of the Roman centuriation. Northwards, where there

<sup>59</sup> MONTEVECCHI 1970: 164-165.

<sup>60</sup> MOLINARI 2013.

<sup>61</sup> BANNING *et al.* 2017.

<sup>62</sup> CAMBI, TERRENATO 1994: 151-158.

<sup>63</sup> CAVALAZZI 2020, 2022.

<sup>64</sup> REDMAN, WATSON 1970; SHARER, ASHMORE 1979: 96-105.

<sup>65</sup> CAVALAZZI *et al.* 2018.

were marshes until the 16th-20th centuries, we sampled some transects oriented north-south and located where the paleochannels of the Apennine rivers had been mapped. The whole sampled area is equal to 150 sq. km, while the investigated area measures 525 sq. km (fig. 1); currently 78 out of 150 sq. km have been examined; anyway, only a fraction of this area, the 23% (18 sq. km), had a minimal level of visibility and it was investigated through intensive artefact survey.

The sample area in the 2018 season was equal to 15.6 sq. km, equivalent to 44% of the territory of Cotignola, and it was composed of five parallel transects. 86% of the sample area was characterised by a level of visibility of the artefacts that was classified by surveyors as “Null” (see below, in this paragraph), a situation in which it was theoretically impossible to identify any archaeological site. Notwithstanding, the research carried out in the remaining territory (14% of the sample) allowed us to detect several archaeological sites.

Unlike other sectors of Bassa Romagna, the Cotignola rural area is characterised by intensive agricultural use; land cover/land use maps realised during the fieldwork show this clearly (fig. 4). We recorded a predominance of woody crops (69,9%), followed by non-intensive agricultural use as arable land, composed of ploughed lands (13%) and herbaceous crops (5%).

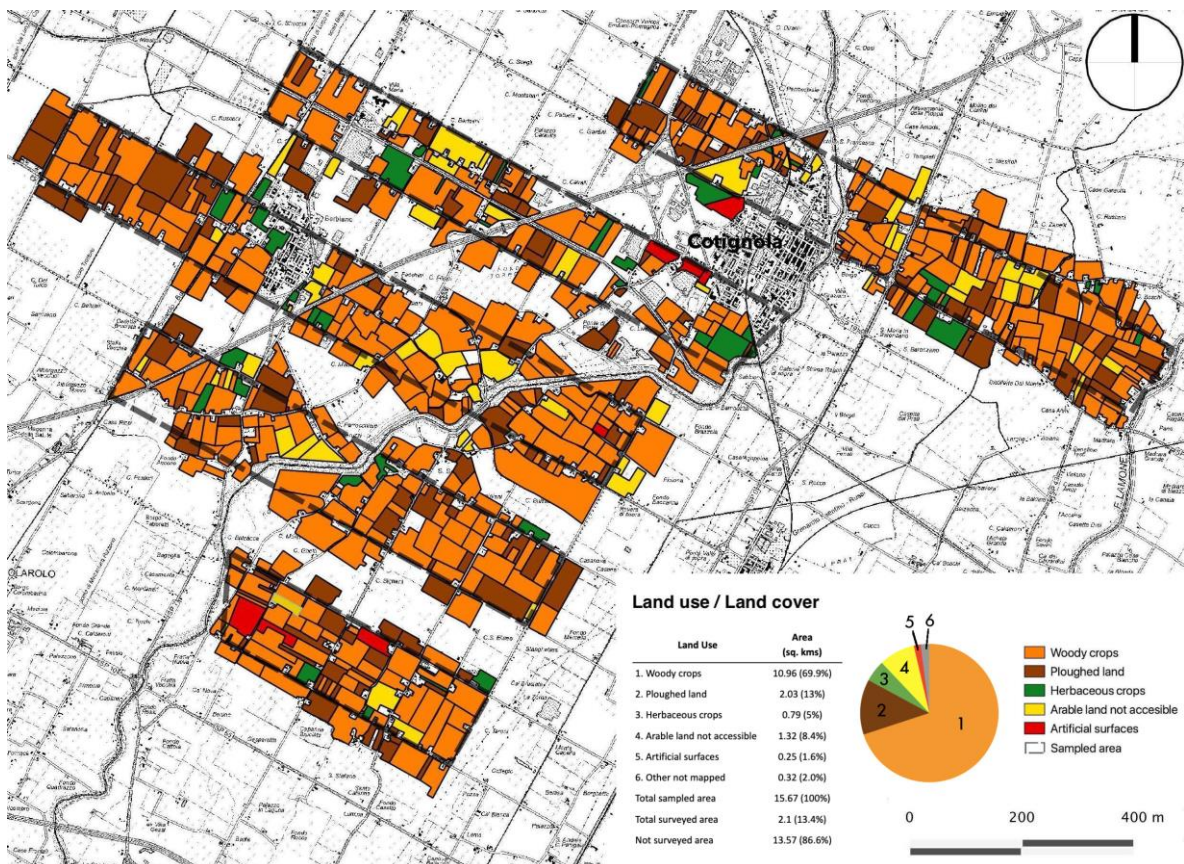


Fig. 4. Land use/land cover in the surveyed area (author M. Cavalazzi).

In the map in fig. 5 it is possible to see the visibility conditions of artefacts in the sample area investigated. This variable has been defined by evaluating different criteria:

**-Land cover/land use:** clearly, a ploughed soil is characterised by better visibility of artefacts than a harrowed one or, worse, with a herbaceous cover.

**-Sky brightness:** the weather conditions and the sun’s position can also influence the visibility of artefacts; cloudy weather is better than a clear sky with the sun at the azimuth, which can cast shadows on the ground.

**-Presence/absence of a dusty patina on artefacts:** a long period of dryness or a recent ploughing can create a dusty patina on the archaeological finds and make seeing them in the ground difficult.

**-Wetness index:** a high value of the wetness index of the ground makes colours brighter and artefacts more visible. The wetness index has been quantified in the number of days since the last rain.



Using a multi-criteria decision process, as summarised in the legend in fig. 5, a different level of visibility was assigned to every parcel in the sampled area, from the value “Null” to the value “Very high”.

As clearly shown in fig. 5, the visibility level in the area investigated is mainly characterised by the range between Null and Low values; the area with these values is equal to 14.9 sq. km on a total of 15.67 sq. km of the sampled population. Only 4.7% of the sampled area is characterised by a higher level of visibility (Medium and High visibility values); this situation was due mainly to land use (i.e. a predominance of woody crops) and the wetness index (i.e. dry period).

We avoided surveying the parcel with visibility value “Null”; all the other parcels have been enumerated and defined as “Topographical Units” (T.U., see above). During the six weeks of fieldwork 112 T.U.s were surveyed (fig. 6), equal to a surface of 2.1 sq. km. They have been identified with a numeric ID starting from 801, to clearly distinguish the T.U.s of this campaign from the previous ones, whose number reached the value 782. As mentioned above, this represents a minimal portion of the sampled area (14%), a condition that, potentially, might have drastically limited the data collected. Indeed, as discussed in the following paragraphs, the sites documented are mainly large and complex settlements, such as castles or fortified villages. On the other hand, except for a single case, the low visibility recorded in the sample area did not allow us to identify sparse settlements, which were documented elsewhere in the Ravenna area, by the Bassa Romandiola project itself or by the Decimano project south of this city<sup>66</sup>.

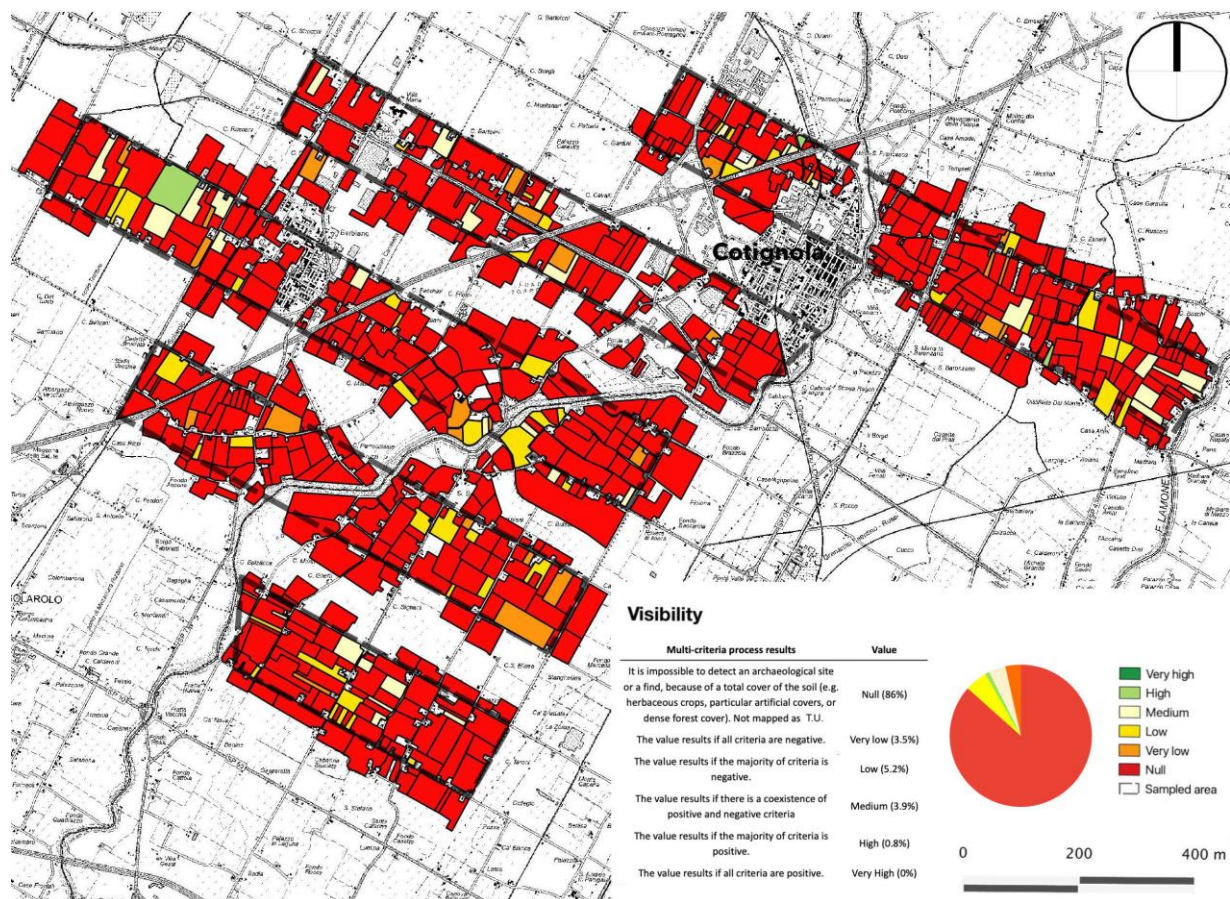


Fig. 5. Visibility values in the surveyed area (author M. Cavalazzi).

<sup>66</sup> CAVALAZZI, MANCASSOLA 2021.

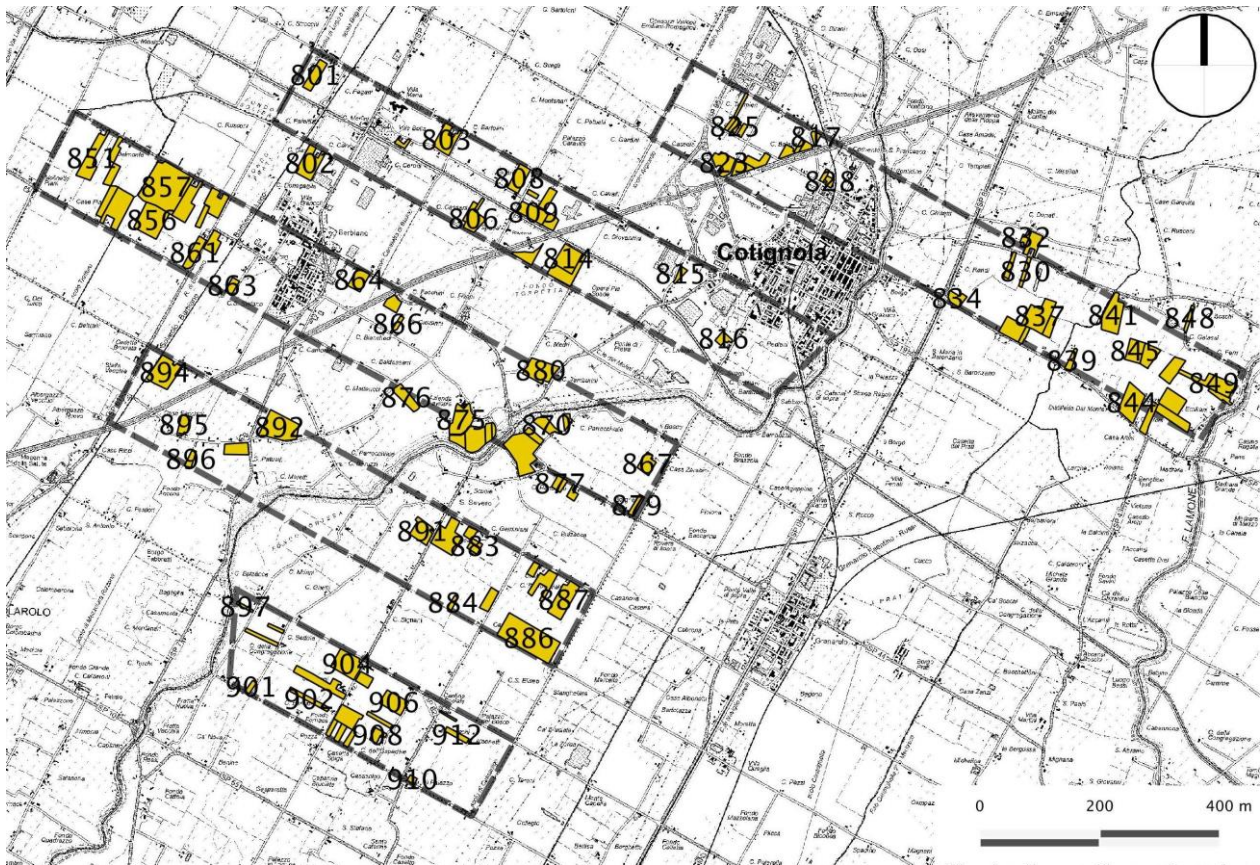


Fig. 6. Map of the Topographical Units investigated in the 2018 campaign (author M. Cavalazzi).

## 7. Archaeological sites and finds

Despite the biases described above, the archaeological survey allowed the identification of seven concentrations of archaeological material interpreted as sites, with a chronology generally included between the 11th and the 16th centuries CE. The distribution map shows how the sites are mainly concentrated around San Severo and Budrio, two hamlets of Cotignola (fig. 7.1-2). The diagnostic finds we found more frequently were medieval coarse ware (common and cooking ware), medieval and modern glazed ware (painted and sgraffito ware), and soapstone.

Two of the seven concentrations documented are located in the area of S. Severo (fig. 7.1). The finds collected here (fig. 8) included cooking and common ware, glazed and tin-glazed ware, coins, glass fragments, soapstone (fig. 9.3), faunal and human remains, and part of a crutch capital (fig. 10). This capital is made of marble, with a surface coarsely worked and decorated with a Greek cross. Unfortunately, this piece appears to be damaged, perhaps as a result of agricultural work. This find has a precise parallel with a similar artefact held currently at the National Museum of S. Vitale of Ravenna, that Raffaella Farioli Campanati dated to the 8th century CE<sup>67</sup>. We can also find *in situ* parallels with similar examples used in the bell towers of the Ravenna area (9th - 11th centuries CE)<sup>68</sup>.

These two sites in the area of S. Severo can be connected to the castle of Cunio. Indeed, a cartographic map dated 1790 CE places the site at this same exact location (fig. 11.1), namely on the left bank of the Senio river, just next to an ancient meander<sup>69</sup>.

<sup>67</sup> FARIOLI CAMPANATI 1969: Tavole, fig. 77. The capital analysed by Farioli Campanati was originally located in the S. Francesco church in Ravenna (previously *Basilica Apostolorum*).

<sup>68</sup> BATTISTINI, BISSI, ROCCHI 2008: 331-332, with previous bibliography.

<sup>69</sup> "Corso del torrente Senio" (about 1790), *Archivio di Stato di Roma*, Rome, *Mappe e Disegni*, Coll. I, cart.102 no. 145; edited in DONATI 2006: 64.

The castle of Cunio is attested since 1036 CE, as property of one of the major families of the area, the Cunio, who took their name from this castle itself<sup>70</sup>. The origin of the family is still unclear, but it seems related to the Guidi; during the 12th centuries it supported the archbishop of Ravenna and at the same time the imperial party<sup>71</sup>. In the 13th century, the castle was the centre of a rural county (*comitatus*), controlled by this family, which included the settlements of Cunio and others around. The castle was destroyed and abandoned between the 13th and 14th centuries CE<sup>72</sup>.

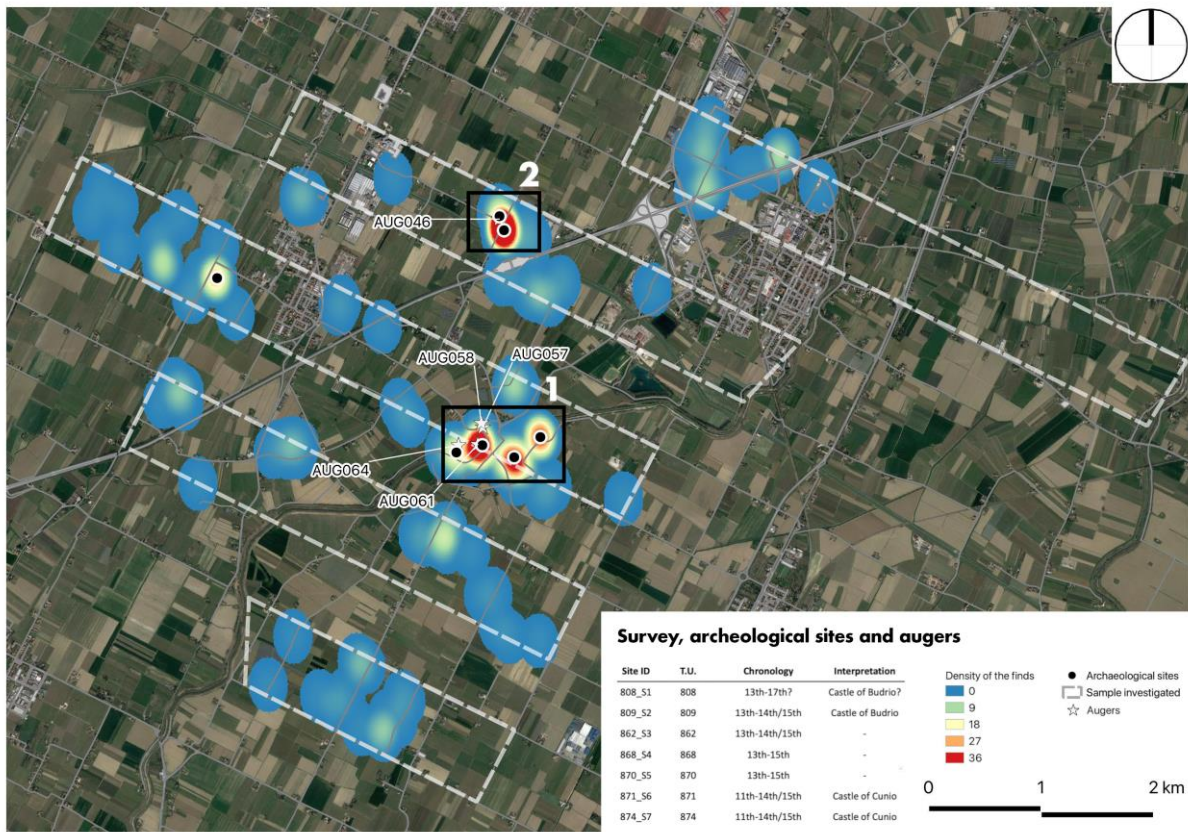


Fig. 7. Heat-map of the finds distribution, with augers (white stars) and site (black dots) location: 1. S. Severo - Cunio; 2. Budrio (authors M. Cavalazzi, A. Ferrari).

Two other sites (sites 1 in T.U. 809 and 808) are located in the area of Budrio (fig. 7.2 and 8, site 1 TU 809). Again, we collected several sherds of medieval pottery, primarily common and cooking ware. Between them there are fragments of common ware with engraved waves (fig. 9.5); this kind of decoration frequently appeared on common ware from the 11th century in the Po and upper-Adriatic area<sup>73</sup>. Another cooking ware vessel, an olla with a rounded and extruded rim and, apparently, a globular body, can be dated to the 14th, beginning of the 15th century at the latest (fig. 9.1)<sup>74</sup>. Several are the archaic majolica sherds (e.g. fig. 9.2). In this case, we find a comparison with the types found in the nearest studied sites (Lugo, San Patrizio village, and Zagonara castle) and we can roughly date them to the 14th/15th centuries CE<sup>75</sup>.

<sup>70</sup> Archivio Arcivescovile di Ravenna, no. F2001, 1036 CE.

<sup>71</sup> PALLOTTI 2018: 64-66.

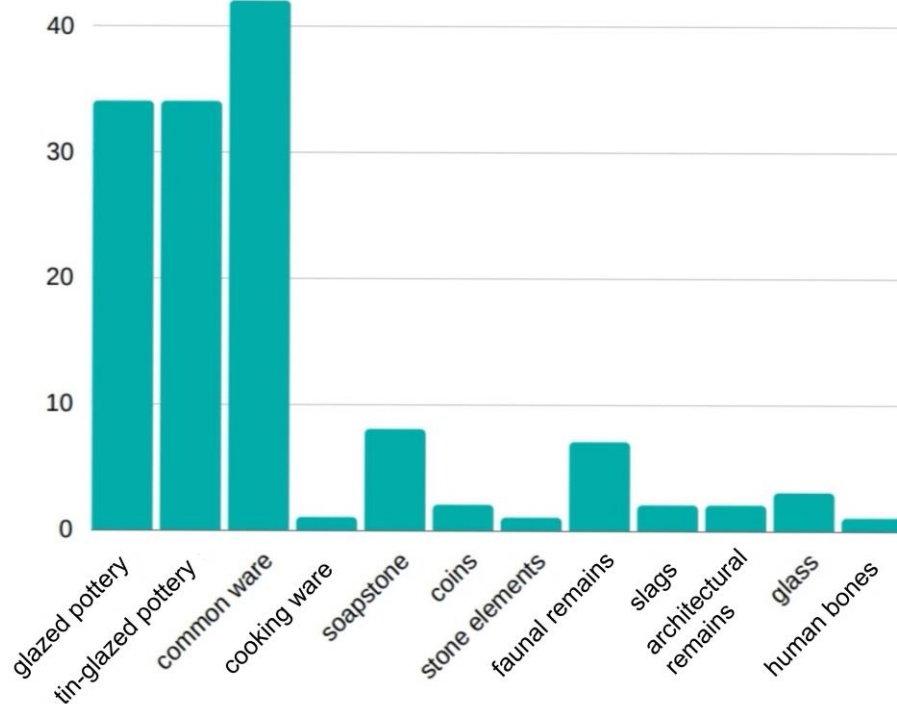
<sup>72</sup> PALLOTTI 2018: 165.

<sup>73</sup> GELICHI, NEGRELLI 2017: 75-76, fig. 41.

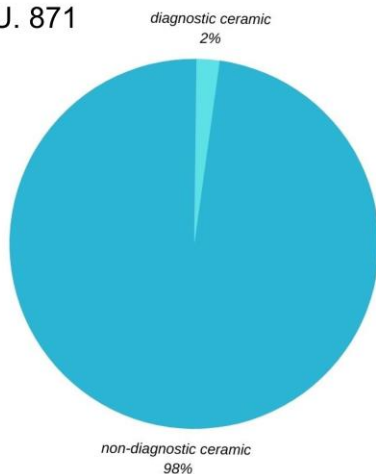
<sup>74</sup> Similar vessel in: LO MELE 2015: 58, tav. XVII, dis. 5.

<sup>75</sup> GELICHI 1991; CAVALAZZI *et al.* 2018.

Site 1, T.U. 871



Site 1, T.U. 871



Site 1, T.U. 809

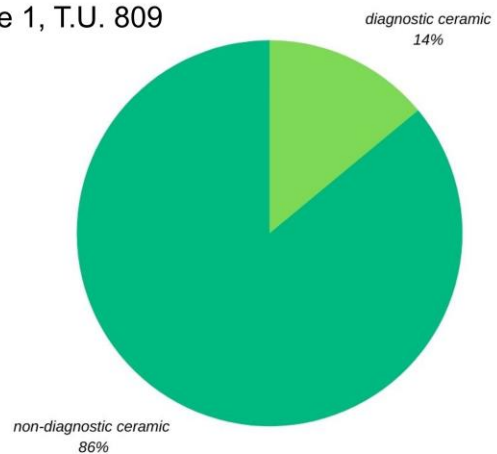


Fig. 8. Above, site 1, T.U. 871 (Cunio), quantification of the archaeological finds collected, histogram; below, pie charts representing the percentages of diagnostic and non-diagnostic ceramic in T.U. 871 and T.U. 809 in Budrio (author A. Ferrari).

A 19th-century iconographic source suggests that these two sites could have been part of the remains of the castle of Budrio (fig. 11.2). This document consists of a sketch on paper in which the author – the painter Giovanni Bertazzoni – reproduced a sight of an older painting, at that time preserved in Budrio's parish church<sup>76</sup>. This representation is crucial because it depicts the standing remains of the castle directly in contact with what seems to have been the parish church of Santa Maria of Budrio. In fact, both archaeological concentrations are located near the same parish church.

The fortified settlement of Budrio was built – together with the castle of Cotignola – by the Commune of Faenza at the beginning of the 13th century<sup>77</sup>. Indeed, in that period, the intervention of the Faenza Commune profoundly changed the settlement pattern in this area. On the one hand, Faenza caused the destruction of several sites, such as the castle of Cunio, while on the other hand, it led to the foundation ex-novo of new fortified villages (the so-called *burgi novi* or *burgi franci*), with a significant impact on the settlement distribution around

<sup>76</sup> FARANDA 1994: 110, fig. 115.

<sup>77</sup> TOLOSANO: 131.

them<sup>78</sup>. The creation of this kind of new settlements was widespread between the 12th and the 13th centuries in central and northern Italy, often linked to the process of creation of the districts of urban Communes. In this territory, we see these dynamics powerfully in action: the new fortified settlements of Cotignola and Budrio had the capacity to change the existing administrative and religious landscape (e.g. growing new parishes, like in Budrio, or attracting in themselves more ancient near religious buildings, like Cotignola with the *plebs* of S. Stefano di Panicale)<sup>79</sup>.

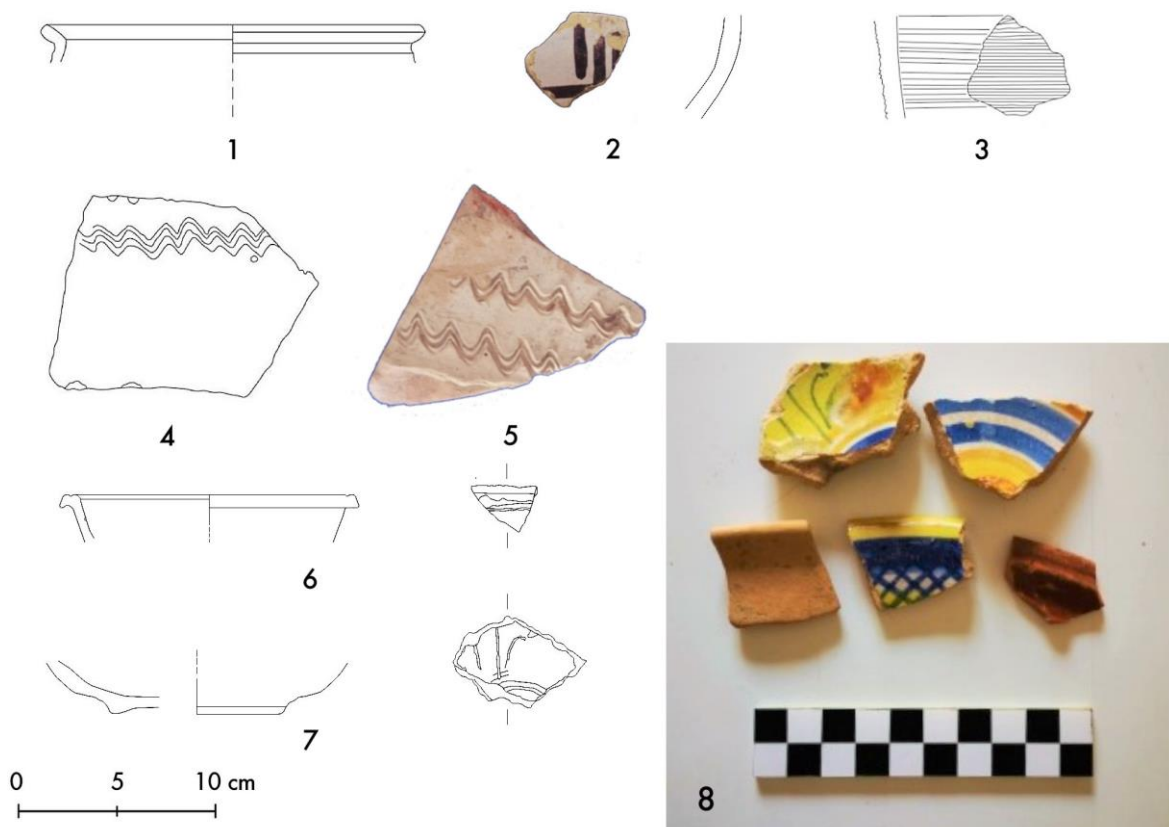


Fig. 9. Pottery and soapstone from the survey: from site 1, T.U. 809, rim of a medieval olla (no. 1) and sherd of tin-glazed pottery, archaic majolica (no. 2); from site 1, T.U. 871, soapstone (no. 3); from site 1, T.U. 809 (no. 4) and from site 1 T.U. 874 (no. 5), two sherds of medieval common ware with engraved wavy decoration; glazed pottery from T.U. 870 (no. 6); from site 1, T.U. 868, painted tin-glazed pottery (15th-16th c., no. 7) and glazed and tin-glazed pottery (15th-18th c. CE, no. 8) (authors M. Cavalazzi, A. Ferrari; drawings by A. Ferrari).

<sup>78</sup> CAVALAZZI 2012, 2021.

<sup>79</sup> CAVALAZZI 2021.



Fig. 10. Crutch capital from the site of the castle of Cunio (site 1, T.U. 871) (author M. Cavalazzi).

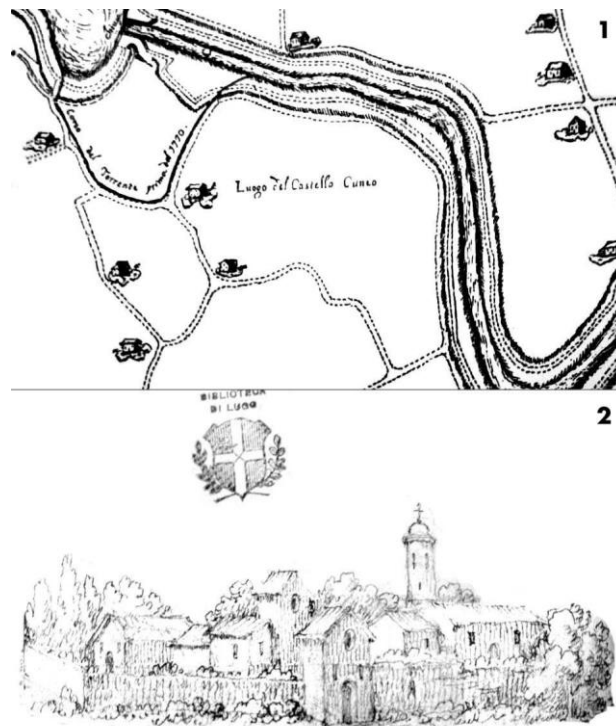


Fig. 11. No. 1: map with the area where the castle of Cunio was (18th c. CE, Archivio di Stato di Roma, Rome Mappe e Disegni, Coll. I, cart. 102 no. 145); no. 2: the castle of Budrio in a sketch by Giovanni Bertazzoni (18th c.), who copied a sight included in a more ancient painting once preserved in the parish church of Budrio; Archive of the Biblioteca Trisi, Comune di Lugo, fondo Bertazzoni (authors M. Cavalazzi, A. Ferrari).

## 8. The geological setting of the sites of Budrio and Cunio

In this paragraph, we will discuss the results of five geoarchaeological auger cores carried out in 2018 nearby the two most important archaeological sites recorded during the artefact survey (fig. 7)<sup>80</sup>. This study has allowed us to better understand the geological setting of these two sites and the most recent palaeogeographical transformations that occurred on a local scale. A schematic description of all cores is presented in Table 1, which includes the identification code of each core (called AUG) together with coordinates<sup>81</sup> and altitude; depth interval of each layer expressed in centimetres; colour recorded using a Munsell Soil Chart; grain size characterising each layer; any natural and/or anthropogenic finds; interpretation of each layer, based on the facies-lithology relationship proposed for the Holocene geological record of the Po Plain<sup>82</sup> (fig. 12.1).

The first geological description concerns the site of Budrio and specifically AUG046, which was carried out just in front of the local church (fig. 12.2). In this core, two possible layers can be interpreted as marshland deposits (215-235 and 235-310), especially the lower one that presented a peculiar grey-bluish colour likely due to reducing conditions of deposition (i.e. underwater), together with several fragments of charcoal and some seeds, millimetric fragments of bricks and shells. Considering that similar layers were found less than 2 km north of this site and at comparable depths (i.e. 2/3 metres), we hypothesised it is part of the Orizzonte Veggiani, a marshland layer identified below the present town of Lugo (fig. 2)<sup>83</sup>. A charred seed of *Vitis vinifera* L. recovered from the layer 235-250 cm was radiocarbon dated. The resulting calibrated chronology equal to 1028-1184 CE suggests that the marshy environment stood in the area up to the 11th/12th centuries<sup>84</sup>. Considering this new date, we can assume that the Orizzonte Veggiani extended more southwards than previously thought<sup>85</sup>.

From the same core, other important information can also be derived from the upper layers, mostly composed of silty/fine sandy deposits characteristic of facies like crevasse splays or levees (0-210), resulting from depositional event(s) when the main watercourse was not too far away. This interpretation is confirmed by several crop marks recognised both north and south of the site and interpretable as palaeochannels and associated crevasse splays (fig. 2)<sup>86</sup>. If we consider the presence in the surroundings of 13th-14th centuries pottery to be associated with the castle of Budrio, we have a narrow time frame during which these deep transformations could have happened. Thus, it becomes even clearer why an emerging power such as *Faventia* decided to create a centre of power in this area of its *contado*. The reclamation of this area offered the opportunity to gain economic value from new arable land, as well as to expand its political influence<sup>87</sup>.

---

<sup>80</sup> For the whole dataset produced in the 2018-2020 geoarchaeological campaigns please refer to ABBALLE 2021.

<sup>81</sup> The reference system used is ETR89 / UTM zone 32N (EPSG: 25832).

<sup>82</sup> AMOROSI *et al.* 2017: 102, fig. 2.

<sup>83</sup> FRANCESCHELLI, MARABINI 2007: 115-120, S2; MARABINI, VAI 2020: 70-73.

<sup>84</sup> The seed was analysed by Beta Analytics (code Beta-531205), having a 95.4% percentage confidence level for the resulting interval equal to 920±30 BP, which translates to 1028-1184 cal CE.

<sup>85</sup> ABBALLE, CAVALAZZI, FIOROTTO 2022.

<sup>86</sup> Sources used: Google Earth, ESRI, Bing, Ministero dell'ambiente e della tutela del territorio e del mare.

<sup>87</sup> ABBALLE, CAVALAZZI 2022.

Cores	Depth	Grain size	Colour	Finds	Interpretation
<b>AUG046</b> 731560.49, 4919393.99; 16.42 m a.s.l.	0-60	Sandy silt	2.5Y 5/4	Fragments of bricks (2 cm)	Modern soil
	60-100	Silty fine sand	2.5Y 7/4		Crevasse splay/levee
	100-175	Silty fine sand	2.5Y 6/6		Crevasse splay/levee
	175-215	Silty fine sand	2.5Y 6/8		Crevasse splay/levee
	215-235	Clayey silt	5Y 7/3		Marsh/Floodplain
	235-310	Clay/silty clay	N 4/0	Charcoal, fragments of bricks, shells, seeds, concretions	Marsh/swamp
	310-350	Medium/fine sand	10Y 4/2	Concretions, charcoal, shell	Palaeosol?
	350-510	Silty fine sand	10Y 5/2		Crevasse splay/levee
	510-570	Fine sand	2.5Y 6/6	Charcoal, carbonate concretions (1 cm)	Crevasse splay/levee
<b>AUG061</b> 731370.40, 4917390.68 21.69 m a.s.l.	0-50	Fine sand	2.5Y 4/4	Many fragments of bricks	Modern soil
	50-100	Fine sand	2.5Y 5/4	Pottery sherd (2 cm)	Archaeological layer
	100-120	Fine sand	2.5Y 5/4	Ceramics	Archaeological layer
	120-160	Clayey silt	2.5Y 5/3	Carbonate concretions (0.5 cm)	Floodplain
	160-220	Fine sand	2.5Y 5/6		Crevasse splay/levee
	220-235	Clayey silt	2.5Y 5/3		Floodplain
	235-255	Silty fine sand	2.5Y 6/6		Crevasse splay/levee
	255-330	Fine sand	2.5Y 5/1	Pottery sherd at 255-260 cm (2 cm), possible concotto	Archaeological layer
	330-350	Fine sand	N 5/0	Organic matter	Marsh/swamp
<b>AUG064</b> 731199.85, 4917383.46 21.14 m a.s.l.	0-40	Silty fine sand	2.5Y 5/4	Fragments of ceramics	Modern soil
	40-140	Fine sand	2.5Y 6/4		Archaeological layer
	140-180	Silty fine sand	2.5Y 5/3	Many fragments of ceramics, pottery sherd (2 cm)	Archaeological layer
	180-265	Silty fine sand	2.5Y 5/4	Shell	Crevasse splay/levee
	265-285	Clayey silt	2.5Y 6/4	Oxides	Floodplain
	285-340	Silty fine sand	2.5Y 6/6		Crevasse splay/levee
	340-365	Clay	10GY 5/1	Organic matter	Marsh/swamp
	365-375	Silty fine sand	10Y 5/2		Crevasse splay/levee
	375-415	Clay/silty clay	10Y 5/2		Floodplain
415-420	Silty fine sand	10Y 5/2		Crevasse splay/levee	
<b>AUG057</b> 731415.85, 4917541.66 22.46 m a.s.l.	0-50	Fine sand	2.5Y 5/4	Pebbles, plastic material	Modern soil
	50-180	Fine sand	2.5Y 6/3		Crevasse splay/levee
	180-280	Medium/fine sand	2.5Y 6/6		Fluvial channel
	280-350	Silty fine sand	5Y 6/4	Concretions	Fluvial channel
	350-448	Silt/clayey silt	N 5/0	Wood	Fluvial channel
448-460	Fine sand	10GY 4/1		Fluvial channel	
<b>AUG058</b> 731401.82, 4917579.35 21.2 m a.s.l.	0-50	Sandy silt	2.5Y 5/4		Modern soil
	50-80	Silty fine sand	2.5Y 6/4		Crevasse splay/levee
	80-110	Sandy silt	2.5Y 5/4	Many fragments of ceramics (2 cm)	Palaeosol?
	110-140	Fine sand	2.5Y 6/6		Crevasse splay/levee
140-200	Medium/fine sand	2.5Y 6/6		Crevasse splay/levee	

Tab. 1. Detailed description of the cores discussed in the text.

The other four cores were instead carried out nearby the castle of Cunio. AUG061 and AUG064 were drilled within the possible perimeter of the castle. Indeed, archaeological layers are present up to a potential depth of almost 2 metres due to the finding of fragments of pottery and broken ceramics. The most superficial layers have likely been entirely destroyed by the heavy ploughing to implant vineyards and orchards. However, archaeological findings in deeper layers leave hope that part of the stratigraphy could still be preserved below the present soil. These finds stood in a sandy matrix that also continues below with (silty) fine sand up to around 2.5 m. These deposits constitute the original soil on which the site was apparently initially settled, while standing already nearby a watercourse, most likely the Senio.

Very interesting is also what lies beneath these layers: in fact, a small fragment of pottery around 2 cm in size possibly associated with traces of concotto was found in the layer 255-330 in AUG061 (fig. 12.3). Unfortunately, the sherd was too small to be precisely identified, but considering its coarse but thin fabric it could possibly be Roman courseware. The same layer, but with no traces of anthropic finds, was also recorded to a similar depth in AUG064, between 265-285 cm. Here, the presence of oxides was more evident, suggesting well-drained floodplain facies with faint traces of pedogenesis. The difference in grain size that these two layers show, the first one being mainly sandy while the second with finer sediments, could be due to human activities, as the pottery sherd may suggest for the first location. Finally, there is an alternation of fine and coarser sediments



below this possible palaeosurface, interpretable as floodplain environments interested by high-energy alluvial events (i.e. crevasse splays). Deeper, layer between 340-365 probably corresponds to a period when this area was covered by water, with similar characteristics to the marshland layer found in Budrio. However, its chronology should be significantly older if a Roman layer was indeed standing above it. In addition, this layer likely refers to a time when neither the Senio nor any other river (e.g. Santerno) flowed near the area, but this should be confirmed with wider investigations.



Fig. 12.1-4. Photos were taken during the field campaign: 1. AUG046 just in front of the Church of Budrio; 2. samples classification and collection in the field of AUG046; 3. concotto found in layer 255-330 in AUG061 highlighted by a white circle; 4. wood found in layer 350-448 in AUG057 (author M. Abballe).

The last two cores were meant to investigate the possible palaeomeander that the Senio created immediately north of the site of Cunio. The presence of a meander here was already depicted in a 1790 map<sup>88</sup>, attesting to its cutting off to build a dam known today as “La Chiusaccia”. In addition, the difference in elevation of circa 3 metres recognised during the fieldwork on the two opposite sides of Via Ca’ Vecchia, is well explained by the presence of a palaeomeander, where maybe artificial embankments had been already made up. The geoarchaeological investigation (AUG057) confirms this reconstruction, thanks to the recording of medium/fine sand deposits typical of fluvial channels (layer 180-280). However, further below, the lithology becomes finer, probably because the channel bed was intersected. Indeed, within this (clayey) silty layer wood fragments were found, still not charred (fig. 12.4), most likely wood pieces that used to flow within the channel or, maybe, fragments of riparian wooden structures. AUG058 was instead done outside the meander and shows an interesting layer at 80-110 cm depth with traces of human activities: this could represent the medieval palaeosol that was later buried by alluvial events likely occurred in the Modern period.

## 9. Conclusion

The investigated area presents the typical problems of lowlands, with a survey project must first consider the sample area’s geomorphological history to produce a reliable reconstruction of the historical settlements’ evolution. The geomorphological study and the artefact survey showed that these factors had a relevant impact on the landscape until the end of the Middle Ages and even after. Furthermore, the investigation had to face another kind of bias, related to the contemporary land use/land cover, which drastically limited the data collection.

<sup>88</sup> “Corso del torrente Senio” (about 1790), *Archivio di Stato di Roma*, Rome, *Mappe e Disegni*, Coll. I, cart.102 no.145; edited in DONATI 2006: 64.

Despite that, it has been possible to identify and study some sites of great importance in the Ravenna area, such as the castles of Budrio and Cunio, previously totally unknown from the archaeological point of view. In particular, these sites were deeply involved in a historical process active in this area between the 12th and 14th centuries CE: the intervention in the countryside of urban Communes led to a relevant change in settlement patterns over the landscape. Specifically, it was the Commune of Faenza that was particularly active in the area of Cotignola: it accelerated the land reclamation process, applied a wide strategy of water management and drainage practices, founded new fortified villages like Budrio and Cotignola itself, and, finally, caused the abandonment of crowded and important castles, like Cunio. All these transformations drove this part of the Ravenna hinterland to a selection between the settlements during the 13th and 14th centuries CE. Step by step, the weaker settlements were abandoned, while others gained more and more importance, obtaining ecclesiastic and civil duties from the beginning of the 13th century and later becoming hamlets and towns that still characterise the rural landscape of the Ravenna province.

#### *Acknowledgements*

*The project Bassa Romandiola is promoted by the Department of History and Cultures of the University of Bologna and the “Centro di Studio sulla Romandiola Nord Occidentale” (<http://www.centrostudiromandiola.it>); it is directed by Prof. Andrea Augenti and coordinated by Dr Marco Cavalazzi. The 2018 campaign was funded by the Comune of Cotignola and Gemos srl. Marco Cavalazzi wrote paragraphs nos. 1, 2, 3, 6, 7, and 9; Michele Abballe nos. 4, 5, and 8; Alice Ferrari paragraphs nos. 5 and 7 and carried out the quantitative and typological study of the collected finds. Authorisations to carry out fieldwork (no. 11488 of 31/08/2018), access archival archaeological data (nos. 11164 of 24/08/2018 and 11474 of 29/08/2019) and publish all data (no. 5110-P of 05/04/2022) were granted by the Ministero della Cultura - Soprintendenza Archeologia Belle Arti e Paesaggio per le province di Ravenna, Forlì-Cesena e Rimini (SABAP-RA). We thank Federico Settembrini, Michela Fanelli, and the other representatives of the municipality of Cotignola for their support. We are also grateful to the people of Cotignola for their generous hospitality. Finally, we thank Celeste Fiorotto from the University of Verona for having floated and sieved the auger samples considered in this paper.*

#### BIBLIOGRAPHY

- ABBALLE M., 2021, *Geoarchaeological hand augering in the hinterland of Ravenna (2018-2020) – (Dataset)*, Pisa (DOI: 10.13131/unipi/xakr-qc30).
- ABBALLE M., 2022, “Geoarchaeological mapping of medieval wetlands and their reclamation in the hinterland of Ravenna: two case studies from Massa Lombarda (RA) and Villafranca di Forlì (FC)” in *ArcheoLogica Data* 2: 42-62. <https://doi.org/10.13131/unipi/2785-0668/n4tg-xz64>.
- ABBALLE M., CAVALAZZI M., 2021, “Morphometric analysis for geoarchaeological research: from testing different methods to results verification in the Romagna plain”, in *Archeologia e Calcolatori* 32(1): 117-136. <https://doi.org/10.19282/ac.32.1.2021.07>.
- ABBALLE M., CAVALAZZI M., 2022, “Flood risk and socio-ecological resilience in a Late Antique and Medieval countryside: managing a post-Roman alluvial landscape in the Ravenna hinterland”, in A.F.O. DA SILVA, A.M. COELHO, J. SIMÕES, S.R.V. DA SILVA (eds.), *Juvenes – The Middle Ages seen by young researchers, vol. II – Space(s)*. Estudos & Colóquios 29. Evora. <https://doi.org/10.4000/books.cidehus.18989>.
- ABBALLE M., CAVALAZZI M., FIOROTTO C., 2022, “Integrated approaches to understanding complex long-term reclamation processes in the hinterland of Ravenna (Italy)”, in *Journal of Wetland Archaeology*: 1-31. <https://doi.org/10.1080/14732971.2022.2083798>.
- AMOROSI *et al.* 2017: AMOROSI A., BRUNO L., CAMPO B., MORELLI A., ROSSI V., SCARPONI D., HONG W., BOHACS K.M., DREXLER T.M., “Global sea-level control on local parasequence architecture from the Holocene record of the Po Plain, Italy”, in *Sedimentology in Italy: recent advances and insights* 87: 99-111. <https://doi.org/10.1016/j.marpetgeo.2017.01.020>.
- AUGENTI *et al.* 2020: AUGENTI A., BONDI M., CAVALAZZI M., FIORINI A., SERICOLA M., “Archeologia dei Paesaggi nel territorio ravennate: il progetto Cervia”, in *Archeologia Medievale. Cultura materiale. Insediamenti. Territorio* XLVII: 115-139. <https://doi.org/10.36153/am47.2020.06>.
- AUGENTI A., FICARA M., RAVAIOLI E., 2012, *Atlante dei beni archeologici della provincia di Ravenna. Vol. 1: Il paesaggio monumentale nel Medioevo*, Bologna.

- BALDUZZI L., 1871, "Sopra due edifici bagnacavallesi, dei quali furono scoperte le vestigia nei 1869", in *Atti e memorie della Regia deputazione di storia patria per le provincie di Romagna* 1: 1-11.
- BANNING E.B., 2002, *Archaeological Survey*, New York.
- BANNING *et al.* 2017: BANNING E.B., HAWKINS A.L., STEWART S.T., HITCHINGS P., EDWARDS S., "Quality Assurance in Archaeological Survey", in *Journal of Archaeological Method and Theory* 24(2): 466-488. <https://doi.org/10.1007/s10816-016-9274-2>.
- BANZOLA M., 2006, "Il castello di Cunio: storia degli studi e stato delle conoscenze", in C. GUARNIERI, G. MONTEVECCHI (eds.), *Cotignola tra archeologia e storia: le vicende di un territorio*, Fusignano: 65-71.
- BATTISTINI G., BISSI L., ROCCHI L., 2008, *I campanili di Ravenna. Storia e restauri*, Ravenna.
- BONOLI G., 1732, *Storia di Lugo ed annessi, libri tre*, Faenza.
- BUCCI G., *Cantiere Edison Castel Bolognese - Bagnacavallo 2011*, unpublished archaeological report, SABAP-BO archive.
- CAMBI F., TERRENATO N., 1994, *Introduzione all'archeologia dei paesaggi*, Roma.
- CAMPANA S., 2018, *Mapping the Archaeological Continuum: Filling 'Empty' Mediterranean Landscapes*, Cham.
- CAVALAZZI M., 2012, "Progetto "Bassa Romandiola". La campagna di ricognizione nel territorio di Lugo di Romagna (RA)", in P. GALETTI (ed.), *Paesaggi, comunità, villaggi medievali*, Spoleto: 703-708.
- CAVALAZZI M., 2020, "'Looking through the keyhole": problems and research strategies for landscape archaeology in an alluvial plain with a high rate of vertical growth. The case of Bassa Romagna and south-eastern Po Valley", in *Groma* 5, <https://doi.org/10.12977/groma34>.
- CAVALAZZI M., 2021, "Paesaggi del potere in età comunale. Villaggi abbandonati e nuove fondazioni in area ravennate nel XIII secolo: fonti archeologiche e scritte a confronto", in ISCUM (ed.), *Tiziano Mannoni. Attualità e sviluppo di metodi e idee*, 2, Sesto Fiorentino (FI): 512-515.
- CAVALAZZI M., 2022a, "Lo scavo del castello di Zagonara e il progetto Bassa Romandiola", in M. MILANESE (ed.), *IX Congresso di Archeologia medievale*, 2, Sesto Fiorentino: 35-40.
- CAVALAZZI M., 2022b, "Sampling in Historical Wetlands: A Dataset for Addressing Landscape Archaeology in Bassa Romagna (Ravenna Hinterland, Northern Italy)", in *ArcheoLogica Data* 2: 30-41. <https://dx.doi.org/10.13131/unipi/2785-0668/a2ky-a663>.
- CAVALAZZI *et al.* 2018: CAVALAZZI M., ABBALLE M., BENATO A., DE FELICIBUS M., "Archeologia dei paesaggi in Bassa Romagna. Il progetto Bassa Romandiola (2009-2016)", in *Archeologia Medievale. Cultura materiale. Insediamenti. Territorio* XLV: 317-334. <https://doi.org/10.1400/270084>.
- CAVALAZZI M., MANCASSOLA N., 2021, "L'insediamento rurale nel territorio ravennate tra la tarda Antichità e l'alto Medioevo (IV-XI secolo)", in P. GALETTI (ed.), *Una terra antica. Paesaggi e insediamenti nella Romania dei secoli V-XI*, Sesto Fiorentino: 63-72.
- CENERINI F., 2006, "Monumenti funerari: analisi epigrafica", in C. GUARNIERI, G. MONTEVECCHI (eds.), *Cotignola tra archeologia e storia: le vicende di un territorio*, Fusignano: 38-42.
- CPA-UBR = Carta delle potenzialità archeologiche - Unione dei Comuni della Bassa Romagna.
- CREMONINI S., 1994, "Lineamenti evolutivi del paesaggio fisico del territorio di Bagnacavallo nel contesto paleoidrografico romagnolo", in A. CALBI, G. SUSINI (eds.), *Storia di Bagnacavallo*, Bagnacavallo and Bologna: 1-40.
- DE FELICIBUS M., 2017, "Società e popolamento altomedievale nel pievato di San Pietro in Sylvis", in *Studi Romagnoli* LXVIII: 457-470.
- DONATI L., 2006, "Insediamento storico e strutture territoriali nel comune di Cotignola", in C. GUARNIERI, G. MONTEVECCHI (eds.), *Cotignola tra archeologia e storia: le vicende di un territorio*, Fusignano: 57-64.
- FANTUZZI M., 1801-04, *Monumenti Ravennati de' secoli di mezzo per la maggior parte inediti*, Venezia.
- FARANDA F., 1994, *Giovanni di Matteo Bertazzoni. Pittore Lucensis (Lugo 1805-1884)*, Faenza.
- FARIOLI CAMPANATI R., 1969, 'Corpus' della scultura paleocristiana bizantina ed altomedioevale di Ravenna. III. *La scultura architettonica*, Roma.
- FRANCESCHELLI C., MARABINI S., 2007, *Lettura di un territorio sepolto: la pianura lughese in età romana*, Bologna.
- GAMBI L., 1949, *L'insediamento umano nella regione della bonifica romagnola*, Roma.
- GATTIGLIA G., STAGNO A.M., 2005, "La documentazione scritta nella ricognizione archeologica sul territorio: un "vecchio" sistema di schedatura", in *Archeologia Medievale. Cultura materiale. Insediamenti. Territorio* XXXII: 453-460. <https://doi.org/10.1400/211036>.
- GELICHI S. (ed.), 1991, *Archeologia medievale a Lugo: aspetti del quotidiano nei ritrovamenti della Rocca*, Firenze.

- GELICHI S., NEGRELLI C. (eds.), 2017, *Adriatico Altomedievale (VI-XI secolo). Scambi, porti, produzioni*, Venezia.
- LO MELE E., 2015, *Tipologia e diffusione delle produzioni ceramiche in Romagna tra XIII e XV secolo*. PhD thesis discussed at the University of Bologna. Available at: <http://amsdottorato.unibo.it/7211/1/tesi.pdf>.
- MARABINI S., VAI G.B., 2020, *Carta Geologica della Pianura tra Imola e Ravenna. Guida alla Lettura*, Imola. Available at [https://www.socgeol.it/files/download/notizie%20dal%20mondo%20della%20geologia/Guida\\_alta.pdf](https://www.socgeol.it/files/download/notizie%20dal%20mondo%20della%20geologia/Guida_alta.pdf).
- MARCONI *et al.* 2008: MARCONI V., FRANCESCHELLI C., MARABINI S., VAI G., ZUFFA G. G., "Provenance of the Cotignola quarry sands (northern Apennines) as a tool for palaeogeographical studies on the action of Senio and Santerno rivers in the Romagna floodplain", in *Il Quaternario Italian Journal of Quaternary Sciences* 21(1B): 139-146. <https://amq.aiqua.it/index.php/amq/article/view/344>.
- MAZZOTTI M., 1972, "La Pieve di Cotignola", in *Bollettino Economico della Camera di Commercio di Ravenna* XXV (7): 674-678.
- MILANTONI C., *Faenza - Via Agrippina 2012*, unpublished archaeological report, SABAP-BO archive.
- MOLINARI M., *Cotignola - Piazza V. Emanuele II 2013*, unpublished archaeological report, SABAP-BO archive.
- MONTEVECCHI F., 1970, "Repertorio dei castelli, rocche e torri", in P. GAZZOLA, G.F. FONTANA, D. BERARDI (eds.), *Rocche e castelli di Romagna* 1, Bologna: 139-400.
- PALLOTTI R., 2018, *Castelli e poteri signorili. Nella Romagna settentrionale (secoli XI-XIII)*, Cesena.
- PRETI D., 2002, *Carta Geologica d'Italia alla scala 1:50.000, Foglio 223*, Ravenna.
- REDMAN C.L., WATSON P.J., 1970, "Systematic, Intensive Surface Collection", in *American Antiquity* 35(3): 279-291. <https://doi.org/10.2307/278339>.
- ROSSI G., 1572, *Historiarum Ravennatum libri decem*, Venetiis.
- SCAGLIARINI, D., 1968, *Ravenna e le ville romane in Romagna*, Ravenna.
- SHARER R.J., ASHMORE W., 1979, *Fundamentals of Archaeology*, Menlo Park, California.
- TAMBURINI A., CANI N., 1991, *Archeologia e storia di una città e di un territorio*, Lugo.
- TOLOSANO M., 1936, *Magistri Tolosani Chronicon Faventinum (AA. 20 av.C. -1236)*, Bologna.