1.01 Izvirni znanstveni članek

The Bioarchaeology of Social Stratification in Bronze Age Italy

Bioarheologija in preučevanje družbene razslojenosti v bronasti dobi Italije

© Claudio Cavazzuti
Università degli Studi di Bologna, Dipartimento di Storia, Culture e Civiltà, Piazza San Giovanni in Monte 2, 40124 Bologna, Italy; Museo delle Civiltà, Servizio di Bioarcheologia, Piazzale G. Marconi 14, 00144 Rome, Italy; Durham University, Department of Archaeology, South Road DH1 3LE Durham, UK; claudio.cavazzuti3@unibo.it

© Alberta Arena
Sapienza, Università di Roma, Dipartimento di Scienze dell'Antichità, Via dei Volsci 122, 00185 Rome, Italy; alberta.arena86@gmail.com

Abstract: Social stratification among Bronze Age communities has been traditionally analysed from the point of view of material evidence, especially in funerary contexts, where disparities in tomb architecture or in the articulation of grave goods may indicate the presence of groups characterised by different access to resources and social status. Recently, advances in the field of bioarchaeology (osteology, isotopes, aDNA) have provided new insights into the theme of inequalities and their relationship with kinship, diet, and mobility. In our paper, we integrate the archaeological evidence of social stratification with bioarchaeological data from four Bronze Age key-sites in Italy, namely Olmo di Nogara, Casinalbo (Po Plain), Trinitapoli-Ipogeo dei Bronzi, and Toppo Daguzzo (south-eastern Italy). The aim is to analyse the variability of health conditions, diet, mobility, and demographic parameters within each of these cemeteries and compare the different dynamics of the emergence of the elite group during the central centuries of the second millennium BC.

Our overview shows that Bronze Age societies in general converged towards a general model in which stratification and competition were common structural traits across the whole peninsula. The amplitude of inequalities, however, varies from site to site, as well as from region to region, as a consequence of different socio-economic backgrounds and cultural manifestations of social hierarchies. In conclusion, we underline the role of kinship as a factor in securing internal stability for the emerging élite and the importance of establishing interorganisational alliances and a common ethos with other nodes of the network.

Keywords: Bronze Age communities, bioarchaeology, social stratification, kinship

Izvleček: Preučevanje družbene razslojenosti bronastodobnih skupnosti je tradicionalno temeljilo na arheoloških materialnih dokazih oziroma ostalinah, zlasti tistih iz pogrebnih kontekstov, kjer lahko razlike v grobni arhitekturi ali prisotnosti grobnih pridatkov nakazujejo na obstoj skupin z različnim dostopom do virov in različnim družbenim statusom. V zadnjem času je napredek na področju bioarheologije (osteologija, izotopi, aDNA) omogočil nov vpogled v družbene neenakosti kot tudi njihovo povezanost s sorodstvenimi vezmi, prehrano in mobilnostjo. V prispevku smo arheološke dokaze o družbeni razslojenosti preučevali skupaj z bioarheološkimi podatki iz štirih ključnih bronastodobnih najdišč v Italiji, in sicer Olmo di Nogara, Casinalbo v Padski nižini, Trinitapoli-Ipogeo dei Bronzi ter Toppo Daguzzo v jugovzhodni Italiji. Naš cilj je bil proučiti razlike v zdravstvenem stanju, prehrani, mobilnosti in demografskih parametrih na vsakem od teh grobišč ter primerjati različne dinamike pojava posameznih družbenih elit v sredini 2. tisočletja pr. n. št.

Naš pregled je pokazal, da so v splošnem bronastodobne družbe na Apeninskem polotoku delovale po modelu, za katerega sta bila značilna razslojevanje in rivalstvo. Stopnje neenakosti pa so se med posameznimi najdišči in regijami vendarle razlikovale, verjetno kot posledica različnih socio-ekonomskih okolij in načinov, kako se je v posameznih skupnostih izražala družbena hierarhija. V zaključku sta poudarjeni vlogi sorodstvenih vezi kot dejavnika, ki je zagotavljal notranjo stabilnost porajajoče se elite, in pomena za vzpostavitev medorganizacijskih zavezništev ter skupnega etosa z ostalimi člani socialne komunikacijske mreže.

Ključne besede: bronastodobne skupnost, bioarheologija, družbena razslojenost, sorodstvene vezi

Introduction

The theme of social stratification in Late Prehistory has become a major topic in the history of archaeology, especially since the second half of the last century, when growing inequalities started to be evaluated as a serious economic and ethical issue across Western societies.

Social inequalities are usually considered the cause/effect of an unbalanced distribution of wealth power and opportunity among the members of a community. Obviously, these may also depend on many other factors, such as sex, gender, age, skills, knowledge, ethnicity, social role, and the relationships of the individual. However, it seems that during the second millennium BC, alongside the generalised process of territorialisation, village communities organised themselves around progressively more enduring power structures pivoted around kinship and inherited rank. This does not mean that all of the above-mentioned distinctions were not important for the definition of hierarchies, but they became increasingly

obliterated by membership of the kinship group, due to the growing necessity of lineages to maintain hegemony and control over the land, as well as to build, manage, and preserve infrastructures conceived to be permanent (e.g. Peroni 1989; 1996; Cardarelli 2015).

From a methodological point of view, most of the works on this subject discuss the intra/inter-site variability of the archaeological record, with a particular emphasis on the differences between households, settlements, architectures, distribution of resources, and prestige goods in burials, and relate the evidence to the theoretical framework derived from sociology, political economy, and anthropology (e.g. Otto 1955; Childe 1958; Gimbutas 1965; Renfrew 1972; Shennan 1975; Gilman 1981; Robb 1994; Price, Feinmann 1995; Sanjuán 1999; Cazzella, Recchia 2006; Díaz-del-Río 2006; Chapman 2008; Guidi 2009; Kristiansen 2010; Cardarelli 2015; Earle *et al*. 2015; Meller *et al*. 2016; Hansen, Müller 2017; Dolfini 2019; Iacono 2019).

Regarding Bronze Age social structures, one of most applied explanatory models, borrowed by cultural anthropology, is the 'conical clan', which was first defined by Kirchoff as a large, internally stratified descent group whose members are distinguished by kinship rank, determined by the "degree of relationship" with the principal line of the clan: "*The core, the* aristoi*, consists of those who are, or are supposed to be [nearest] descendants of the common ancestor of the clan*" (Kirchoff 1955, 7–8). In this kind of organisation, the eldest male in the direct descent from the (often legendary) "founder" holds the highest rank and exercise governance over the group, as well as religious functions (see also Sahlins 1963; Friedman 1975; Hage 2000; Cathcart 2006; Cupitò, Leonardi 2005; Cupitò 2006; Rainbird 2006).

The fact that the Bronze Age must have been the period of the "rise of the privileged" (Coles, Harding 1979, 535), was already acknowledged early in the second half of the 20th century. In his important essay, Gilman stated that a number of studies clearly demonstrated that "the élite of the European Bronze Age were hereditary" (Gilman 1981, 1). In her analysis of the Únětice cemetery at Branč in south-western Slovakia, Susan Shennan also argued that "*descent might well be patrilineal and, in this case, given the necessity of exogamy in such a small scale community, the women would have to come in from outside*" (Shennan 1975, 279).

More recently, outstanding bioarchaeological research projects carried out in southern Germany have proven what was formerly hypothesised based on material evidence. Mittnik and collaborators have demonstrated through aDNA analysis that Early Bronze Age households of the Lech Valley "*consisted of a high-status core family and unrelated low-status individuals, a social organization accompanied by patrilocality and female exogamy*", which perpetuated over 700 years (Mittnik *et al*. 2019). Exogamic practices have been also detected in the same context, as well as in Late Bronze Age Denmark and northern Italy, using strontium and/or oxygen isotope analyses (Frei *et al*. 2015; 2017; Knipper *et al*. 2017; Cavazzuti *et al*. 2019a).

Further investigations, focused on the dietary habits of Únětice communities, have also established that $\delta^{15}N$ values of élite individuals significantly exceeded those of 'commoners'. This means that part of the upper segment of the population had privileged access to protein from meat and dairy products, but also possibly fish (Knipper *et al*. 2015). Únětice culture undoubtedly provides the most remarkable convergence between archaeological and biological evidence. To what extent can we generalise this model?

In many regions of Europe, aDNA and isotope studies are currently providing new inspiring perspectives on the variability of the mortuary record, especially in the fields of mobility, kinship, and dietary habits (e.g. Nafplioti 2009 and Nafplioti 2016 on Minoans and Mycenaeans; Oelze 2012 and Oelze *et al*. 2012 on the EBA in southern Germany; Wahl, Price 2013 on the Urnfield culture, south-eastern Germany, Hallstatt A1; Frei *et al*. 2015 and Frei *et al*. 2017 on the Egtved and Skrydstrup women, LBA Denmark; Frei *et al*. 2019 on 3rd and 2nd millennium BC Denmark; Knipper *et al*. 2017 and Sjögren *et al*. 2020 on the Bell Beaker and EBA in southern Germany; Cavazzuti *et al*. 2019a and Cavazzuti *et al*. 2019b on the MBA-LBA in northern Italy; Gerling 2015, Allentoft *et al*. 2015, Haak *et al*. 2015, Olalde *et al*. 2018, Olalde *et al*. 2019 on spatial and chronological macro-scales). These new advances are stimulating bioarchaeologists to deal with other material evidence of social inequalities (e.g. Nafplioti 2009; Pokutta *et al*. 2015; Cavazzuti *et al*. 2019a; 2019b; Mittnik *et al*. 2019; Sjögren *et al*. 2020). Ancient DNA and isotopic datasets for diet and mobility are generally not so large as to develop a sufficiently

Italy	Central Europe	Mainland Greece
Early Bronze Age 1 (2300/2200–2000/1900 BC)	Bronzezeit A1 (2200–1900 BC)	Early Helladic III (2300/2200–2100 BC)
		Middle Helladic I (2100–1900 BC)
Early Bronze Age 2 (2000/1900–1700/1650 BC)	Bronzezeit A2 (1900–1600 BC)	Middle Helladic II (1900–1800 BC)
		Middle Helladic III (1800–1700 BC)
		Late Helladic I (1700–1600 BC)
Middle Bronze Age 1 (1700/1650–1550/1500 BC)	Bronzezeit B1 (1600–1500 BC)	Late Helladic II (1600–1420 BC)
Middle Bronze Age 2 (1550/1500–1450/1400 BC)	Bronzezeit B2-C (1500–1300 BC)	
Middle Bronze Age 3 (1450/1400–1330/1300 BC)		Late Helladic IIIA (1420–1300 BC)
Recent Bronze Age 1 (1330/1300–1225/1200 BC)	Bronzezeit D (1300–1200 BC)	Late Helladic IIIB (1300–1220 BC)
Recent Bronze Age 2 (1225/1200–1150 BC)	Hallstatt A1 (1200–1100 BC)	Late Helladic IIIC (1220–1130 BC)
Final Bronze Age 1-2 (1150–1050 BC)	Hallstatt A2 (1100–1000 BC)	Submycenaean (1130–1015 BC)
Final Bronze Age 3 (1050–980/925 BC)	Hallstatt B1 (1000–900 BC)	Protogeometric (1015–900 BC)

Table 1. Italian Bronze Age chronology and correlation with Central Europe and mainland Greece. Abbreviations in the text: Early Bronze Age = EBA; Middle Bronze Age = MBA; Recent Bronze Age = RBA; Final Bronze Age = FBA; Bronzezeit = Bz; Middle Helladic = MH; Late Helladic = LH.

Tabela 1. Kronologija stopenj bronaste dobe v Italiji ter povezava s kronologijo osrednje Evrope in celinske Grčije.

complete framework of how the whole society worked and changed through time and, in particular, when communities became as large in number as those seen in the Bronze Age. Nevertheless, all of these bioarchaeological approaches are successfully contributing to the collection of significant indicators of inter/intra-group differences.

In our paper, we address the theme of social inequalities in Middle and Late Bronze Age Italy (see Tab. 1 for chronology; Late Bronze Age = RBA and FBA in Italy), integrating bioarchaeological data with archaeological evidence, focusing on the Terramare area in the Po Plain and on the south-eastern part of the peninsula, where the largest and best-documented funerary contexts are located. From the mid-2nd millennium BC, we can see the appearance of large necropolises and urnfields in the Po Plain and in Apulia, including hundreds, if not thousands of burials. This phenomenon is one of the direct outcomes of the process that led to the stabilisation of settlements in the territory and to formidable demographic growth during the Middle Bronze Age (Cardarelli 2009). The striking quantity of burials represents an unprecedented opportunity to explore demographic profiles and articulation of these societies, as well as to define which dynamics caused a more stable social differentiation to emerge within village communities.

Nonetheless, some of the aforementioned analytical approaches, which target the organic matter of bones, have some limitations in two contingent occurrences of the

Figure 1. Geographical location of the analysed sites.

Slika 1. Geografske lokacije obravnavanih najdišč.

Italian MBA and RBA. In the Po Plain, the extensive adoption of cremation around 1450–1350 BC inhibits the preservation of the collagen and consequently the analysis of carbon and nitrogen isotopes, as well as aDNA. On the other hand, in south-eastern Italy, the frequent use of large collective hypogea demands a certain caution in associating isotopic signatures recorded from human bones/teeth with the distribution of grave goods. It is often hard to clearly recognise the original depositions, because both skeletal remains and grave goods have been repeatedly manipulated and disarticulated during the long-lasting use of the burial sites. Here we have considered recent important stable isotope studies on single or undisturbed inhumations that may help to highlight social inequalities and compare different archaeological contexts (Tafuri *et al*. 2009; Varalli *et al*. 2016; Tafuri *et al*. 2018).

A cornerstone of our discussion is the demographic composition of burial groups and their variation over time. A good demographic sample represents the necessary conditions for every kind of social analysis since it allows for the discrimination between a 'natural population' (=unbiased population) and groups conducting any form of social selection in accessing the funerary space. For this reason, our contribution takes into account the sex ratio and the subadult cohort in the different contexts, with special consideration of infant and child burials, the percentage of which is a good indicator of restricted or open access to the necropolis or to distinct topographic groups.

We must nonetheless take into account that mobility can modify the demographic structure of a given community. The nodes of the networks are characterised by the natural tendency to attract people from the immediate or broader hinterland, as well as from distant places. Newcomers are usually juveniles or adults, who join a community or a specific kinship for a variety of reasons: they can be warriors or artisans attracted by new opportunities or directly invited by the local hegemonic groups, but also slaves, concubines, foster adolescents and so on. All these characters tend to expand the adult cohort in large, interconnected centres; as a consequence, these classes of individuals may be more frequent than infants in the related cemeteries (or in some parts of the cemeteries).

As in the rest of Europe, the theme of élite identities in Italy has been a major topic in protohistoric studies and it is strictly entwined with the geographical location of the peninsula, naturally representing a cultural crossroads and a belt connecting the Mediterranean and the continental European civilisations. In many ways, the Po Plain and south-eastern Italy may embody two different models, since they clearly maintained relationships with two important regions of the European network: the trans-alpine areas (most notably the Danubian-Carpathian Basin) and the Aegean, respectively. Therefore, the influence of different socio-political systems can be seen in the context of local developments (see also Vanzetti 2014). The sites that show the widest datasets are Olmo di Nogara, Casinalbo (Terramare, Po Plain), Trinitapoli-Ipogeo dei Bronzi, and Toppo Daguzzo-tomba 3 (south-eastern Italy) (Figure 1). Here, Italian scholars have identified evidence of the emerging élites, or at least the rise of new forms of social hierarchies. In the following paragraphs, we will focus on the osteological data and, where isoto-

pic investigations have been conducted, on diet and mobility patterns. Our main aim is to integrate and discuss the well-known material evidence of social stratification, widely documented in cemeteries, settlements, hoards, and other kind of archaeological contexts.

The Terramare area

In the case of the Terramare (Central Po Plain, c. 1650–1150 BC), we have relatively good documentation of cemeteries (approximately a dozen), as well as smaller funerary areas including few burials; however, in the whole Terramare area, the number of known settlements is remarkably greater (around 200). A possible explanation for these disproportionate numbers is that such pluristratified settlements are archaeologically and topographically much more evident, while cemeteries tend to be smaller and with no visible monuments or emerging structures. Destruction due to recent ploughing can also be one of the causes for the 'lack' of evidence of burial areas.

Systematically, cemeteries are located in the proximities of the villages and a single cemetery corresponds to each village. We nonetheless ignore whether this relationship between villages and cemeteries is always bijective. As isotope analysis has recently suggested, funerary areas might also have hosted deceased not only from the nearest Terramara, but also from the neighbouring farms, or small settlements dispersed in the hinterland, which could have referred to a 'central place' also for what concerns burials (Cavazzuti *et al*. 2019a, 33). Interestingly, the number of graves found in cemeteries rarely mirrors the amount we can expect, considering the demographic calculations based on the size and chronology of the villages (Cardarelli 2014, 844–845). Despite possible cases of selection, the Terramare cemeteries nonetheless appear largely inclusive, given that they incorporate several hundred burials, among which both sexes and all age categories are included.

Concerning mortuary rituals, the Terramare area shows two different customs (Figure 2). North of the River Po, in the plains between the Mincio and Adige rivers, the necropolises such as Bovolone, Scalvinetto, Castello del Tartaro, Vallona di Ostiglia, Franzine Nuove, Roncoferraro, Povegliano, and Olmo di Nogara include both inhumations and urn cremations in different proportions (Salzani 2005; David-Elbiali 2010).

From the advanced phases of the MBA (c. 1450/1400 BC; BzB2/C transition in central European chronology), the funerary ritual changes towards an increasingly more intense use of urn cremation, which becomes largely prevalent at the beginning of the RBA (c. 1330/1300 BC; BzC2/D; for recent chronological revisions see Bernabò Brea *et al*. 2018; Cardarelli 2018). Among the abovementioned necropolises, two sub-groups are recognisable, relative to the practice of deposing weapons as grave goods. Only at Olmo di Nogara, Povegliano, and Roncoferraro are bronze swords, daggers, and helmet elements documented in male inhumations, while in all other sites

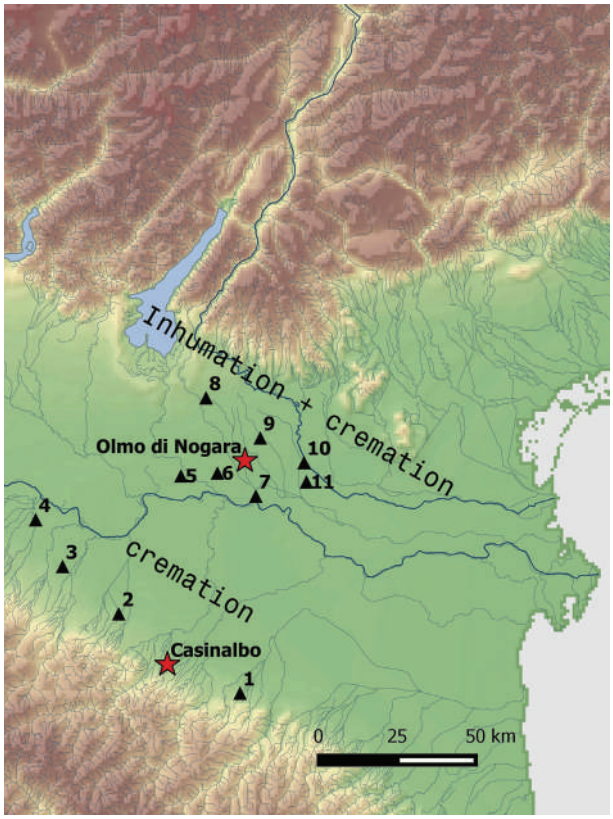

Figure 2. Terramare cemeteries and funerary customs. 1. Pragatto; 2. Montata di Reggio Emilia; 3. Beneceto; 4. Copezzato; 5. Pietole; 6. Roncoferraro; 7. Vallona di Ostiglia; 8. Povegliano Veronese; 9. Bovolone; 10 Scalvinetto; 11. Franzine Nuove di Villabartolomea.

Slika 2. Grobišča in pogrebni običaj na območju *Terramare*. 1. Pragatto; 2. Montata di Reggio Emilia; 3. Beneceto; 4. Copezzato; 5. Pietole; 6. Roncoferraro; 7. Vallona di Ostiglia; 8. Povegliano Veronese; 9. Bovolone; 10. Scalvinetto; 11. Franzine Nuove di Villabartolomea.

they are completely absent (Cupitò 2006). The hypothesis that the adoption of cremation marks a change in the concept of the afterlife is quite striking and very convincing. The destruction of the dead body and the individual status symbols on the pyre might be seen as the necessary sacrifice of the physical connotations for accessing the sphere of the divine and of the ancestors (Peroni 1989, 318–322; Cardarelli *et al*. 2006). From an archaeological perspective, this "sacrifice" is reflected in the general scarcity of grave goods, and particularly, in the exclusion of weapons from urns.

The same austere and consequently 'egalitarian' appearance characterises the urnfields south of the River Po where inhumations are, instead, totally lacking. We can mention Casinalbo, Montata, and Copezzato among the best-known 'urnfields' (Cardarelli, Tirabassi 1997; Cardarelli 2014). Thus, despite the great similarities that affect material culture and settlement typology in the whole Terramare area, the Po marks some kind of 'ritual border' for reasons that are still under discussion and probably rely on cultural differences in ritual practices rather than only on chronological *décalages* concerning the introduction of cremation.

Thanks to the extensive publication of the two archaeological and osteological complexes, Olmo di Nogara and Casinalbo currently represent two milestones on which we can deal with the subject of internal social distinctions from a bioarchaeological perspective (Salzani 2005; Pulcini 2014; Canci *et al.* 2015 for Olmo di Nogara. Cardarelli 2014; Cavazzuti, Salvadei 2014 for Casinalbo).

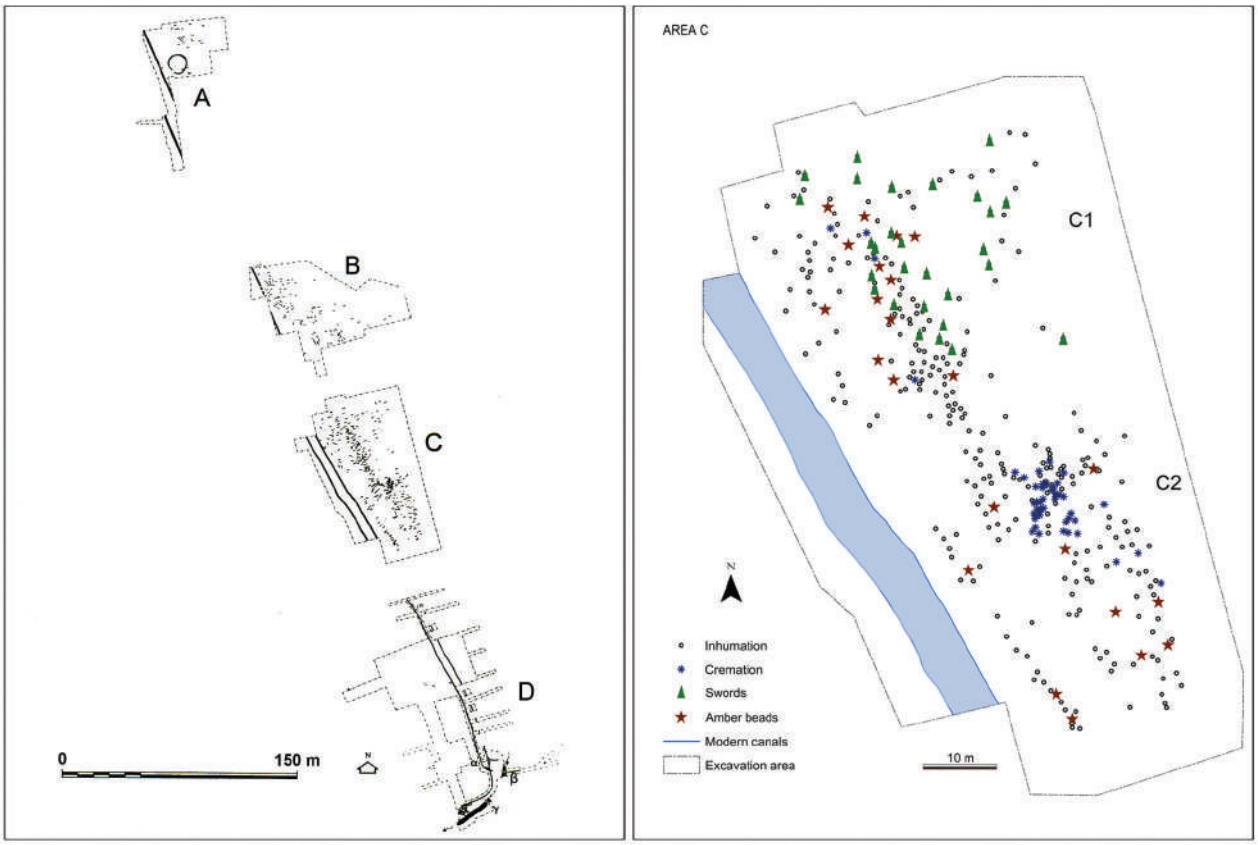

Figure 3. The excavation areas at Olmo di Nogara necropolis (on the left). Area C shows the distribution of inhumations (black dots), cremations (blue asterisks), swords (green triangles), and amber beads (red stars) (mod. after Salzani 2005).

Slika 3. Območja arheoloških raziskav na grobišču Olmo di Nogara (levo). Območje C kaže razporeditev skeletnih grobov (črne pike), žganih grobov (modre zvezdice), mečev (zeleni trikotniki) in jantarne jagode (rdeče zvezde) (prirejeno po Salzani 2005).

Olmo di Nogara (Verona, Veneto)

The Olmo di Nogara necropolis is located along the River Tartaro, on the northern side of the Po. It is divided into four excavation areas (A, B, C, D) with an overall number of 471 inhumations and 62 cremations, all of them dating between the MBA2 and the RBA2 (Salzani 2005; Canci *et al.* 2015).

The necropolis can be reasonably considered inclusive, since the anthropological analysis on inhumations have revealed the presence of adults of both sexes (M=32%, F=29%, ND=6%; Pulcini 2014, 55) and a significant percentage of subadults (33%), although some of these might be lost since the graves of children were not dug as deeply and could have been destroyed by modern ploughing (Vanzetti 2010, 246). Interestingly, perinatal (foetal and newborn) individuals are relatively well documented (6.5%). Among the cremations analysed so far, on the contrary, the *infans 1* class (0–6 years of age) is totally missing, while instead 6–20-year-old subadults are still present (18.8%; Magno *et al*. 2015).

A hegemonic group has been archaeologically identified through the occurrence of swords and other weapons in approximately 1/3 of male inhumations, most of them concentrated in the northern part of area C, identified as C1, while in C2 armed males are totally absent (Figure 3). A lower number of armed individuals are present in area B as well, while none is attested in areas A and D. A similar wealth distribution among the different parts of the necropolis can be also observed in female burials (amber beads occur in approximately 1/5 of the female inhumations).

The engagement of men in warfare practice is emphasised by the high percentage of traumatic injuries, especially among adult and mature males. According to Pulcini, 16 individuals (eight armed and eight non-armed) show traces of slashing, impact, and puncture, resulting from inter-personal conflicts. Most of these subjects are located in the area C1 (Pulcini 2014, Fig. 85). These traumas, however, must be considered as a minimum number, since wounds do not necessarily reach the bone (Canci *et al.* 2015, 335).

Moreover, the impression that group C1 was not only role-based (‘warriors’) is evidenced by at least one of the armed individuals (grave n. 410), who was affected by a severe case of *cubitus valgus* since birth on both humeri and was unable to use his arms, particularly in sword fighting. Evidently, this handicap suggests that the sword, beyond its purely functional task, embodied a status symbol for a ‘class’ of people who were designated to possess that item, possibly as a birth right rather than being able or formidable in combat. According to this hypothesis, one may expect to find some other clues of kinship between the wealthiest individuals. Two males from area B (nn. 484 and 486) are buried beside each other, and both graves contain a long sword. They also share the same congenital anomaly, *spina bifida* (Canci *et al*. 2005, 500; Pulcini 2014, 82). In addition, the successful mtDNA analysis of a small number of individuals (nn. 42, 50, 475, 493) suggests the existence of consanguinity along the maternal line since at least two individuals share identical sequences (Obinu *et al*. 2005, 504). These two (nn. 475 and 493) are a male and a female from area B, the first accompanied by a long sword and the second by two decorated pins and amber beads. At Olmo di Nogara, the possibility that the rank was hereditary is also supported by the presence of rich grave goods among 10 *Infans 1* (0–6 years of age) and eight *Infans 2* (7–12 years of age), which represents approximately 10% and the 25% of the overall number of *Infans 1* and *Infans 2*.

Stable isotope analysis shows high levels of $\delta^{13}C$, indicating a diet with significant intake of food derived from C4 plants (millet; Tafuri *et al*. 2009). Similar $\delta^{13}C$ values found in animal bones might also imply that carbon enrichment in humans was due to the consumption of animals (mainly pigs) fed with millet. Moreover, contrary to archaeological suggestions, Tafuri et al.’s study indicates the absence of significant differences in protein intake ($\delta^{15}N$ values) between those accompanied by rich grave goods, and the others who had none. Therefore, as emphasised by the authors, the isotopic data give no evidence that ‘status’ differences extended to diet, or at least if any dietary differences did exist, they are not isotopically measurable (Tafuri *et al*. 2009, 151). Similarly, Maria Letizia Pulcini, in her re-examination of the whole skeletal series, argues that no substantial differences can be observed in health status and physical stress between élite groups and ‘commoners’ for the entire duration of the cemetery (Pulcini 2014, 246).

The common interpretation of the context highlights the existence of a hereditary élite, showing weapons and rich

ornaments (Cupitò, Leonardi 2005, 490). However, looking at the chronological development of the necropolis, it is rather clear that the exhibition of the warrior status attenuates during the transition from the MBA to the RBA, in concomitance with the progressive adoption of cremation (Baratella, Cupitò 2015). In the RBA, weapons are definitely excluded from male burials; contextually, we can also observe exceptionally rich grave goods among adult females and subadults. From this phase, we can see the repercussions of new religious attitudes towards the afterlife regarding the symbolism of male power and prestige as revealed by the growing austerity in the sphere of the celebration of the dead men (Canci *et al*. 2015, 338). This does not exclude that before the final deposition in urns, élite male individuals were celebrated with ostentatious funerals, perhaps with feasting, offerings and large cremation pyres. Yet, the exclusion of weapons from the graves, alongside the destruction of the deceased's body, in our opinion, marks a radical change in the conception of the afterlife. Such an ideological shift might be at least partially connected to the changes in the social structures driven by new emerging political powers (e.g. Bietti Sestieri *et al*. 2013, 166).

In conclusion, the distinctive trait of the emerging groups of Olmo di Nogara is that they choose to cluster their graves in a few specific areas of the necropolis, but they do not spatially segregate themselves from the rest of the community as other élites in the south of Italy do, perhaps emulating the Eastern Mediterranean aristocracies (such as at Toppo Daguzzo, see below). Furthermore, the wealth/power does not appear to be concentrated in a few hands, but rather it is distributed among different segments of the population, and is not reflected in an excessive disparity of lifestyle, especially regarding diet, health status, and physical activities. As Vanzetti has pointed out through the rank-size analysis at Olmo, the possible stress towards the formation of an élite class seems to be prevented by the redistribution of power in corporate terms (Vanzetti 2010, 250). The collective component seems therefore to prevail, attenuating the force of emerging groups, which likely negotiate their leadership with the community and guide the ideological/religious reform through a progressive introduction of cremation rites.

The coexistence of the two funerary rituals and the transition towards urn cremation from at least the 15th century BC must be evaluated within the more general framework of long-lasting contacts between the Po Plain and the Danubian populations (Gàta-Wieselburg, Unterwölbling, Maros, Vatya, Encrusted Pottery culture), that has been documented from the Bell Beaker period/Early Bronze Age onwards, especially with regard to ceramic types, ornaments, solid-hilted daggers, *Brotlaibidole,* and some aspects of the funerary rituals (Hundt 1974; Bellintani 1987; Reiter 2008; de Marinis *et al*. 2015; Salzani *et al*. 2015; Škvor Jernejčič 2019; Cardarelli *et al*. 2020; Cavazzuti *et al*. *in press*).

Late third-early 2nd millennium material co-occurrences in northern Italy and the western-central Danubian-Carpathian areas clearly show that the two regions were continuously well-connected, probably as a consequence of the increasing demand for metal, and especially for tin perhaps from the Erzgebirge sources, which became progressively important in Europe at least from the EBA2 onwards. This is demonstrated by the growing emphasis on prestige metal goods. Ösenringe and solid-hilted daggers, for example, are widely distributed in burials and hoards along the upper-middle Danube, as well as along its tributaries (Krause 1988; Innerhofer 1997; Vandkilde 2005), but they have been also found in the Alpine lakes area and in the Po Plain (Bernabò Brea *et al*. 1997, 308–311; Baioni 2001; De Marinis 2010; De Marinis, Valzolgher 2013).

The use of these pre-existing corridors continues or even intensifies in subsequent phases, although the exchange of goods and information shifts towards new forms and contents, more related to settlement, land management, and, even more intensively than before, warriorhood. A striking example is the presence of Boiu-Sauerbrunn-Keszthely type swords at Olmo di Nogara (Salzani 2005), largely distributed in the Danubian-Carpathian Basin (Neumann 2009), but we can also mention the shared types of horse equipment (Sofaer *et al*. 2013), and above all, similar settlement patterns, internal organisation of villages, and social structures (Peroni 1989; 1997; Cardarelli 2009).

The introduction of the 'urnfield model', so different from the former tradition, undoubtedly derived from changes of ideology connected to the flow of influential new ideas throughout the network, and especially from its hubs – as the Danubian area certainly was during the first half of the 2nd millennium BC – , towards other con-

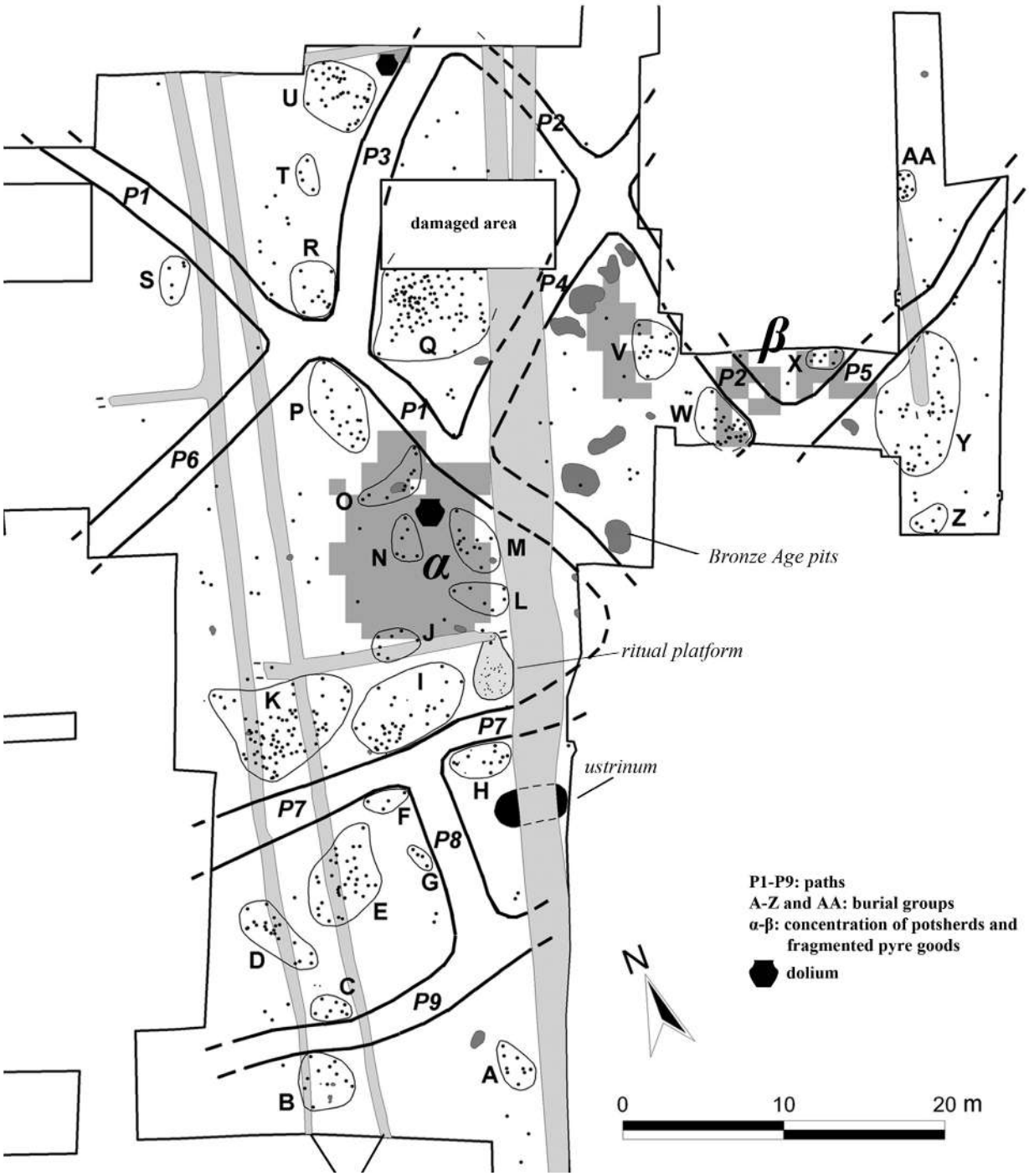

Figure 4. The excavation area at Casinalbo. Burials are represented by black dots and burial groups by capital letters. The ritual areas "α" and "β" are marked in grey (mod. after Cardarelli 2014).

Slika 4. Območje arheoloških raziskav na najdišču Casinalbo. Grobovi so označeni s črnimi pikami, medtem ko so skupine grobov z velikimi tiskanimi črkami. Ritualna prostora »α« in »β« sta označena s sivo (prirejeno po Cardarelli 2014).

nected areas. Social theoreticians argue that ideas travel with less resistance among similar societies and along the existing corridors of networks, which were previously established by trade or migration of individuals and groups (see Rogers 2003; Mcpherson *et al*. 2001). In the case of the Po and Danube plains, as well as the neighbouring areas, connections were likely administered by warrior élites, highly motivated by the supply and demand for metal and metal objects, but also by the will to participate in the supra-regional network.

More details about the nature and the magnitude of these influences could be revealed in the future by the integrated analysis of archaeological evidence, aDNA, and isotope data from the two territories.

Casinalbo (Modena, Emilia-Romagna)

Casinalbo is located on the opposite side of the plain, around 40 km south of the River Po and 7 km north of the Apennines. The site comprises both a 2/3-hectare *terramara* and an urnfield, which chronologically span between MBA2 and RBA2 (Cardarelli 2014).

During the excavation of the cemetery, 673 urn cremations were recovered, but it is estimated that the entire necropolis may include approximately 3000 burials. The urnfield is crossed by a series of orthogonal paths forming distinct parcels, which encompass the burial groups. These aggregations are separated by wide empty spaces that are sporadically occupied by isolated graves (Figure 4).

Groups can be small (less than 12 graves), medium sized (between 21 and 36 graves) or large, including more than 70 graves. The density of the burials, which sometimes reaches ten urns per square metre, leads to a strong inclination to emphasise membership of specific corporate groups. Frequently, the urns were placed one above the other, or very close, accentuating social bonds between individuals. Despite the fragmented nature of the cremated remains, sex and age determinations on 349 burials (containing the bones of 357 individuals) have provided a wide demographic dataset for cross analysis with the archaeological data, and specifically with topography and chronology.

The sex ratio among adults and juveniles is very close to 1:1 (M=34.4%; F=32.7%; Undet.=5.4%; Cavazzuti, Salvadei 2014, 676). This general picture is also reflected in the distinct groups, where normally an equal number of adult males and females is represented. The percentage of individuals under 20 years of age is 33.2%. Among these subadults, those under 2 years of age are extremely rare (1.4%). This is similar to what is seen in all the other Terramare urnfields and generally in Late Bronze Age Italy (Vanzetti, Borgognini Tarli 2003).

Using anthropological data, the calculation of the juvenility index, and the use of regression formulas by Jean Pierre Bocquet-Appel and Claude Masset (Bocquet, Masset 1977; Bocquet-Appel, Masset 1982) have allowed us to produce a model of a nuclear family, which includes a male-female couple and an average number of 6.38 children per woman (Cavazzuti, Salvadei 2014, 702–704). According to this ‘average family’, two of the offspring managed to reach adulthood, two died within 2 years after birth (and were then excluded from the urnfield), one died in infancy, and the last reached a subadult age or adulthood.

This model was then applied to the real demographic composition of the burial groups, in order to ascertain how compatible these clusters might be with one or more familiar units.

The chronology of each single grave relies upon vertical and horizontal stratigraphies, typo-chronology, and radiocarbon dates (Cardarelli *et al*. 2014). One can imagine that the number of burials in a single group might be directly proportional to the time span covered by the group itself, according to the equation ‘the more the burials, the larger the timespan’. This concept is perfectly applicable to small and medium-sized groups.

Small groups, such as group C (Figure 5), usually include both sexes, adults and subadults, spanning a time of up to four generations (around 100 years). According to chronology, medium-sized groups encompass 8 to 13 generations, with a similar number of male+female couples and as many subadults. Since the number of couples perfectly fits in the generational range and the distribution of individuals throughout the generations is rather homogeneous, we can conclude that medium-sized groups are at least compatible with a unilineal descent. Group I, for example, includes 10–12 male+female couples and 11 subadults distributed over 8–13 generations (Figure 5).

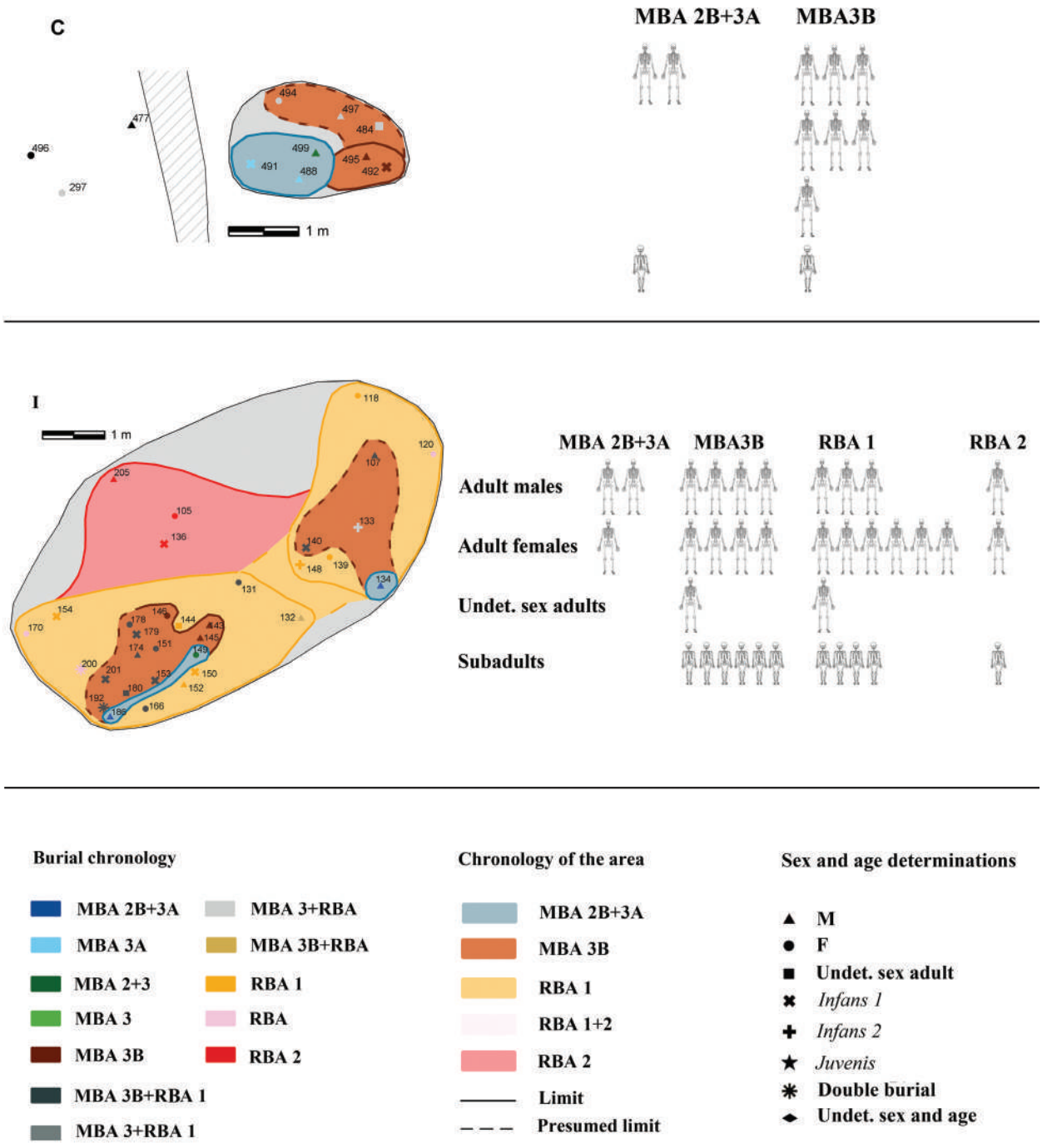

Figure 5. Two examples of small and medium-sized groups (C and I groups), with their demographic component distributed along the various phases (mod. after Cardarelli *et al*. 2014b).

Slika 5. Dva primera majhne in srednje velike skupine (skupini C in I) z demografskimi podatki, razporejenimi v različne faze (prirejeno po Cardarelli *et al*. 2014b).

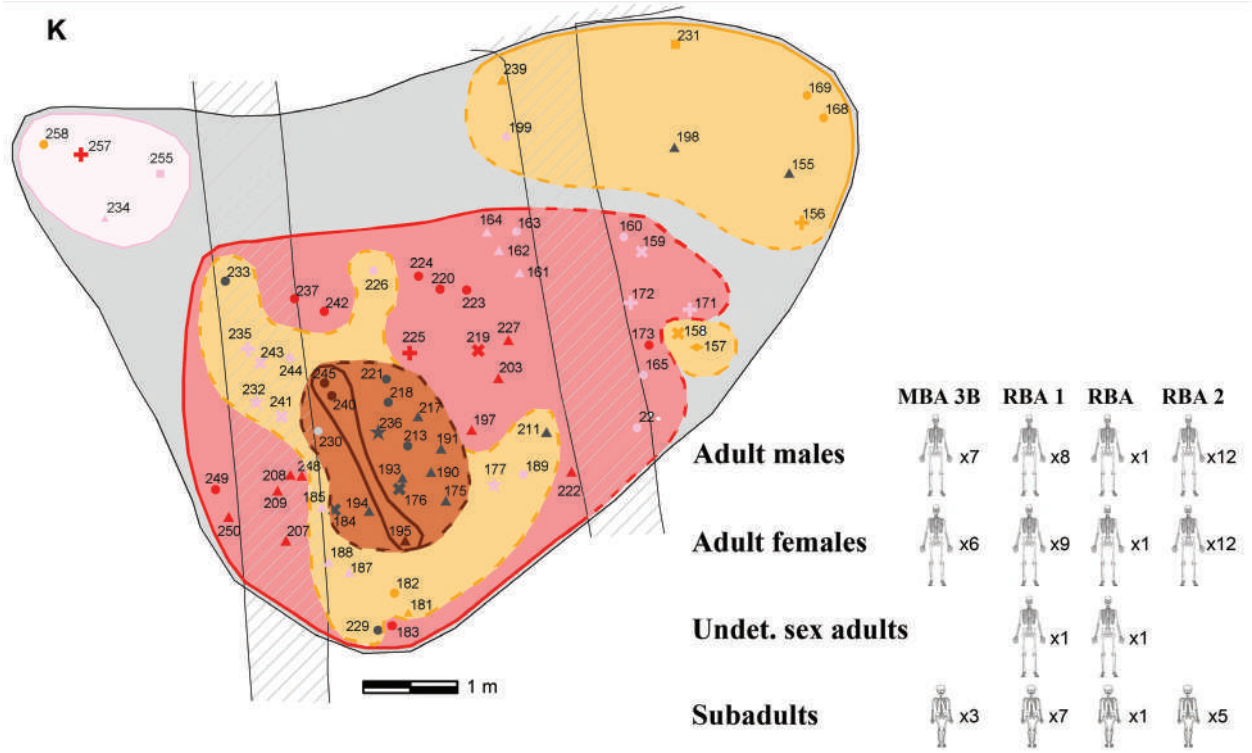

Figure 6. The large group "K", with its demographic component distributed throughout the various phases. The shape of the symbol represents the sex/age category of the individual, while the colour represents the chronological phase (see legend in the previous figure) (mod. after Cardarelli *et al*. 2014b).

Slika 6. Velika skupina K z demografskimi podatki, razporejenimi prek različnih faz. Oblika znaka predstavlja spol/starostno kategorijo osebe, barva pa kronološko stopnjo (glej legendo na prejšnji sliki) (prirejeno po Cardarelli *et al*. 2014b).

What happens with the largest group analysed so far (K) seems to go in the opposite direction. Group K includes 75 graves and spans only 5–9 generations (Figure 6). Therefore, contrary to expectations, it covers a more limited period, in comparison to medium-sized groups. K is composed of 28 adult males, 28 adult females, 2 adults of undetermined sex and 16 subadults. The underestimation of the latter here might be due to the excavation of a Late Medieval irrigation channel that intercepted an area with a prevalence of subadults. Hence, we can conclude that group K is far from being compatible with a unilineal descent. Even more interesting, the emergence of this new model dates to the last phases of the Italian MBA, during the second half of the 14th century BC in absolute chronology.

In contrast to the old 'egalitarian paradigm' traditionally assumed by scholars for early urnfields, and especially for the Terramare culture, the integrated analysis on Casinalbo seems to result in a more articulated picture, where different corporate groups cohabit in the same community and share the same burial space, but they distinguish themselves with different aggregation criteria. It seems that in the earlier phases, the groups were not so large in number, and when they were, they likely limited the access to the firstborn and his family (= one lineage). From the MBA3, and more evidently during the RBA, some of the groups seem to break the former rigid order and start to include more people who were possibly kin, but not of the principal line of descent (= two or more lineages; Figure 7).

We ignore how competition worked within the Terramare society, but we may expect that it developed and grew during the transition to the RBA.

Despite the general scarcity of grave goods, concealing the social status of the individuals, the osteological analyses have provided further clues to inequality. Greenish spots have been observed on several individuals who had no grave goods and not even minute traces of bronze inside the urns. Most of these are adult and mature males (N=25), but also females (N=8), and even subadults (N=7). As J. McKinley has pointed out, the green spots may represent the result of the contact between the skeleton and bronze objects during the burning of the pyre, where the temperature could occasionally reach 1000°C (McKinley 1993). It should be considered that those pyre goods that were deliberately excluded from the urns but have been found in two specific areas of the necropolis ground ("α" and "β", Figure 4) were broken, bent, or partially melted. Among the fragmented objects there are swords, daggers, rivets, and typically feminine ornaments. Assuming that males were accompanied by weapons on the pyre, we can calculate a figure of potential sword-bearers of at least 25.6%, which is not so different to that of the Olmo di Nogara inhumations (32%). Evidently, the possibility that pyre goods left traces on bone tissue during cremation is random and, therefore, this occurrence must be considered a minimum number.

A further research development has addressed the theme of mobility/social permeability at Casinalbo, through strontium isotope analysis ($^{87}Sr/^{86}Sr$) in the framework of the Ex-SPACE project (Cavazzuti *et al*. 2019a). The Emilian area, south of the River Po, appears isotopically quite homogenous as the Apennine area is mainly constituted by Cenozoic marine carbonates and the alluvial plain is formed by the sediments transported from the mountains to the Po by its tributaries (Figure 8).

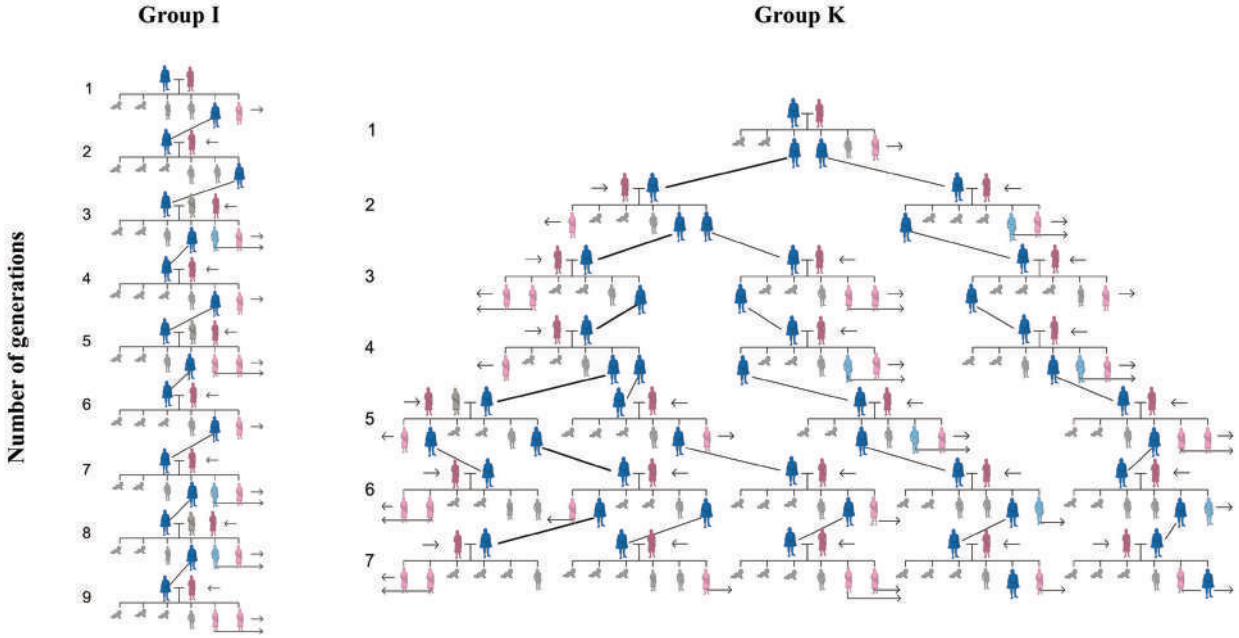

Figure 7. Comparison between two patrilocal models of descent applied to medium-sized group I and large group K. The nuclear family includes a male/female couple and six children, calculated through Bocquet-Appel and Masset's regression formulas. The group I is compatible with a unilineal descent, while group K is too large and chronologically compressed to fit the same type of structure (mod. after Cardarelli *et al*. 2014b).

Slika 7. Primerjava med dvema patrilokalnima modeloma rodu, uporabljenima na srednje veliki skupini I in veliki skupini K. Nuklearna družina vključuje par moški-ženska ter šest otrok, obenem pa je osnovana z uporabo regresijskih enačb Bacquet in Masset. Skupina I je skladna z enolinijskim rodom, medtem ko je skupina K prevelika in traja dlje časa, zato ne ustreza enaki strukturi (prirejeno po Cardarelli *et al.* 2014b).

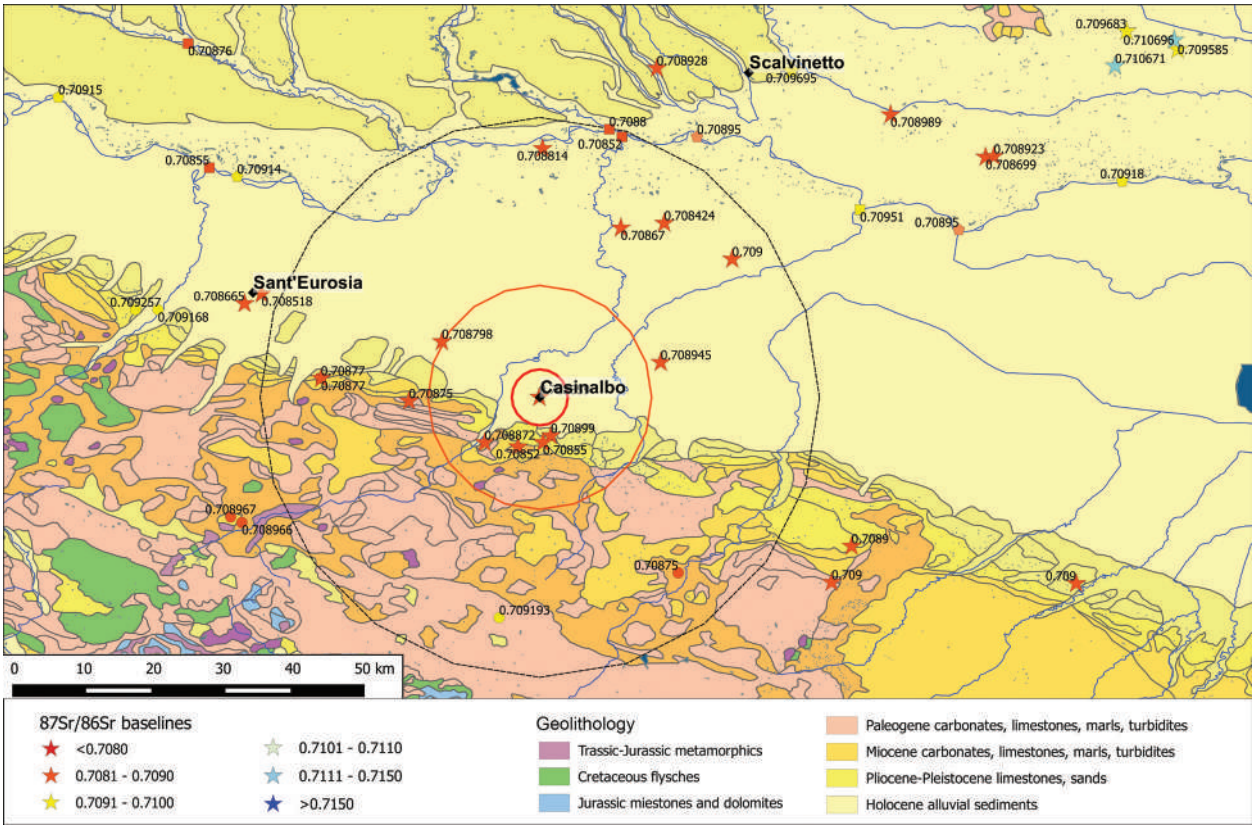

Figure 8. Casinalbo territory and biologically available strontium baselines (mod. after Cavazzuti *et al*. 2019a, 25). Stars represent the $^{87}Sr/^{86}Sr$ territorial baselines obtained from vegetal/faunal samples, pentagons on Po river waters, squares on tributary river waters.

Slika 8. Območje Casinalba in temeljne vrednosti (baseline) biološko dostopnega stroncija (prirejeno po Cavazzuti *et al*. 2019a, 25). Zvezde predstavljajo osnovno podlago vrednosti $^{87}Sr/^{86}Sr$, pridobljeno z vzorci rastlin/živali, petkratniki z vzorci vode iz reke Pad in kvadrati z vzorci iz rečnih pritokov.

Strontium baselines for the territory surrounding Casinalbo, obtained from archaeological fauna, modern plants, snails, mineral/river waters, and soil, range between 0.7085 and 0.7089 within a radius of 5 km from the site, between 0.7084 and 0.7090 in the immediate hinterland (5–20 km) and between 0.7084 and 0.7090 in the broader hinterland (20–50 km). Such restricted variability of the strontium baselines at different distances reflects the overall geological homogeneity of the Emilian alluvial plain. On the one hand, such uniformity complicates the identification of the individuals' provenance; on the other hand, it simplifies the identification of 'outliers', and increases the probability of their 'foreign' origin. For this reasons, the analysis of the distribution of the individuals' $^{87}Sr/^{86}Sr$ values assumes a greater importance, as it enables the detection of an indigenous group (where $^{87}Sr/^{86}Sr$ values are denser) and non-indigenous individuals (the 'outliers' of the distribution; for a description of the principles and methods of the strontium isotope analysis see Cavazzuti *et al*. 2019a, and references included).

Samples have been taken from petrous bone of 24 individuals (adult males, adult or young females, *infans 1* subadults), selected among those which had previously been analysed from an osteological point of view. The results show that most of the individuals are compatible with Casinalbo and its hinterland's $^{87}Sr/^{86}Sr$ values, and only one male individual is clearly an outlier (Figure 9).

Regarding the three distributions (males, females, subadults), we observe that most of the adult males concentrate in a narrow range, while only two seem to be non-indigenous. Females and subadults are more dispersed,

as a consequence of differentiated provenances, although from the radius of the immediate or broader hinterland. This picture, in our opinion, is compatible with a patrilocal structure, in which males tend to stay in the place of origin (few are incomers), while a number of females are integrated in the community as a result of exogamic practices. The variability of subadults might also indicate that children were part of fosterage practices for reinforcing alliances, kinship ties, and mutual trust in order to prevent eventual conflicts. Another possibility, although less probable, is that the Casinalbo urnfield served not just the *terramara* itself, but also other nearby satellite settlements, in a radius of a few kilometres.

The results do not show any visible differences in mobility between individuals buried in large groups, medium-sized or small groups. However, a clue to the relationship between inequalities and mobility is revealed by differential mobility among female individuals with or without grave goods. As shown in figure 10, adult or young females with grave goods (ornaments, such as bronze pins) cluster in a very narrow range (0.7091–0.7092, with one exception), compatible with the immediate or broader hinterland (5–50 km), while those without grave goods seem more indigenous or from the immediate hinterland (5–20 km). This isotopic evidence might be interpreted in terms of more intense mobility among high-status females.

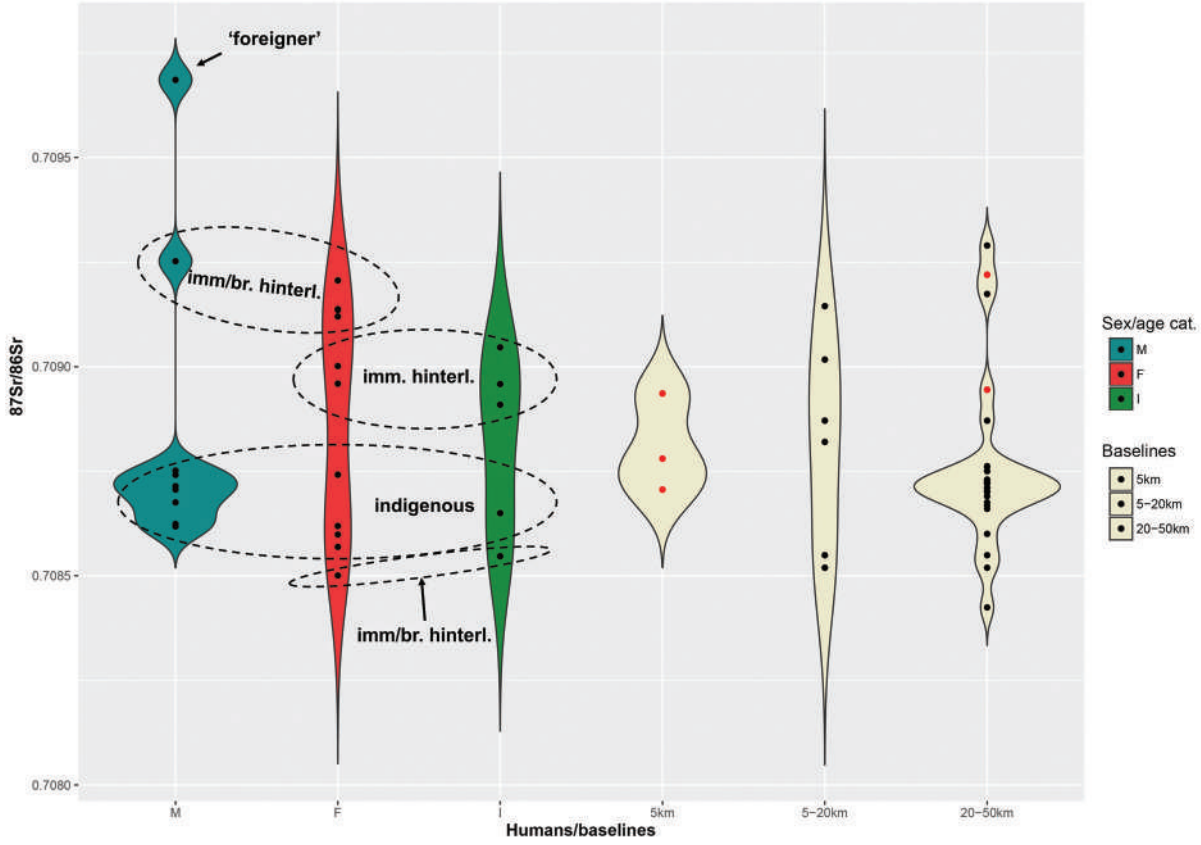

Figure 9. Violin plot. Distribution of the $^{87}Sr/^{86}Sr$ values among adult males (M), females (F), *infans 1* (I) cremations and 5 km (site catchment area), 5–20 km (immediate hinterland), 20–50 km (broader hinterland) environmental baselines at Casinalbo. Each black dot represents one sample, human or baseline; red dots among baselines represent archaeological fauna samples (after Cavazzuti *et al*. 2019a).

Slika 9. Violinski graf. Razporeditev vrednosti $^{87}Sr/^{86}Sr$ kremiranih odraslih moških (M), žensk (F), majhnih otrok (I) in osnovna podlaga območij, oddaljenih do 5 km (območje neposredno okoli najdišča), od 5 do 20 km (neposredno zaledje), od 20 do 50 km (širše zaledje) od najdišča Casinalbo. Vsaka črna pika predstavlja en vzorec (človeške kosti/zoba ali temeljne vrednosti); rdeče pike predstavljajo vzorce arheoloških živali (prirejeno po Cavazzuti *et al*. 2019a).

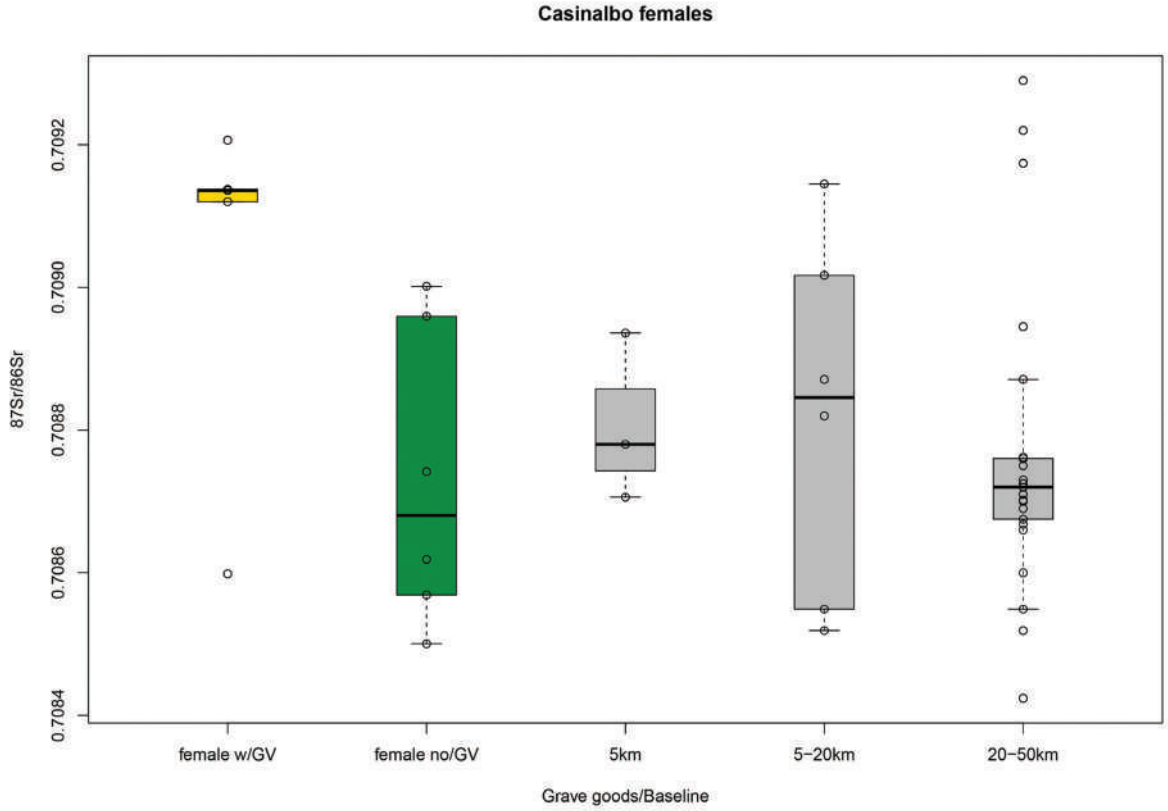

Figure 10. Boxplot. Distribution of the $^{87}Sr/^{86}Sr$ values among females with grave goods (yellow) and without grave goods (green) compared to the $^{87}Sr/^{86}Sr$ baselines at different radii from Casinalbo. Three female individuals show similar more radiogenic values (> 0.7091) compared with the females without grave goods, who appear more compatible with the 5 and 5–20 km ranges and, therefore, more local.

Slika 10. Grafikon kvartilov. Razporeditev vrednosti $^{87}Sr/^{86}Sr$ žensk z grobnimi pridatki (rumena) in brez grobnih pridatkov (zelena) v primerjavi s temeljnimi vrednostmi (baseline) $^{87}Sr/^{86}Sr$ ter različnimi oddaljenostmi od najdišča Casinalbo. Tri osebe ženskega spola kažejo podobne, bolj radiogene vrednosti (> 0,7091) v primerjavi z osebami ženskega spola brez grobnih pridatkov, vrednosti katerih so bolj skladne z vrednostmi območij oddaljenosti do 5 km in od 5 do 20 km, kar nakazuje na lokalne prebivalke.

South-eastern Italy

The funerary evidence in south-eastern Italy dating back to the MBA and RBA is extremely rich and variegated; both inhumation and cremation are attested, in different artificial or natural contexts (e.g. Cazzella 2010; Pacciarelli 2012; Cazzella *et al*. 2017).

On the one hand, funerary monuments of different kinds, such as dolmens (e.g. Bisceglie, Cataldo 1995) or burial mounds (e.g. Giovinazzo, Lo Porto 1967; Principalli 2010; Torre S. Sabina, Lo Porto 1963; 1993; Onnis 2010, 2011) contributed in the shaping the landscape. On the other hand, apparently less visible contexts such as natural caves (e.g. Grotta Manaccora, Baumgärtel 1951; 1953; Recchia 1993; 1995) or artificial hypogea (e.g. Trinitapoli, see below), hosted hundreds of deceased persons and represented key places for the self-representation of south-eastern Italian communities. Moreover, from the very end of the MBA, a new burial rite is introduced. From this phase and throughout the Late Bronze Age, urn cremations are in fact attested at different sites, such as Canosa (Lo Porto 1997; 2004; Minozzi *et al*. 2006), Torre Castelluccia (Müller-Karpe 1960-1961; Lo Porto 1973; Gorgoglione 2002; Vanzetti, Borgognini Tarli 2003) and

Timmari (Quagliati, Ridola 1906; Mancinelli 2003; Cipolloni Sampò 1994; Vanzetti, Borgognini Tarli 2003).

Using the combination of archaeological, anthropological, and isotopic data, the two contexts of Trinitapoli-Madonna di Loreto (Tunzi Sisto 1999) and Toppo Daguzzo-tomba 3 (Cipolloni Sampò 1986; ibid. 1999) provide the best explanation for the emergence of prominent social segments in south-eastern Italy.

Trinitapoli (Barletta-Andria-Trani, Apulia)

Located in the Basso Tavoliere of Northern Apulia, Trinitapoli represents a *unicum* among Italian Bronze Age contexts for its extraordinary monumental structures, preserved materials, and human remains (Tunzi Sisto 1999; 2005). The site includes 15 artificial hypogea that were in use during the MBA.

In most cases, traces of fireplaces, ceramics, and food remains testify their use as ritual places. From the Late

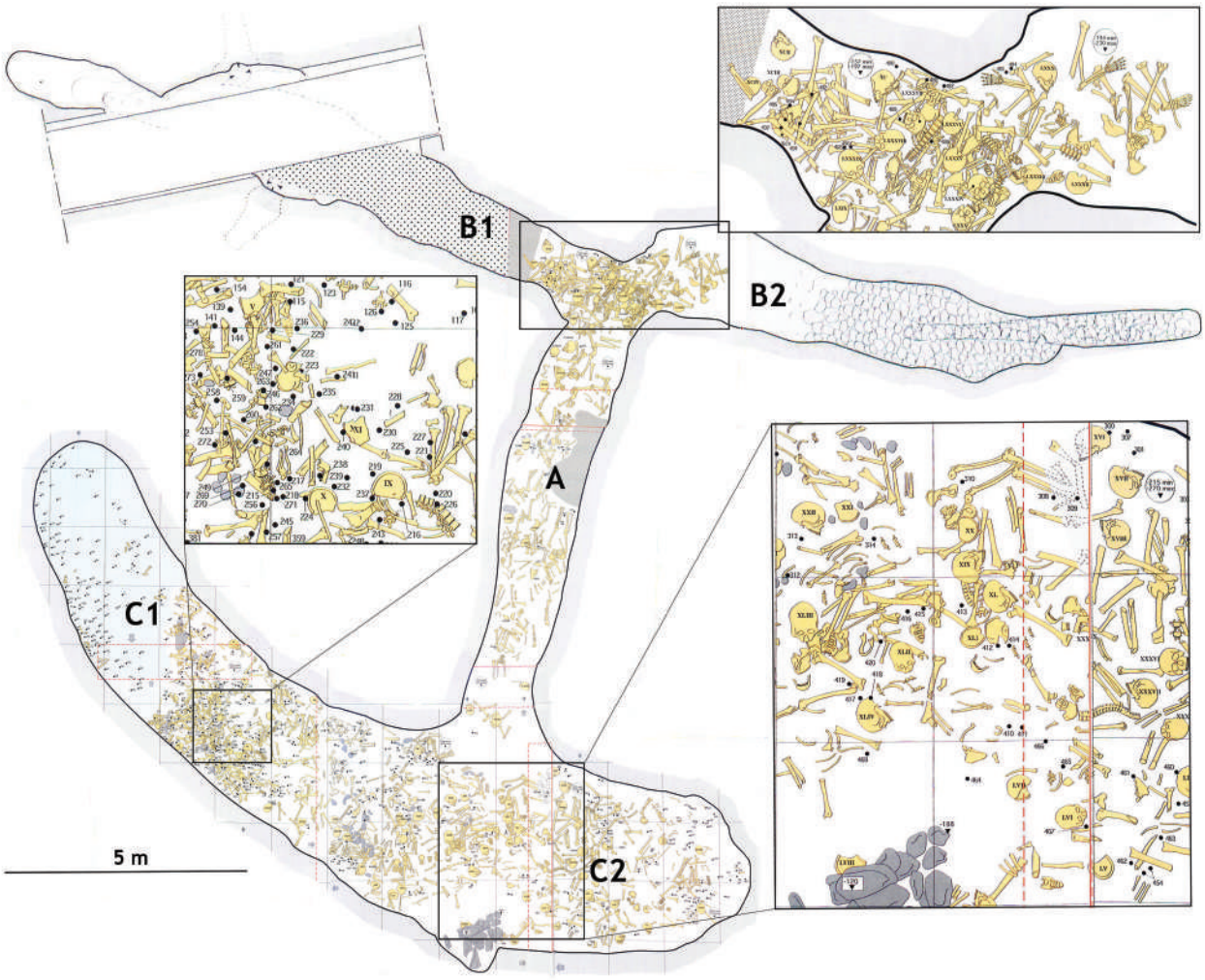

Figure 11. The "Ipogeo dei Bronzi" at Trinitapoli and the subdivision of the various internal areas (mod. after Tunzi Sisto 1999).

Slika 11. Hipogej »Ipogeo dei Bronzi« v Tritinapoliju in razdelitev različnih notranjih območij (prirejeno po Tunzi Sisto 1999).

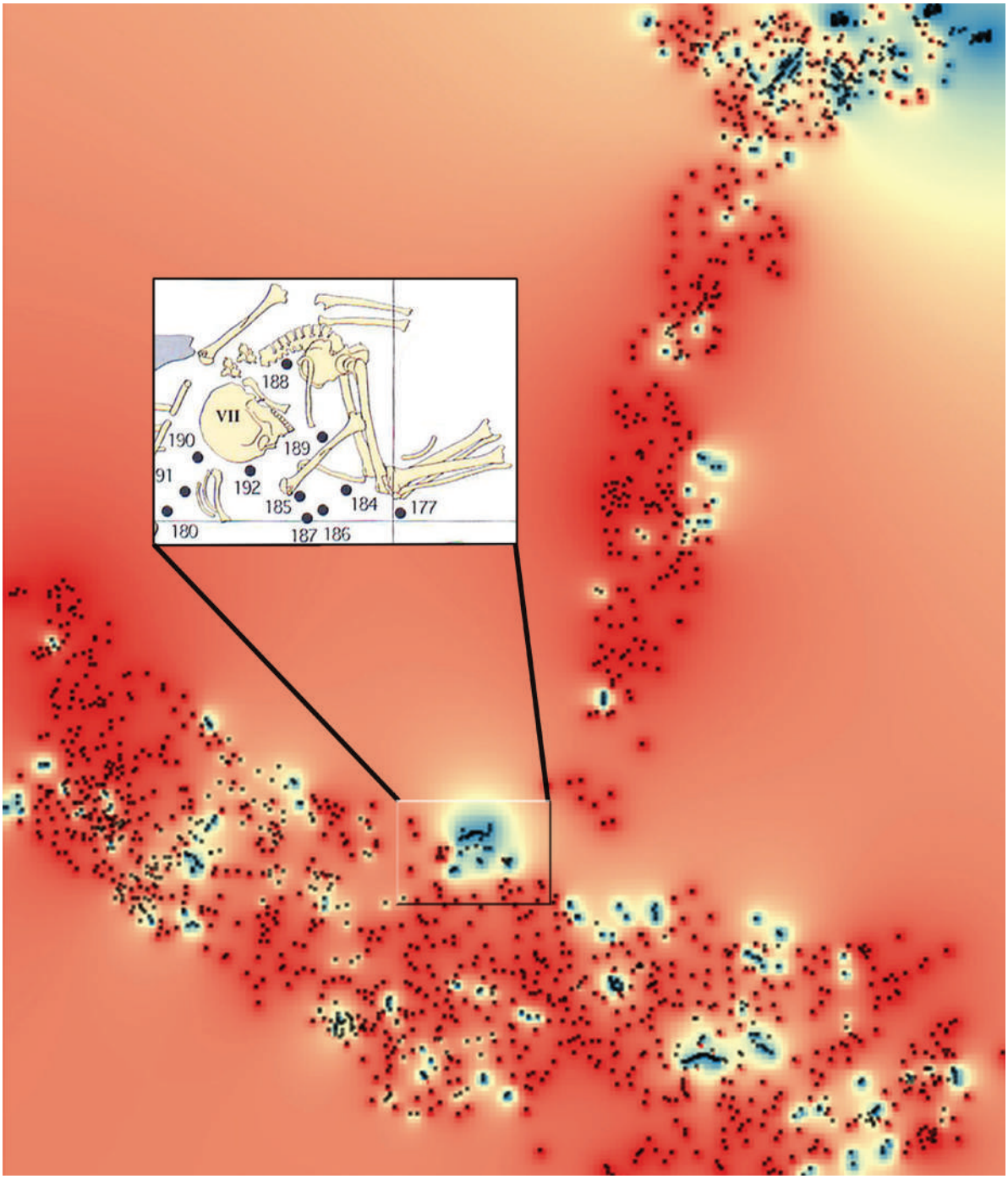

Figure 12. Anatomical connections inside the "Ipogeo dei Bronzi". Each black dot is a human bone; blue zones represent groups of bones in close anatomical connections, while reddish areas represent disconnected bones. The "Lady of the Ambers" is highlighted in the rectangle.

Slika 12. Anatomske lege okostij znotraj hipogeja »Ipogeo dei Bronzi«. Vsaka črna pika predstavlja človeško kost; modra območja predstavljajo skupino kosti v skoraj anatomski legi, medtem ko rdeča predstavljajo kosti, ki niso v anatomski legi. Tako imenovana »La signora delle ambre« je označena v pravokotniku.

Protoapennine/Apennine phase (MBA2-3), at least five hypogea were transformed from ritual places to collective tombs. Among these, four have bigger dimensions and an internal articulation of spaces ("Ipogeo dei Bronzi", "Ipogeo degli Avori", "Ipogeo dei Fermatrecce", "Minervino"), while one is a small mono-chamber ("Ipogeo del Guardiano"). The grand architecture and the religious function of the early hypogea seem to have encouraged the ambition of the emerging groups to be buried in such evocative and sacred monuments (Tunzi Sisto 2005, 196–197).

Nowadays, most archaeological and anthropological data come from the "Ipogeo dei Bronzi", which is also the largest among the funerary structures found at Trinitapoli. From a spatial point of view, this hypogeum is organised in three parts: the main chamber (Sector C, including C1 and C2), a major corridor (corridor A), and two minor corridors (corridors B1 and B2, the "*stomia*"; Figure 11). The human remains of approximately 194 individuals occupy the whole structure but with different densities and different states of preservation in each of the three areas (Minozzi *et al*. 1999, 296). The minimum number of 163 individuals counted by Minozzi and collaborators must be integrated with 31 additional individuals identified by Cenni and collaborators (Cenni *et al*. 1999, 304).

The chaotic bone assemblage observed at the "Ipogeo dei Bronzi" is not dissimilar to most of the other collective graves of central and southern Italy. The skeletal assemblages have not generally maintained their original anatomical connections as a consequence of the reiterate disposal of the dead, the need to make space, and possibly the ritual manipulation of some of the ancestors' bones (Figure 12). In area C (chamber), there is the only case of a skeleton, the "Lady of the Ambers", found anatomically articulated (except for the feet) along with her rich grave goods in their original positions.

The highest density of bones and anatomical connections are located at the tomb entrance (area B). Nevertheless, other small groups of bones are in undisturbed positions along the whole hypogeum. This means that the tomb hosted primary burials and that skeletons were subsequently disarticulated after the bodies decomposed, to make space for new depositions. Referring to the distribution of grave goods (weapons and female *parures*) and the anthropological data, Renato Peroni interpreted the "Ipogeo dei Bronzi" as a burial belonging to an élite group that was hierarchically articulated in a principal *genus* and other subordinate segments (*clientes*; Peroni 1999).

Osteological analyses show interesting results. Of the c. 194 identified individuals, the prevalence of males (N=101) over females (N=51), undetermined sex adults (N=11), and undetermined sex subadults (N=31), clearly demonstrates the general "exclusive" nature of the hypogeum, as well as some important social criteria (sex and age) of selection in access. The overall scarcity of the *infans 1* (0–6 years of age) and *infans 2* (7–12 years of age) categories does not appear to be related to problems in conservation or documentation, but rather to the deliberate exclusion of some segments of the enlarged kinship group.

This view seems even more convincing if we look more closely at the spatial distribution of sex and age classes. In the area C1, which was the earliest to be occupied (MBA2-3), the ratio between adult males, females, adults of undetermined sex, and subadults (*infantes* and *juvenes*) is 41:32:5:15, a similar proportion to Casinalbo-group K (28:28:2:15), in terms of demographic composition, with the exception of an overrepresentation of the male component (adult individuals of unknown sex must be taken into consideration). All the other spaces (C2, A, B1, B2), which were occupied in the later phases, show a more marked dominance of the male component. Interestingly, moving away from the concentration of 'richness' in C1, the density of bones and the degree of manipulation progressively decreases, while the deviations from the 'natural' demographic composition of an "ideal" (inclusive) descent increase. At the confluence of the two *stomia* (B1 and B2), moreover, we observe a remarkable concentration of human skeletons, mostly males, with a significant number of anatomical connections and less fragmentation than everywhere else. Hence, it is very probable that these burials mark the final act and the closing of the tomb, maybe as a consequence of some sudden and disastrous event (Tunzi Sisto 1999, 210). The possibility that the group of male individuals buried in B1 and B2 was involved, in some way, in conflict episodes is also suggested by the high frequency of traumas on the skull, ribs and long bones (Minozzi *et al*. 1999, 302). Renato Peroni suggests that the "Ipogeo dei Bronzi" was in use for a time span of 250 years (Peroni 1999), namely ten generations. Although the period could be slightly over-

estimated, it is evident that the whole hypogeum includes more than a unilineal descent (single lineage), which theoretically should result in a maximum of ten male-female couples and at least ten subadults.

Even the group in C1 is demographically wider than a restricted, agnatic descent and, therefore, we must conclude that the tomb hosts the remains of an enlarged kinship, a 'conical clan', or of a richer lineage (C1) which included a consistent number of outsiders bound by some sort of dependency to the dominant descent (see also Vanzetti 2014, 82–84; Cardarelli 2015, 181–183). It is also possible that in Area C2, A and B, the under-representation of female and subadults could be attributed to a change in the criteria of inclusion. Perhaps, in the more recent phases, only the females and subadults connected to the dominant males had the right to be buried in the hypogeum.

The analysis of archaeological materials has determined that a noteworthy amount of ceramic and bronze objects, mostly concentrated in C1 and C2, can be ascribed to trans-Adriatic models (e.g. about the 50% of the vessels are close reproductions of Dalmatian models, spectacle spirals are a mainly female ornament typical of the eastern coast, and knives are very close to the Albanian versions of Aegean types; Tunzi Sisto 1999; Peroni 1999; Vanzetti 1999; Cataldo 1999; Onnis 2011; Arena *et al*. 2018; Arena *et al*. 2020). However, we have no data about the residential patterns of the "Ipogeo dei Bronzi" to confirm or deny the presence of immigrants from the Balkan Peninsula. Interestingly, from the nearby "Ipogeo degli Avori", the strontium isotope analysis on bone and tooth enamel of six individuals suggests that four of them were non-locals, possibly from Albania, the Balkans, or most notably, Greece (Bos 2005).

At Mycenae, strontium isotope analysis performed on eleven individuals of the Grave Circle A, have revealed the presence of three probable non-locals whose isotopic signatures differ from the local one, which ranges from 0.708181 up to 0.708353; of these three, two are adult females (Nafplioti 2008, 289). A. Nafplioti suggests this could be the effect of alliance policies of high-status élites, consolidating their power and social position through marriage with foreign women. Although it is impossible to determine the exact geographic provenance of the non-locals through isotopic signatures, it is important to remark that two of the non-locals at the "Ipogeo degli Avori" (Sample id: 48 and 214A) have an isotopic ratio at least compatible with that of Mycenae (respectively 0,70812 and 0,70822; Bos 2005, 117).

Individual movements between Greece and south-eastern Italy are not impossible, especially in the Middle Bronze Age, and especially in the light of the Aegean pottery found all along the coastal line of Apulia to Gargano (Jones *et al*. 2014).

Although the isotopic sample is limited, we have a strong impression that Trinitapoli took advantage of its geographic position in building trans-coastal exchanges and alliances, perhaps for the control of the maritime passage. These relationships might have been decisive in the construction of a more centralised power, and control of the élites over the subordinates.

Toppo Daguzzo (Matera, Basilicata)

Tomb 3 at Toppo Daguzzo is the best investigated among a group of chamber tombs and is located on the side of a hilltop, near the Bronze Age settlement (Cipolloni Sampò 1986; 1999). On the plateau of the "acropolis" the surveys have revealed the dispersion of Mycenaean pottery fragments (LH IIIB/C-IIIC, 13th–12th century BC), which could be related to the presence of a structure that has not been fully investigated.

Tomb 3 is composed of a 10 m long *dromos*, a *stomion*, and a wide rectangular chamber that hosts the human remains of 11 individuals (6 adult males, 4 adult females, and 1 infant) and has been dated to the second half of 15th-beginning of the 14th century BC (MBA3; Figure 13).

The grave spans approximately 50 years, namely two or three generations (Recchia 1999). Every male deposition is accompanied by at least one weapon (one or more daggers, or one sword) and female burials by amber or glass ornaments. The topographic "isolation" of such a rich social group has been related to the motivation to distinguish itself from the rest of the community. This evidence, in addition to the structural similarities (*dromos* + *stomion* + chamber) with Mycenaean chamber tombs, has been interpreted as an emulation of Aegean aristocracies (Cipolloni Sampò 1986, 7).

The anthropological analysis on the 11 individuals ascertained 5.9% of caries and a 0.7% of dental abscesses,

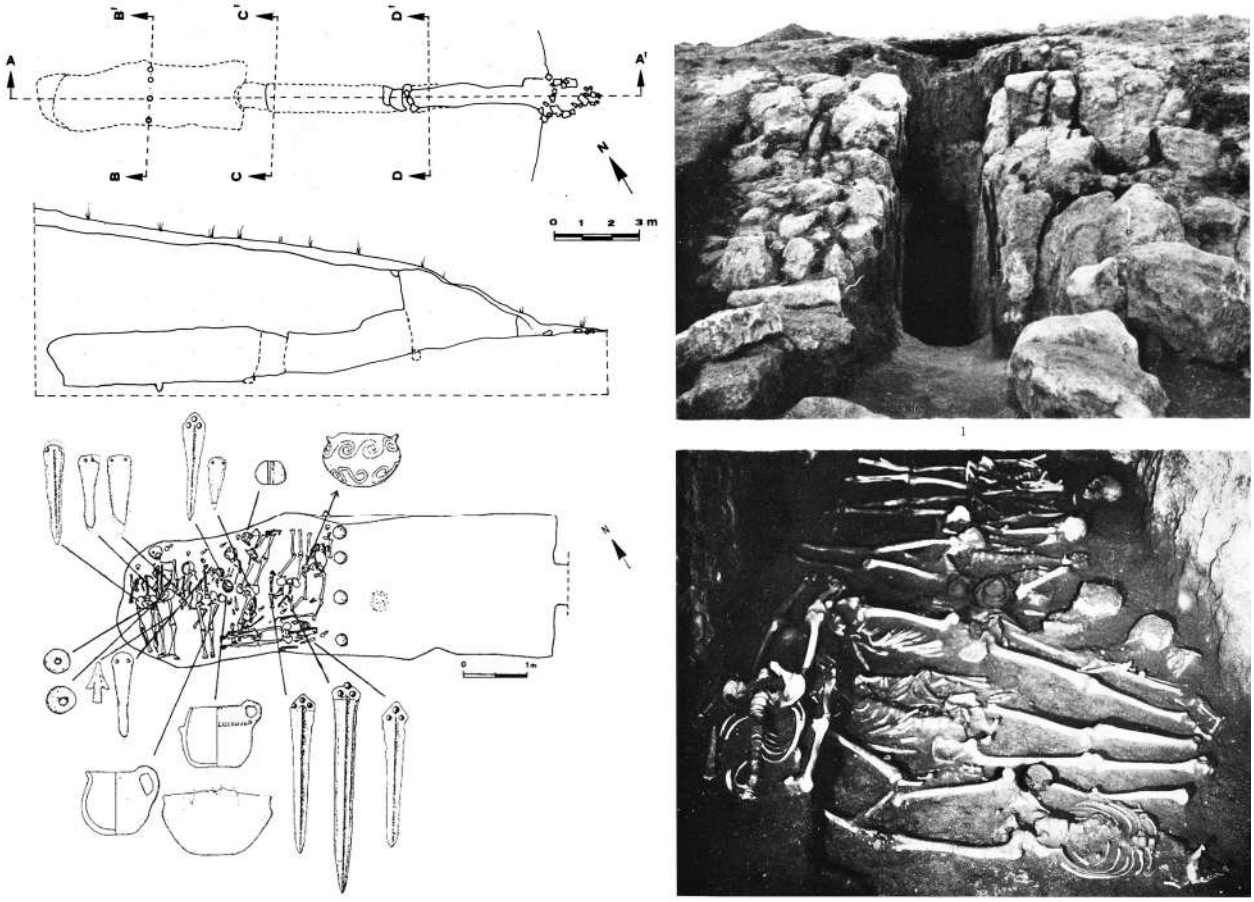

Figure 13. Tomb 3 at Toppo Daguzzo. On the bottom left the distribution of skeletons and grave goods in the chamber (mod. after Cipolloni Sampò 1986 and Recchia 1999).

Slika 13. Grobnica 3 v Toppo Daguzzo. Levo spodaj je prikazana razporeditev okostij in grobnih pridatkov v kamri (prirejeno po Cipolloni Sampò 1986; Recchia 1999).

whereas the average occurrence in Bronze Age Italy is higher (6.7% and 1.3% respectively). A similar discrepancy between the *élite* and the rest of the population has been observed between the Grave Circle B individuals at Mycenae and the average of the rest of the Bronze Age populations of Greece (6.2% caries against 8%; 2.4% abscesses against 4.5% of the Greek average; Minozzi *et al*. 1994). Although caries, abscesses, and ante-mortem tooth loss should be analysed in relation to age, these data may suggest a correlation between dental health and social status. Concerning traumatic injuries, the percentage of injured individuals found at Toppo Daguzzo (25%) is much higher in comparison with the Italian average (8.8%; Minozzi *et al*. 1994). Again, this is to be seen in a comparable trend, although to a lesser degree, in Greece, where the percentage at Grave Circle B (17.5%) exceeds the Greek average (15.8%). Hence, it may be possible to interpret this higher incidence of traumatic events with a major involvement of eminent social segments in war practices.

In the fortunate case of Toppo Daguzzo, the preserved collagen has allowed for both mitochondrial DNA and paleodiet analysis. Molecular data seem to confirm the familiar chamber burial hypothesis. Two individuals distinguish themselves by having the same genetic mutation, and at least two others are identical to Andersons's reference sequence (Maffei 1994, 382).

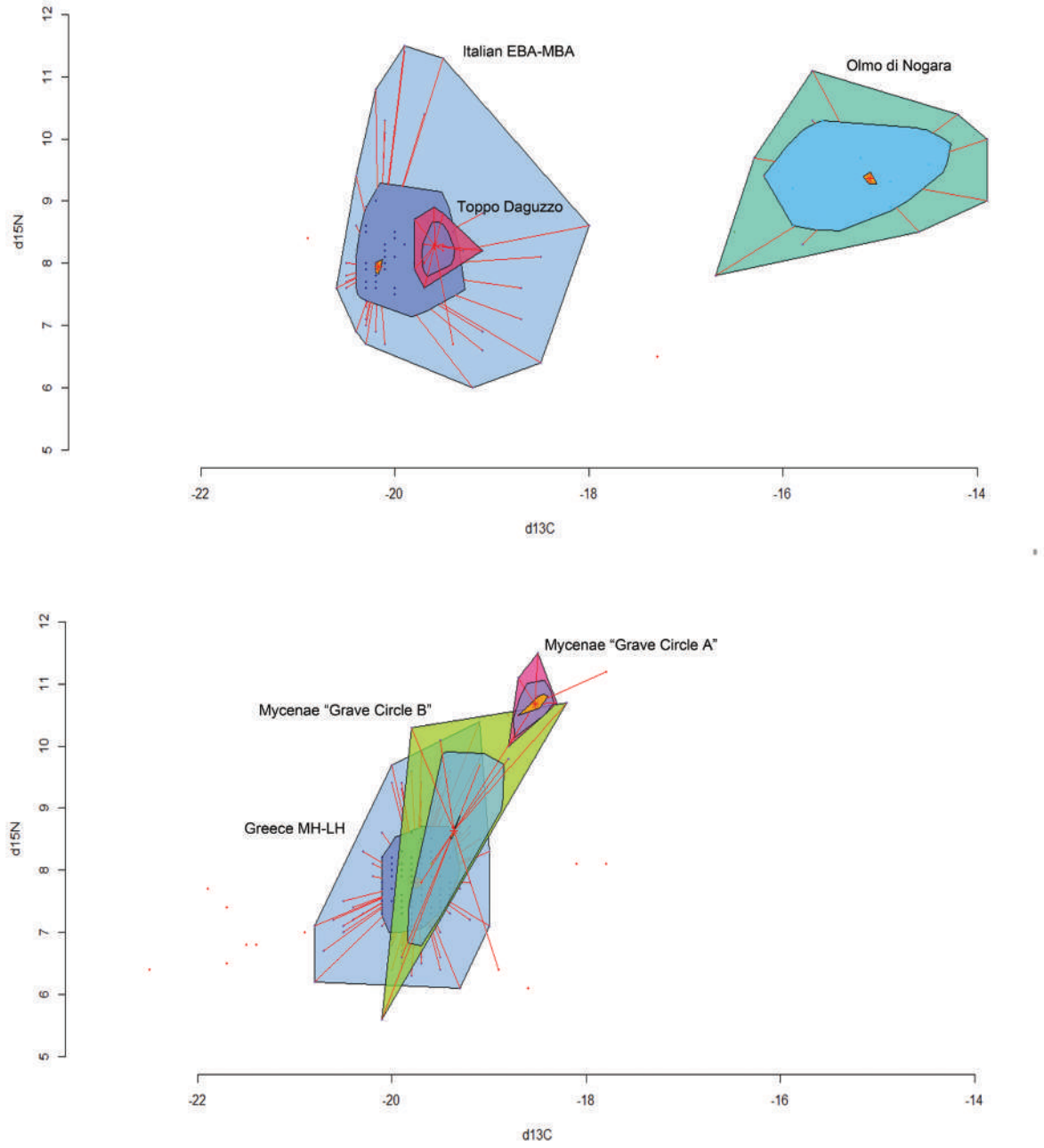

Figure 14. Bagplots representing stable isotope ($\delta^{15}N$ and $\delta^{13}C$) variability in Bronze Age Italy (at the top) and MH-LH Greece (at the bottom). Compared to MH-LH Greece, $\delta^{15}N$ data in EBA-MBA Italy do not show significant variations among different communities and social groups. Differences mostly appear at an individual level (Source: Richards, Hedges 2008; Triantaphyllou *et al*. 2008; Tafuri *et al*. 2009; Petroutsa, Manolis 2010; Varalli *et al*. 2016).

Slika 14. Vrečasti graf predstavlja raznolikost vrednosti stabilnih izotopov ($\delta^{15}N$ and $\delta^{13}C$) iz bronaste dobe v Italiji (zgoraj) ter v srednje in pozno heladskem obdobju v Grčiji (spodaj). V primerjavi s srednje in pozno heladskim obdobjem v Grčiji $\delta^{15}N$ v zgodnji in srednji bronasti dobi v Italiji ne kaže pomembnih razlik med različnimi skupnostmi in družbenimi skupinami. Razlike so večinoma opazne na ravni posameznih oseb (vir podatkov: Richards, Hedges 2008; Triantaphyllou *et al*. 2008; Tafuri *et al*. 2009; Petroutsa, Manolis 2010; Varalli *et al*. 2016).

Tafuri et al.'s study of stable isotopes shows a relatively restricted variability of carbon and nitrogen values, especially in comparison to Olmo di Nogara, whose rich quantities of both isotopes is due to millet consumption and possibly to a higher protein intake (Tafuri *et al*. 2009). The authors suggest that at Toppo Daguzzo plants such as wheat and barley most likely provided 65–70% of the protein requirement, and consequently, the consumption of meat and fish was perhaps only of minor importance, which is particularly curious for a group that has all the characteristics of a Bronze Age élite. Interestingly, Toppo Daguzzo $\delta^{13}C$ and $\delta^{15}N$ averages do not statistically differ from other Early and MBA Italian populations (excluding Olmo di Nogara), where there are no manifest archaeological traces of high status groups (Arano, Grotta Misa, Grotta dello Scoglietto, Felcetone; Varalli *et al*. 2016, 4; Figure 14).

Isotopic data collected from Bronze Age Greece, instead, show clearly differentiated diets relating to the aristocratic context of Mycenae Grave Circles compared to other MH and LH sites (Richards, Hedges 2008; Triantaphyllou *et al*. 2008; Petroutsa, Manolis 2010). Grave Circle B, and to a greater extent, Grave Circle A show higher carbon and nitrogen values, indicating a significant protein intake from meat and very likely marine food up to 20–25% for some individuals, as suggested by Richards and Hedges.

Conclusive remarks: what does bioarchaeology tell us about social stratification in Middle-Late Bronze Age Italy?

In our opinion, the synthetic panorama of the bioarchaeological data from the four key sites considered here demonstrates that, at the transition between Middle and Late Bronze Age, village communities were characterised by a striking internal variability among different co-residential social segments. Despite the limited genetic data, osteological and demographic analyses, the evidence suggests that, in general, kinship ties were the primary criterion for clustering the deceased into the funerary space. The variability in terms of number of burials, access to the burial space (inclusion/exclusion of subadults, in particular, but also of females), frequency of traumas and pathologies among these groups, substantially confirms the observations derived from other archaeological indicators (grave goods), and show that the majority of communities converged towards a general model in which stratification was the common structural trait across the whole peninsula. Obviously, the amplitude of the inequalities varies from site to site, especially between nodal centres and smaller villages, as well as from region to region, as a consequence of different socio-economic backgrounds and cultural manifestations of social hierarchies.

It is therefore clear that competition at various levels existed not only among different communities, villages, or tribes (Cardarelli 2015, 188), but also inside the community itself. The data from the *terramara* at Casinalbo suggest that this kind of dynamic was also operating inside small centres.

Our overview shows that the basic pre-conditions for groups to emerge were: *a)* the demographic power of the enlarged kinship and the capacity to maintain large numbers throughout the generations (see also Cazzella, Recchia 2006, 760); *b)* involvement and success in warfare, and the consequent capacity for redistributing the spoils of war (also facilitated by the power of gathering a wide demographic base); *c)* a high degree of connectivity with regional and supra-regional networks and a fast, frequent, and stable interconnection with other emerging groups in the hinterland and in more distant (even remote) nodes of the networks.

Other functions were probably attributed to the dominant groups, such as religious or economic roles, but these appears less discernible from a bioarchaeological perspective.

Despite the emphasis on internal competition, which probably represented a sort of common structural mechanism for social development, emerging groups in Italian contexts of this period seem nonetheless still rather distant from the model of aristocracy that is clearly visible, for example, in the more complex organisms of the Aegean. Except for Toppo Daguzzo, all other local emerging groups are integrated in (a more or less inclusive) collective space, although they emphasise their identity by clustering in specific areas of the necropolis/hypogeum. At Olmo di Nogara, Casinalbo, and perhaps at Trinitapoli-Ipogeo dei Bronzi we see the rise of these kinship groups, which seem to organise themselves through a descent system very similar to what we know as 'conical clan' (see also new data from Trinitapoli from Arena *et al*.

2020). However, their diet, in terms of protein intake, as well as the general living conditions (pathologies, physical stress), do not show substantial differences, when compared to individuals without indicators of prestige.

By contrast, Toppo Daguzzo Tomb 3 shows an élite group more involved in the process of emulating Aegean or Eastern Mediterranean aristocracies, at least for what concerns the monumentality of the tomb and the will of distinguishing itself from the rest of the community. Their distinctive lifestyle (participation in armed conflicts, access to prestige goods), their perhaps slightly privileged life conditions (better dental health), however, did not include a high protein intake. While Mycenaean aristocracies could eat more meat than 'commoners' and marine food plausibly once or twice per week, the Italian élite did not have significant access to this kind of 'luxury'.

Besides all these considerations, already emphasised by a number of scientific contributions, the new isotopic data about the mobility of people stimulate a wider reflection on the dynamics of the emergence and stabilisation of new power structures. As documented at Casinalbo and Trinitapoli, where this kind of analyses have been carried out, exogamy was a systematic strategy for establishing connections. The possibility of incorporating high-status women from outside was crucial in order to institute or reinforce not only political/military alliances, but also exchange routes and, consequently, to reaching the social position for exercising the 'redistributive power' typical of the emerging governance organisms.

In other Bronze Age key contexts, such as the cemetery at Scalvinetto (*terramara* at Fondo Paviani, northern district of the Terramare system), almost 50% of the analysed individuals were not indigenous (Cavazzuti *et al*. 2019a, 33–34). The immigrated people are, again, mostly women, who reached the 'central place' of Fondo Paviani from a variety of places, during late childhood or early adolescence (therefore, in the age of marriage).

In our view, it was exactly the interplay between the investment in mobility (especially women's mobility) and in kinship ties that was the most successful strategy of emerging groups. The balance between *mobility*, represented by interconnections, and *stability*, embodied by enduring ties with kinship and tradition, created the political legitimation of power and its hereditary transmission. Using the language of sociology, the Bronze Age élites produced persistent "interorganisational" alliances with other élites (Mann 1986; López 2013). This dynamic was probably favoured by the idea that these emerging groups were sharing the same social challenge (competition) and the same objectives, thus creating a common *ethos*, a sort of "homophily", *sensu* Rogers (Rogers 2003; Mcpherson *et al*. 2001). This state generated a power structure in which the leaders used their resources and their common system of values to establish barriers that made it more and more difficult for people from outside or at the bottom of the social hierarchy to participate in the governance of the society in general, while at the same time this structural state of competition produced constant rivalries with other élite groups.

This theoretical framework finds a striking correspondence in the isotopic data from the well-known centre of Frattesina, located along the Po river Delta. The site arose during the 12th century BC and progressively became a prominent hub linking continental Europe and the Mediterranean, as evidenced by the remarkable variety of exotic materials and commodities discovered. Recent strontium isotope analyses on the related cemetery (Le Narde) have highlighted considerable 'inequality' of mobility patterns among different social segments. Mobility is more frequent among the 'richer' burials, while unfurnished burials belong to indigenous individuals (Figure 15).

Interestingly, almost all the 'rich outsiders' likely came from the hinterland (within 50 km from the site) and not from remote regions. This evidence seems to contradict the presence of exotic commodities, which marks Frattesina as one of the most "international centres" of LBA Italy. However, as we proposed in the original contribution (Cavazzuti *et al*. 2019b), the interchange between élite groups in that territorial node was crucial to re-organise stable political ties in the region after the collapse of the Terramare settlement system and legitimate the new actors in the mutated Mediterranean network of the 12th–11th centuries BC. Thanks to the bioarchaeological and biogeochemical analyses, therefore, the hypothesis that Frattesina was an "*emporium*" favoured by the presence of Eastern Mediterranean traders or aristocracies, previously advanced by some scholars (e.g. Bietti Sestieri 2008, 17), now appears much less probable.

These new bioarchaeological approaches are positively contributing to integrate and, sometimes, modify our

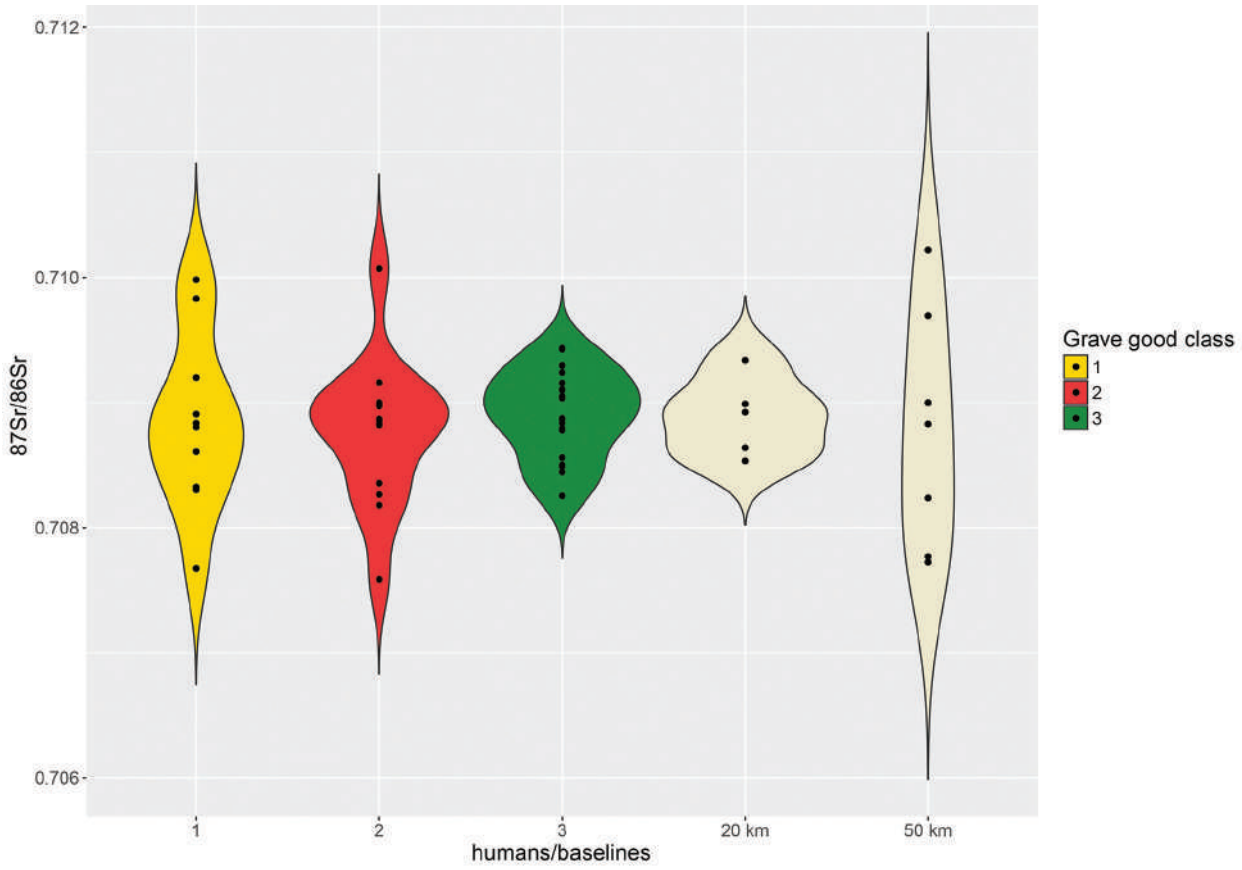

Figure 15. Distribution of the $^{87}Sr/^{86}Sr$ values among Le Narde di Frattesina's richest burials ("class 1", in the yellow violin plot), less rich burials ("class 2", in the red violin plot), and burials with no grave goods ("class 3" in the green violin plot) compared with 0-20 km (immediate hinterland) and 20-50 km (broader hinterland) environmental baselines. Each black dot represents one sample, human or baseline. The more variable of provenances among richer burials is indicated by the broader amplitude of the strontium isotope data in the yellow and red violins (after Cavazzuti *et al*. 2019b).

Slika 15. Razporeditev vrednosti $^{87}Sr/^{86}Sr$ najbogatejših pokopov iz Le Narde v Frattesini (»razred 1« v rumenem violinskem prikazu), manj bogatih pokopov (»razred 2« v rdečem violinskem prikazu) in pokopov brez grobnih pridatkov (»razred 3« v zelenem violinskem prikazu) ter osnovne podlage območja oddaljenosti od 0 do 20 km (neposredno zaledje) in območja oddaljenosti od 20 do 50 km (širše zaledje). Vsaka črna pika predstavlja en vzorec (človeške kosti/zoba ali temeljne vrednosti). Bolj raznolik izvor med bogatimi pokopi je nakazan s širšim razponom vrednosti izotopov stroncija v v rumenem in rdečem violinskem prikazu (prirejeno po Cavazzuti *et al*. 2019b).

general picture of social dynamics during prehistory. What Kristian Kristiansen has defined as the "third science revolution in archaeology" (Kristiansen 2014) amplifies considerably our potential to capture the nuances of the archaeological record. Undoubtedly, the Italian contexts still lack an extensive analysis of aDNA series. When the genetic landscape is finally available, it will probably trigger further discussions on the theme of social stratification, and its connection with kinship, ancestry, and ethnicity, similarly to what is happening in other regions of Europe.

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Bioarheologija in preučevanje družbene razslojenosti v bronasti dobi Italije

(Povzetek)

Prispevek obravnava družbeno razslojenost skupnosti srednje in pozne bronaste dobe v severni in jugovzhodni Italiji. Zaradi številnih novih arheoloških in bioarheoloških podatkov imamo zdaj možnost, da te podatke med seboj povežemo, hkrati pa na tak način raziskujemo družbene neenakosti tudi na področjih, kot so zdravstveno stanje, prehrana, sorodstvene vezi, demografija ter mobilnost. S pomočjo primerjalne analize smo se posvetili predvsem preučevanju dinamike pojava elit.

V analizi smo se osredotočili na štiri grobišča: Olmo di Nogara in Casinalbo v Padski nižini ter Trinitapoli-Ipogeo dei Bronzi in Toppo Daguzzo na jugovzhodu Apeninskega polotoka (slika 1). Najdišče Olmo di Nogara leži na severnem delu Padske nižine in je eno najbolj znanih grobišč na področju t. i. kulture *Terramare*. Na tem najdišču so bili najdeni tako skeletni kot tudi žgani pokopi v žarah (slika 2). Na območju C1 je bila pokopana skupina posameznikov, ki bi jo lahko, glede na prisotnost mečev tipa Boiu-Sauerbrunn-Keszthely v moških grobovih in prestižnih nakitnih predmetov, kot so jantarne jagode, v ženskih grobovih, prepoznali kot vodilno (slika 3). Sicer redki genetski podatki nakazujejo, da so bile vsaj nekatere od teh uglednih oseb med seboj v sorodstvu, in je bil potemtakem družbeni status verjetno podedovan. Osteološke analize so pokazale, da so bile poškodbe na kosteh, ki bi bile lahko posledica vojskovanja in drugih vojnih aktivnosti, pogoste. Kljub očitni hierarhični družbeni ureditvi skupnosti, analiza stabilnih izotopov ogljika in dušika ni pokazala bistvenih razlik v prehrani elite in »običajnih ljudi«.

Grobišče Casinalbo se nahaja na južnem delu Padske nižine (slika 2). Žarno grobišče s pripadajočo naselbino (t. i. *terramara*) je bilo organizirano v ločene skupine grobov z različnim številom pokopov (slika 4). Celostna analiza arheološke stratigrafije najdišča, arheoloških najdb in sežganih človeških ostankov je pokazala obstoj različnih modelov socialnega združevanja. Majhne in srednje velike skupine razlagamo kot skupino posameznikov enega rodu nekaj generacij (slika 5). Drugače pa so velike skupine grobov, ki so se pojavile od približno 1400–1350 pr. n. št., vključevale več kot eno rodovno linijo. V njih bi lahko prepoznali razširjeno sorodstveno skupino, za katero je značilna velika demografska moč (sliki 6 in 7).

Znano je, da v okviru obredja kremacije v času najzgodnejših žarnih grobišč bronasto orožje ni bilo deponirano v grobove. Osteološka analiza je zdaj prvič razkrila prisotnost zelenkastih lis na kremiranih kosteh, ki jih lahko razlagamo kot posledico prisotnosti kovinskih predmetov med kremacijo pokojnika na grmadi, odlomki kovinskih predmetov pa so bili sicer najdeni na posebnih obrednih območjih na grobišču (slika 4). Zanimivo je, da se odstotek posameznikov z grobnimi pridatki z grmade iz Casinalba ne razlikuje od odstotka, zabeleženega med skeletnimi grobovi z grobnimi pridatki na grobišču Olmo di Nogaro. Kljub razlikam v pogrebnih običajih in manjši razliki v sami dataciji pokopov z obeh najdišč, bi lahko za obe grobišči predpostavili podoben model družbene hierarhije. Analiza stabilnih izotopov stroncija izvedena na 24 osebkih je pokazala, da je bila eksogamija znotraj širšega zaledja običajna praksa, zlasti pri ženskah z visokim družbenim statusom (slike 8 – 10).

Hipogejska grobnica »*Ipogeo dei Bronzi*« je ena največjih od petnajstih grobnic, izkopanih na najdišču Trinitapoli v severni Apuliji, v njej pa so bili najdeni med seboj premešani ostanki skoraj 200 oseb (slika 11). V anatomski legi je bila najdena le ena odrasla ženska. To je bila tako imenovana »*La signora delle ambre*« (dama z jantarjem) – bogata ženska, najdena v središču grobnice (slika 12), okrašena z jantarjevim in očalasto-spiralam nakitom, značilnim za širši jadranski prostor. Bronasti grobni pridatki (orožje in ženski nakit) so bili zbrani v posebnem delu grobnice (območje C1), v katerem je bil verjetno pokopan vladajoči rod. Iz na celotne demografske slike in splošne kronologije je razvidno, da je celotna grobnica vključevala več kot le enolinearno agnatsko sorodstvo (en rod). Potemtakem je moč sklepati, da so bili v grobnici najdeni skeletni ostanki razširjenega sorodstva, »stožčastega klana« ali bogatejšega rodu (območje C1), ki je vključeval večje število ostalih nečlanov, ki so bili na nek način odvisni in povezani z vladajočim rodom.

Grob 3 iz Toppo Daguzza predstavlja eno od najbolje raziskanih hipogejskih ali podzemnih grobnic na tem najdišču, umeščeno na pobočje hriba nedaleč od Matere v Bazilikati. Hipogej sestavljajo 10 m dolg *dromos*, *stomion* in široka pravokotna kamra, v kateri so bili najdeni človeški ostanki enajstih oseb, ki so bili sodeč po analizah aDNA verjetno članov iste družine. Grobni pridatki, kot sta orožje in bogat nakit (jantar in steklo) (slika 13), kažejo na visok družbeni položaj te skupine. Za moške so bile značilne pogoste travmatične poškodbe, ki so posledica medosebnih konfliktov. Kljub »aristokratske-

mu« videzu skupine je analiza stabilnih izotopov ogljika in dušika razkrila »slabo« prehrano z nizkim vnosom beljakovin.

Pričujoči pregled je pokazal, da lahko na prehodu med srednjo in pozno bronasto dobo v okviru vaških skupnosti prepoznamo veliko notranjo raznolikost med posameznimi družbenimi skupinami. Izrazita razslojenost, ki jo je povzročilo tekmovanje za vire in prestiž, ni obstajala le med različnimi skupnostmi, temveč tudi znotraj ene skupnosti. Osnovni predpogoji za nastanek skupin so bili: a) demografska moč razširjenega sorodstva; b) vpletenost in uspeh v vojskovanju; c) visoka stopnja vpetosti v regionalne in nadregionalne komunikacijske mreže.

Kljub naraščajočim razlikam med elitami in podrejenimi deli družbe, ki so na najdišču Toppo Daguzzo razvidne bolj kot kjerkoli drugje, ugledne skupine Apeninskega polotoka niso dosegle ravni aristokracij iz vzhodnega Sredozemlja, to pa se zlasti kaže v prehrani in z vnosom beljakovin (slika 14).

Arheološki in biogeokemijski podatki so pokazali, da so bile poleg stabilnosti, ki so jo zagotavljale trdne sorodstvene vezi, prav mobilnost, eksogamija in širše medsebojne veze, temeljne pri vzpostavljanju »medorganizacijskih« zavezništev z drugimi elitnimi skupinami, ostalimi člani komunikacijske mreže (slika 15). Te porajajoče se skupine so imele enak družbeni izziv (rivalstvo) in enake cilje, kar je ustvarjalo skupni etos, nekakšno »homofilijo«. To je ustvarjalo strukturo moči, v kateri so vodje s svojimi viri in svojim skupnim sistemom vrednot vzpostavili meje, zaradi katerih so ljudje od zunaj ali iz dna družbene lestvice vedno težje sodelovali pri upravljanju družbe, hkrati pa je to strukturno stanje tekmovalnosti povzročalo nenehno rivalstvo z drugimi skupinami elite.