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Environment, crops and harvesting strategies during the II millennium BC: Resilience and adaptation in socio-economic systems of Bronze Age communities in Apulia (SE Italy)

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ABSTRACT

The socio-cultural dynamics of the Bronze Age communities of Apulia (S-E Italy) during the 2nd millennium BC represent a crucial moment in the history of the relationship between humans and nature. Over the last few decades, several studies have highlighted the complex pattern of Late Holocene climate shifts across the Mediterranean region and the difficulties in distinguishing these changes from human impacts in many proxy records. This study consists of a regional-diachronic overview of Bronze Age archaeobotanical data, pertaining to south-eastern Italy, derived from charcoal and seed/fruit analysis performed on materials from several archaeological sites distributed across Apulia. The aim is to identify possible plant-related changes in subsistence strategies during a period of transformation in the environment as well as cultural systems. It follows an integrated approach in which the shifts in plant assemblages (seeds/fruits and charcoals) are considered in the light of high-resolution palaeoclimate proxies, available for the central Mediterranean area, and socio-cultural dynamics inferred from archaeological evidences.

The different lines of evidence explored provide the basis for a discussion of the possible reasons for changes in subsistence strategies during the course of the Bronze Age in the area. What emerges from our analysis are major transformations of annual crop husbandry, seasonal harvesting strategies and storage technologies, one in the Middle and one in the Late Bronze Age. Although the first transformation appears to be linked to climate forces, the latter seems to be the result of social and political "pressure".

1. Introduction

Subsistence strategies linked to the exploitation of vegetation reveal the continuously evolving dynamics of adaptation, interaction and change that give rise over time to the network of relations between human beings and plants. From a diachronic point of view, from the Neolithic onwards, agrarian societies had to cope with climatic and environmental fluctuations, seeking to overcome geographical and ecological limitations by means of new technologies (irrigation, crop rotation, manuring, etc.), specific agronomic strategies (selecting more suitable crops or varieties, etc.) and intensive exploitation of wild plants (Rosen, 2007; Ertug, 2009; Chevalier, 2013; Whitehouse and Kirleis, 2014). These techniques enabled communities to manage the risk of crop failure or produce a surplus. Exchange and trade also played an important role in guaranteeing the availability of food and adequate resources during hard times (Brumfiel and Earle, 1987).

Changes in subsistence strategies, recognizable from an analysis of archaeobotanical assemblages in a diachronic perspective, can arise from various causes linked to the environmental, technological, cultural, social and, not least, symbolic spheres. An integrated approach, in which the shifting assemblages of plant macroremains are considered in the light of climatic and environmental variations as well as socio-cultural dynamics, may therefore shed some light on the changes detected in food habits.

The region considered in this study is south-east Italy, particularly Apulia, where much archaeobotanical research has been conducted over the last thirty years. The first result of these investigations was the summary recently compiled by the authors concerning climate and its influence on human adaptation strategies during the Neolithic, as highlighted by changes in agricultural practices (Fiorentino et al., 2013). In this paper, we extend this research to the

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Bronze Age societies, providing new data on the debate dealing with the history of the relationship between culture, environment and climate during the Late Holocene in Italy (Mercuri et al., 2011).

In the general framework of the archaeobotanical analysis performed in southern Italy, 58% of the Bronze Age sites are located in Apulia (Mercuri et al., 2014). Thanks to the research conducted by the Laboratory of Archaeobotany and Palaeoecology (LAP), we currently have a large database available composed of 32,286 seed/fruits remains and 4220 charcoals, collected in 16 archaeological sites. On the regional scale, the Bronze Age palaeovegetational framework is based on the Alimini pollen sequence (Di Rita and Magri, 2009), comparison of which with plant assemblages from archaeological sites may help to understand the relationship between human and nature.

The socio-cultural features of the Bronze Age communities of Apulia during the second millennium BC represent an exemplary case in the complex history of the interrelationship between societies and their environment, which they use and modify. From the Early Bronze Age onwards, these features include the growth of fortified coastal sites linked to increased maritime trade with the East and the subsequent rise in social distinctions throughout the Late Bronze Age, when elite groups appear to emerge (Radina and Recchia, 2010; Recchia, 2010; Cazzella and Recchia, 2013). This development of social and economical complexity entailed a change, or at least a revision, in the people–environment relationship during the Late Holocene, a period whose climate pattern appears particularly complex, especially considering the difficulties in distinguishing climate change from human impact in many proxy records (Reille and Pons, 1992; Pons and Quézel, 1998; Quézel, 1999; Follieri et al., 2000; Jalut et al., 2000, 2009; Roberts et al., 2011; Zanchetta et al., 2013).

This paper presents a regional diachronic overview of Bronze Age archaeobotanical data derived from analysis of charcoals, discussed here as palaeoenvironmental record, and seed/fruits, used as subsistence and agronomic indicators, from several archaeological sites distributed across Apulia. The aim is to contribute to the debate on subsistence strategies (Stika and Heiss, 2013) and their transformation during a period of change in environmental as well as cultural systems. It follows an integrated approach, in which archaeobotanical record is discussed diachronically, taking into account natural and social dynamics and according to the different lines of evidences explored (independent palaeoclimate curves, archaeological features, agronomic characteristics) with the purpose to identify any possible correlation between changes in climate, cultural systems and agro-production aspects. The specific focus is to understand whether, how, and why Bronze Age communities in Puglia adapted or modified their subsistence strategies in terms of plant exploitation.

2. Materials and methods

The present regional-diachronic overview is based on the literature and our research into 16 settlements located in the region (Fig. 1), whose physical and geological characteristics have already been detailed in Fiorentino et al. (2013). The sites considered are from the Early to Late Bronze Age (2000–1000 BC) and are located inland as well as in the coastal zone. Table 1 shows the basic data on the cultural period and chronology, the names of settlements, their location, the contexts investigated, and the bibliographical references. Despite the large amount of plant remains recovered, which can potentially provide a broader understanding of human–plant interaction, comparison of archaeobotanical assemblages is affected by several difficulties: a) the archaeobotanical assemblages are rather heterogeneous in terms sampling strategies; b) the archaeological sites are unequally distributed among the various cultural phases; c) the archaeological investigations have focused above all on coastal areas, so inland areas are not always represented; d) from a chronological point of view the main difficulty is to place the archaeobotanical data of each settlement on a continuous timescale.

Table 1
Information on the studied sites: Phase, cultural period and chronology (*EBA* Early Bronze Age, *MBA* Middle Bronze Age, *LBA* Late Bronze Age), settlements (name of the site), contexts investigated, location (the numbers correspond to those reported in Fig. 1; (*c*) coastal, (*i*) inland), type of plant remains (*Ch* charcoals, *S/F* seed/fruits) and bibliographical references.

Phase	Chronology	Settlements	Location	Type of plant remains	Context	References
I	EBA_MBA1 (2000–1500 BC)	Coppa Nevigata (Manfredonia)	1 (*c*)	*Ch*, *S/F*	cooking hearth, silos	Fiorentino and D'Oronzo (2012)
		Castello Angioino (Mola di Bari)	4 (*c*)	*Ch*, *S/F*	levels of occupation	*Internal report*
		Piazza Palmieri (Monopoli)	5 (*c*)	*Ch*	levels of occupation	Fiorentino (1995a)
		Piazza San Salvatore (Giovinazzo)	3 (*c*)	*Ch*	levels of occupation	Fiorentino (1998)
		San Domenico (Taranto)	12 (*c*)	*Ch*, *S/F*	levels of occupation	Fiorentino (1999)
		Carluva (Minervino Murge)	13 (*i*)	*Ch*, *S/F*	levels of occupation	*Internal report*
		Masseria Caterina (Minervino Murge)	14 (*i*)	*Ch*, *S/F*	levels of occupation	*Internal report*
		Le Chianche (minervino Murge)	15 (*i*)	*Ch*	levels of occupation	*Internal report*
II	MBA2–3 (1500–1300 BC)	Scogli di Apani (Carovigno)	8 (*c*)	*Ch*, *S/F*	huts 1–2, cooking hearths	*Internal report*
		San Domenico (Taranto)	12 (*c*)	*Ch*, *S/F*	levels of occupation	Fiorentino (1999)
		Piazza Palmieri (Monopoli)	5 (*c*)	*Ch*, *S/F*	hut, cooking hearths	Fiorentino (1995a)
		Roca (Melendugno)	9 (*c*)	*Ch*	levels of occupation, fortification	Primavera and Fiorentino (2012)
		Piazza San Salvatore (Giovinazzo)	3 (*c*)	*Ch*	levels of occupation	Fiorentino (1998)
		Scalo di Furno (Poro Cesareo)	10 (*c*)	*Ch*, *S/F*	levels of occupation	*Internal report*
		Masseria Chiancudda (Cisternino)	6 (*c*)	*Ch*	levels of occupation	*Internal report*
		Grotta della Tartaruga (Torre a Mare)	16 (*c*)	*S/F*	ritual	Fiorentino (1998b)
III	RBA-FBA (1300–1000 BC)	Coppa Nevigata (Manfredonia)	1 (*c*)	*Ch*, *S/F*	two-room building	Fiorentino and D'Oronzo (2012)
		Piazza Palmieri (Monopoli)	5 (*c*)	*Ch*, *S/F*	domestic hearth	Fiorentino (1995a)
		Roca (Melendugno)	9 (*c*)	*Ch*, *S/F*	levels of occupation, huts, ritual	Pagliara et al. (2007)
		San Domenico (Taranto)	12 (*c*)	*S/F*	levels of occupation	Fiorentino (1999)
		Madonna del Petto (Barletta)	2 (*c*)	*S/F*	silos	Fiorentino (1995b)
		Castello Angioino (Mola di Bari)	4 (*c*)	*S/F*	levels of occupation	*Internal report*
		Torre Santa Sabina (Carovigno)	7 (*c*)	*S/F*	levels of occupation	Fiorentino (1996)
		Torre Castelluccia (Pulsano)	11 (*c*)	*S/F*	hut 7 (storaging), hearth	Gorgoglione et al. (1993)

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