



Eating in prosperity: First stable isotope evidence of diet from Palatial Knossos

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ARTICLE INFO

Article history:

Received 9 September 2015

Received in revised form 15 January 2016

Accepted 17 January 2016

Available online xxx

Keywords:

Stable isotopes

Carbon

Nitrogen

Diet

Social variation

Knossos

Aegean

ABSTRACT

This paper discusses the first stable isotope evidence of diet from Protopalatial to Neopalatial Knossos on Crete to reconstruct individual long-term dietary records for people from the site, spanning the period circa 1900 to 1600 BC. The aim is to shed light onto the lifeways and social organization of the respective communities, and to investigate people's everyday life for evidence of the site's politico-economic supremacy in the Neopalatial period.

Eighty-one human and 12 animal individuals from two Palatial cemeteries at Knossos were sampled for cortical bone and the extracted collagen was analyzed for stable carbon and nitrogen isotope ratios to trace relative proportions of (broad categories of) foodstuffs that they consumed on a day-to-day basis. The human collagen stable isotope signatures follow a broad distribution that reflects a range of diets, where animal protein, including marine in addition to terrestrial, was consumed at different levels. Faunal isotope values from the site are consistent with a terrestrial C₃ trophic context with apparently no C₄ protein input.

The observed dietary variation in the human stable isotope ratios shows no clear sex-, tomb-, or cemetery-pattern; it rather follows a temporal trend that is in tune with contemporary socio-economic and political developments and the increasing prosperity of Knossos in the period investigated. Moreover, the study yielded the first positive human palaeodietary evidence for marine food consumption in Prehistoric Crete.

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1. Introduction

This paper builds on extensive scholarship concerning the affluence and politico-economic growth of the major site of Minoan Knossos on Crete (Fig. 1) that peaked over the course of the Neopalatial period (MMIII–LMIB¹ or circa 1700 to 1490/1470 BC) (e.g. Whitelaw, 2012, 2004; MacDonald, 2013, 2005). It offers new insights to the actual life conditions of Palatial Knossos' inhabitants. This study presents the first results of stable isotope ratio analysis on archeological bone collagen from human remains found at this site. These results allow reconstruction of individual long-term dietary records for these people by tracing relative proportions of (broad categories of) foodstuffs that they consumed on a day-to-day basis (Horn et al., 2009; Lee-Thorp, 2008; DeNiro and Epstein, 1981, 1978). This study thus offers, for the first time, a more tangible measure of the site's untested heyday. In other words, it investigates how living at Palatial Knossos translated into people's everyday diet. Although none of the burials from either of the two cemeteries examined, Ailias and Lower Gypsades, can be taken to represent the 'royal' family of Palatial Knossos, the quality of some of the rare burial furnishings recovered from Ailias may be interpreted as evidence that the people buried there were of elevated status.

Moreover, this paper explores the biological correlates of identity and social structure by examining patterns of dietary variation in relation to sex-, tomb- and cemetery-affiliation. It also discusses Knossos in the palaeodietary isotopic context that is available to date for Bronze Age Crete and compares the MMII–LMI Knossos isotopic data to the LMIIIA–B site of Armenoi (Richards and Hedges, 2007) in north-central Crete (some 70 km west of Knossos). Despite post-dating the last interments at Ailias or Lower Gypsades by more than 200 years, Armenoi offers the nearest temporal parallel from the island to contextualize the human dietary reconstruction of Palatial Knossos.

2. Archeological background

2.1. Palatial Knossos: production and consumption

Knossos grew rapidly from Prepalatial to Protopalatial and more dramatically during Neopalatial times, by which point it was closely involved in networks of contacts, interactions and trade operating in the Aegean and the Asia Minor, and maintained a preeminent role in a trade for metals stretching as far as the eastern Mediterranean. Thus the Neopalatial period at Knossos was a time of increased affluence, architectural and artistic developments, with political and/or economic control extending over much of the island (e.g. Whitelaw, 2012, 2004;

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¹ Abbreviations: MM = Middle Minoan, LM = Late Minoan.



Fig. 1. Map of the Aegean; marked on it are the sites mentioned in this article.

MacDonald, 2010; Wiener, 2007; Adams, 2006; Rehak and Younger, 2001).

Built structures for storage and storage vessels (large jars or pithoi) at the Knossos palace attest to a large scale production of cereals, legumes, fruits, or oil, wine, etc., available for consumption by the palatial elite and officials, the dependant personnel, and probably, to some extent, by the remainder of the community (Hamilakis, 1996). Dating from LMIIIA onwards, Linear B tablets from Knossos supplement evidence for the operation of an extensive farming and herding system monitored by the palace (Hallager, 2010, 1977; Killen, 2004; Killen, 1994; Popham, 1970). Study of zooarchaeological remains shows that in the Bronze Age the four principal domestic species, i.e. sheep, goats, pigs and cows, as well as game such as fallow deer, were consumed at the site (e.g. Isaakidou, 2004, 2007a, 2007b). Material culture associated with tasks pertinent to herding practices and the associated by-products give further insights into the specific consumption and management practices. Moreover, published archaeobotanical evidence and specialized pottery lipid residue analysis from the site offer direct evidence for specific grains, legumes, nuts and fruits consumed, albeit not directly relevant in chronological terms to the period that this paper examines (e.g. Sarpaki, 2012, 2013; Livarda, 2012, for the Neolithic, the Late Bronze Age and Protogeometric Knossos respectively). Fish and other marine food consumption must also have been available to the people of Knossos because of its proximity to the sea. This is a common assumption for population groups living on or close to the coast that, in the Aegean, is corroborated by evidence for fishing activities from frescoes and pictorial vases in addition to the actual fishing equipment and fish bones recovered from Bronze Age sites (Papathanasiou et al., 2013; Gerontakou, 2010; Macgillivray and Sackett, 2010; Hadjianastasiou, 1996; Powell, 1996, 1992; Bintliff, 1977).

Zooarchaeological evidence, however, may be compromised by excavation practices and a bias towards the preservation of skeletal remains from larger-sized mammals compared to smaller ones or to fish bones (e.g. soil sieving and floatation will yield remains of smaller/younger animals otherwise not retrieved) (Craig et al., 2006). Likewise,

plant remains may be underrepresented owing to inappropriate excavation techniques or due to factors controlling preservation by charring (Papathanasiou et al., 2013). Moreover, archaeological animal bone, archaeobotanical records or pertinent material culture evidence, albeit potentially very informative about past human population dietary records, cannot directly reconstruct actual dietary practices if examined in isolation. They constitute evidence for production, preparation and generally the availability of certain food resources at a certain site, but they cannot address what was actually consumed or by whom. Individual dietary records are instead more directly reflected in the chemical profile of people's bones. Further insights into individual dietary records are also available through macroscopic analysis of people's skeletal remains and the recording of frequencies of diet-related skeletal and dental pathologies (e.g. dietary deficiencies such as scurvy, rickets, anemia, or dental caries, calculus and hypoplasia).

2.2. The cemetery sites examined

A total of eighty-one human individuals from Knossos were sampled for stable carbon and nitrogen isotope analysis for the purposes of this study. They derive from two roughly contemporary cemeteries situated near the palace and less than two km distant from each other: the Ailias MMII–LMI chamber tombs and the Lower Gypsades MMIII–LMI tholos (vaulted) tomb and ossuary that span the period during which Knossos flourished (Fig. 2) (Hood and Smyth, 1981: 7, 11; Hood, 1957; Hood and Boardman, 1955; Cook and Boardman, 1954). Excavations at both sites, undertaken in the 1950s under the directorship of Dr. Sinclair Hood of the British School at Athens, yielded substantial, well-preserved and meticulously-documented human skeletal material.²

² The author has studied both these skeletal collections for their full publication (Nafplioti, in preparation), and also sampled them for ⁸⁷Sr/⁸⁶Sr as part of a broader residential mobility research project (Nafplioti, 2012, 2011, 2008, 2007).

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