Exploring intra-settlement use of space in Late Bronze Age Greece: preliminary observations on the archaeobotanical visibility of storage and disposal strategies during the late 2nd millennium BC in the Aegean

Aristotle University of Thessaloniki
School of History & Archaeology

Angeliki Karathanou & Soultana Maria Valamoti

Introduction

Figure 1: Map of Greece showing the location of the sites studied.

- Archaeobotanical data from the Late Bronze Age (LBA, 1700-1050 BC) layers of four settlements located across the north-south axis of mainland Greece (Fig. 1) are used to explore crop storage and refuse disposal strategies in the Aegean during the late 2nd millennium BC.
- Among other taphonomic factors (Dennell 1974; Hillman 1984; Jones 1984; Van der Veen 1985, 2007; Van der Veen & Jones 2006), the role of destruction by fire and sampling strategy in the formation of the assemblages considered here is examined (Fig. 2).
- Preliminary results, based on the ongoing PhD study of AK, allow some first insights to the use of intra-settlement space among different in character sites during a period when palatial centres rose and fell in the Mycenaean southern and central Greece (Shelmerdine & Bennet 2008), and loose hierarchical local networks were established among the settlements in the North (Andreou 2010).

Methodology

Settlement	Samples (ca.)	Sampling	Fire destr. layer(s)
Toumba	1500	systematic	-
Kynos	40	judgemental	x
Mitrou	100	systematic	x
Ayios Vassileios	530	systematic	x

Figure 2: Table summarizing a) the number of samples scanned, b) the method of sampling strategy applied, and c) the presence (x) or absence (-) of *in situ* destruction layers in each site.

Settlement	Floor	Hearth	*Pithos*	Claybin	Pit	Outdoor	Total
Toumba	2	3	3		2	1	**11**
Kynos			1	1			**2**
Mitrou	1					1	**2**
Ayios Vassileios	2						**2**

Figure 3: Contextual origin of the 17 samples presented here in detail.

Charred plant remains were recovered by flotation from ca. 2170 soil samples collected either systematically or based on judgment sampling from various indoor and outdoor contexts (Fig 2-3). Preliminary data discussed here derived from: a) scanning all samples, and b) quantitative analysis of 17 samples representing the majority of contexts (Fig. 3-5).

The species present

Figure 4: The cereal and pulse species identified. Fig and grape are the most common among fruits/nuts. Olive is only sporadically found at Kynos and Ayios Vassileios. Wild flora seeds are also attested, including typical weed species.

Archaeobotanical composition analysis

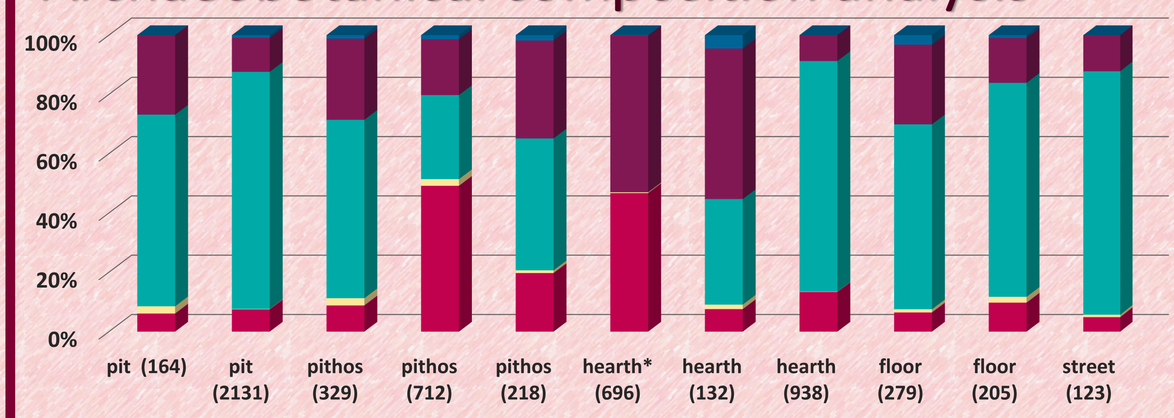


Fig. 5a: Thessaloniki Toumba samples

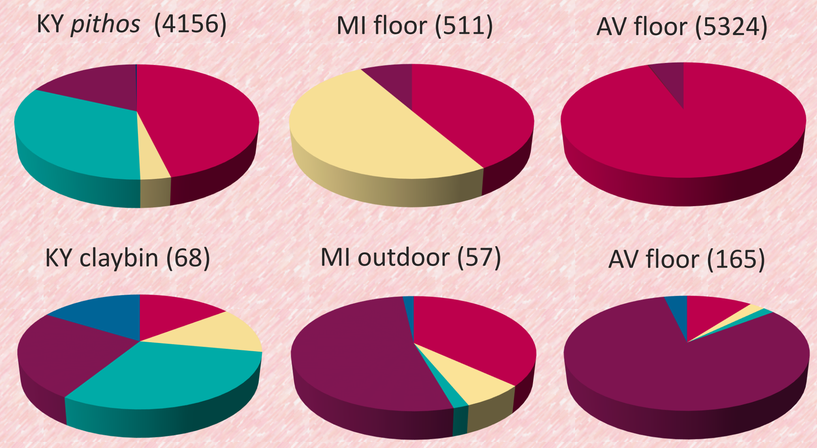


Fig. 5b: Kynos, Mitrou and Ayios Vassileios samples

Figure 5: a. Histogram for Toumba and **b.** pie charts for Kynos (KY), Mitrou (MI) and Ayios Vassileios (AV) showing total sample composition in plant categories per context for the 17 samples analyzed. Plant remains from heavy residues are not considered, apart from Kynos. In all cases >100 countable items per sample are present, with the exception of two samples from Kynos and Mitrou containing though >50 items. In parentheses the absolute number of plant remains contained in each sample. Plant categories include: cereal grain (wheat, barley, millet), pulse seeds, cereal chaff (glume bases, rachises, culm nodes), wild species and fruit/nut.

Heterogeneous sample composition in most cases with plant categories present in variable percentages (Fig. 5):

- Kynos claybin sample quite balanced.
- Toumba samples dominated by glume bases in their majority.
- Mitrou and AV mixed samples and one hearth sample from Toumba dominated by wild flora seeds.

Grain rich samples also encountered in all sites (Fig. 5):

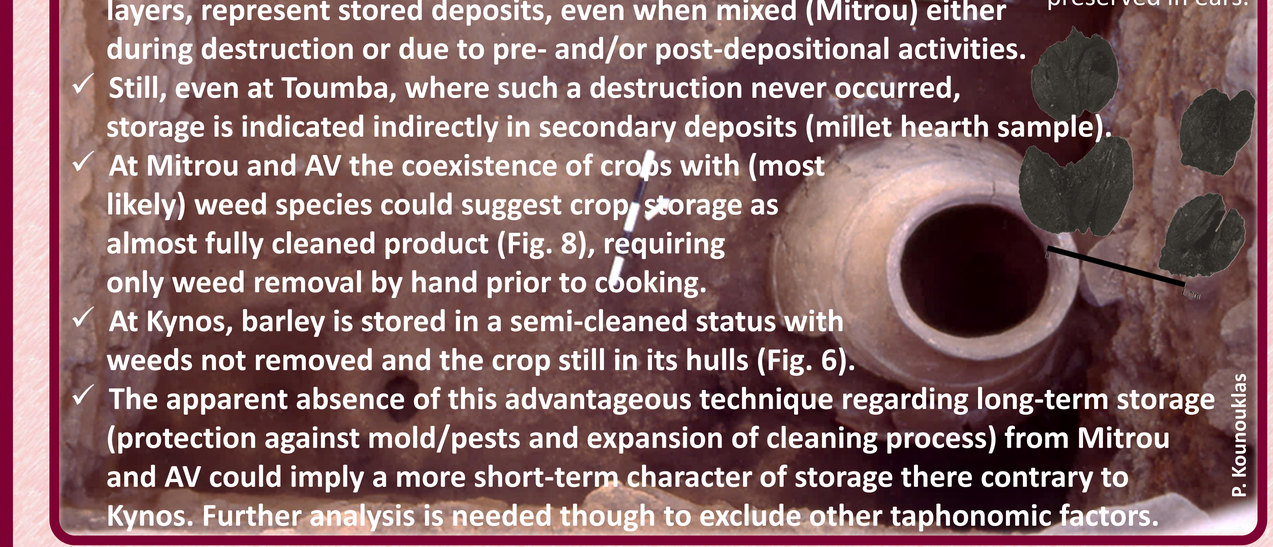
- Almost exclusively barley grains at the *in situ* concentration from AV with few wild seeds (*Avena* sp. mostly) (Fig. 8).
- Mixed cereals and pulses with wild species (*Lolium* sp. & *Galium* sp.) at a Mitrou floor sample.
- Prevailing barley grains accompanied by numerous rachises, lemmas & paleas and fewer wild seeds (*Avena sp*. mostly) in a *pithos* at Kynos (Fig. 6).
- A far wider variety of wild species in a small millet concentration from a hearth* at Toumba.

- ➢ Cereal grains and pulse seeds represent the final product in grain-rich samples. Also they could represent food consumption residues or cooking accidents when in small numbers in mixed samples.
- ➢ Crop by-products indicate both early (i.e. winnowing) and late (i.e. de-husking, fine-sieving) processing stages (glume bases *and* rachises, culm nodes and silicified awns respectively[1]). In mixed samples they could result from their burning as fuel, either on their own or contained in dung/dung-cakes.
- ➢ Wild seeds could have also been included in crop by-products, especially if typical weeds of cultivation. Additionally, they could have been used on their own (i.e. herbs, medicine, etc.) or contained in dung from grazing animals.
- ➢ Fruits/nuts, like fig and grape, were probably consumed by humans and/or animals, ending up in the assemblages as food residues and/or through dung.

[1]Not included in analysis but present at Toumba.

Crop storage strategies

Figure 6: Kynos; room with *pithos* containing hulled barley, occasionally still preserved in ears.



- ✓ **Grain-rich samples, mostly associated with *in situ* fire destruction layers, represent stored deposits, even when mixed (Mitrou) either during destruction or due to pre- and/or post-depositional activities.**
- ✓ **Still, even at Toumba, where such a destruction never occurred, storage is indicated indirectly in secondary deposits (millet hearth sample).**
- ✓ **At Mitrou and AV the coexistence of crops with (most likely) weed species could suggest crop storage as almost fully cleaned product (Fig. 8), requiring only weed removal by hand prior to cooking.**
- ✓ **At Kynos, barley is stored in a semi-cleaned status with weeds not removed and the crop still in its hulls (Fig. 6).**
- ✓ **The apparent absence of this advantageous technique regarding long-term storage (protection against mold/pests and expansion of cleaning process) from Mitrou and AV could imply a more short-term character of storage there contrary to Kynos. Further analysis is needed though to exclude other taphonomic factors.**

P. Kounouklas

Refuse disposal strategies

Figure 7: Toumba; floor and hearth in Building E.

- ✓ **Samples heterogeneous in composition most likely correspond to refuse, as a result of certain activities involving intended pre-depositional and/or depositional mixing (i.e. preparation of food & fodder, fuel spending, use of dung, etc.).**
- ✓ **At Toumba waste was not related to any specifically defined area, being accumulated both in outdoor areas and within buildings (Fig. 7), possibly due to the tightly built residential space on the tell settlement.**
- ✓ **Analysis of refuse spatial distribution is still ongoing at the other sites but a pattern is already observed. At Mitrou and AV refuse are dominated by wild species and not by chaff as at Toumba. This difference could imply different management of ash-containing refuse within settlement space, potentially reflecting regional level differences between settlements of southern and northern Greece.**

Toumba Excavation

Conclusion

Figure 8: The barley concentration found spilled on top of a heavily burnt floor at Ayios Vassileios.

- ❖ Preliminary analysis shows that taphonomic factors greatly affect sample composition and the degree to which crop storage and refuse disposal patterns can be reconstructed.
- ❖ Preservation by burnt destruction episodes reveals direct storage evidence allowing for a discussion of storage organization within and between settlements.
- ❖ Systematic sampling successfully detects refuse deposits, allowing for a thorough study of their spatial distribution and management practices. In combination with contextual analysis, they also provide indirect evidence for storage even when *in situ* stored deposits are not preserved.
- ❖ Completion of analysis of each data-set will allow for a detailed reconstruction of crop storage and refuse disposal strategies, providing a sound methodological basis for a diachronic comparative investigation of intra-settlement use of space in the Aegean during the LBA, when major sociopolitical changes occurred.

References & Acknowledgments

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