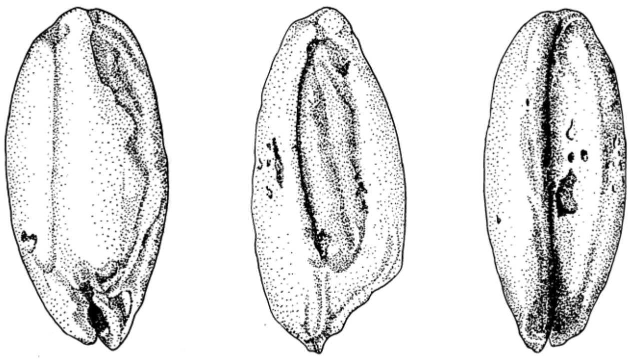

Plant use and management at Măgura-Buduiasca (Teleor 003), southern Romania: Preliminary report on the archaeobotanical analysis

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Introduction

Extensive sampling and recovery of archaeobotanical remains by machine flotation at Măgura-Buduiasca has yielded an assemblage of charred plant material that sheds significant light on the nature of plant use and farming practices during the sixth millennium cal BC. The site occupation includes the earliest centuries of agricultural activity in southern Romania, for which little archaeobotanical evidence has been available until now (Cârciumaru 1996). Analysis of botanical material from the Starčevo–Criş, Early Dudeşti, Late Dudeşti and Vădastra occupations provides an opportunity to consider plant-related practices and their social implications over the long term.

Methods

Excluding disturbed surface layers, all excavation units were sampled for flotation. Large soil samples of *c.* 40-50 litres were taken, where possible, on the assumption that plant material would be present at low density; units of smaller volume were sampled in their entirety. In total, 158 samples (*c.* 3700 litres of soil) were processed; sample sizes ranged from 0.25 litres to 80 litres, with an average of 24 litres.

The flotation machine, constructed in collaboration with Eduard Florea at the Teleorman Museum using plans provided by Glynis Jones, was a modified version of the Ankara flotation system (French 1971) including adjustments suggested by G. Hillman and K. Wardle. The machine was set up behind the museum and used recycled water pumped from a reservoir (two connected oil drums), which was renewed daily. Geological sieves with 1 mm and 300 μm mesh sizes retained the floating material (the flot), while a *c*. 1 mm mesh inside the machine retained the non-floating material (heavy residue). Flots and heavy residues were dried in the shade prior to sorting.

The heavy residue from each sample was sorted at the museum. After sieving with a 4 mm mesh, the coarse residue (>4 mm) was sorted in its entirely for all biological and artefactual material. The fine residue (<4 mm) was sorted in its entirety or, if large in volume, split into random subsamples; fractions no smaller than 1/8 of the total sample were sorted. If sorting of a subsample indicated that the whole fine residue would yield 30 or more botanical items, all of it was sorted.

The botanical material was identified using modern reference material and reference works such as Jacomet (1987). A low-power (x7–45) stereoscopic incident microscope was used for sorting and identification. Seeds and chaff were quantified by counting the 'minimum number of items' (mni): for cereal grains, embryo or apical ends (whichever was more numerous in a sample) were counted; for chaff, individual glume bases of glume wheats were counted. For wild taxa, mni counts similarly recorded, where possible. Occasional fragments of nutshell were counted as such (no hilar scars were observed permitting 'mni' estimates); occasional finds of charred fruit flesh/skin were quantified by volume (ml). Wood charcoal, which was sorted from the >2 mm portions of the heavy residue and flot, was quantified by volume (ml).

Samples were selected for archaeobotanical analysis if they were deemed to derive from contexts of reasonably secure Neolithic date based on ceramic analysis by Laurens Thissen and Pavel Mirea (pers. comm.). A total of 102 samples were selected on this basis. These samples derive from a total of 28 'complexes' or pits (Table 1). For the purposes of this preliminary interpretation, samples from the same pit were amalgamated in order to approximate major depositional/behavioural 'events'. Soil volumes relating to these pit fills ranged from 186 to 694 litres.

Results

Overview of the assemblage

Summarised compositional data, based on the amalgamation of samples per 'complex' or pit, are given in Table 2. The low density of charred botanical items per litre soil across individual pits (Fig. 1, Table 2), *c.* 1 item per litre on average and ranging from *c.* 0.1 to 13 items per litre, is comparable to many 'flat-extended' sites elsewhere in south-east and central Europe (e.g. Marinova 2006; Bogaard et al. 2007; Kreuz 2007) and likely reflects a combination of factors, including the shallow depth of deposits (and the destructive effects of intermittent wetting/drying on charred botanical material) and the tertiary nature of the pit fills (re-deposition tending to dilute concentrations from primary burning contexts). Fig. 2 shows the relationship between abundances of seed/chaff items and volumes of wood charcoal per pit; the generally positive association may reflect a common origin in domestic fires, where floor sweepings may have been burnt along with wood fuel.

Given the absence of contexts associated with *in situ* burning, it appears that all of the botanical material was re-deposited away from the original circumstances of charring. Residuality is a concern; AMS-dating of three barley and one einkorn grain from pit 13A (Starčevo–Criş) yielded dates in the expected time frame of the early 6th millennium cal BC, while a fourth barley grain dates to the later sixth-millennium cal BC (Table 3).

Table 2 summarises overall frequencies of botanical categories in terms of the number of pits in which they occur, their maximum abundance per pit and their total count. Cereal grain constitutes the most frequently occurring category of botanical material overall; it is often too poorly preserved to be identified further, but well preserved grains were predominantly einkorn wheat (mostly from one-seeded spikelets – Fig. 3) and barley (including some identifiable as hulled). Cereal grain is more common and abundant than cereal chaff. Glume bases (the bases of the hulls or husks that enclose one or more grains in glume wheat spikelets, which make up the ear) were identified as einkorn or 'new type' (Jones *et al*. 2000), with a few poorly preserved remains most closely resembling emmer. The occurrence of 'new type' glume bases in the assemblage, from at least the Early Dudeşti period (very little chaff was recovered from the Starčevo–Criş pits), adds to growing evidence for this morphological type alongside einkorn and emmer in early farming assemblages in south-east Europe, in continuity with their co-occurrence in earlier Pre-Pottery and Pottery Neolithic assemblages in central and south-east Anatolia (e.g. Jones *et al*. 2000; Bogaard *et al*. 2008).

Pulse seeds are less common and abundant than cereal grain but occur in the majority of pits (Table 2). Lentil is the most ubiquitous type, followed by bitter vetch in six units and pea in two (Fig. 4).

The recurrence of cereals and pulses across many pit fills suggests probable cultivation and use of einkorn, [hulled] barley and lentil in particular. Taking into account the chronological distribution of the pits (Table 4), einkorn and barley are well attested across most periods, with the addition of lentil in at least the Early Dudeşti and Vădastra occupations. Pulses identified to species are infrequent in the Starčevo–Criş pits, lentil and bitter vetch occurring in one pit each, though indeterminate large-seeded legumes (too poorly preserved for more specific identification) occur in three of the four pit fills dating to this earliest phase (Table 2). Taking these indeterminate pulses into account, a combination of cereals and pulses is well attested more or less throughout the site sequence.

The final crop type attested is broomcorn millet (Fig. 5), a small-seeded cereal of particular interest since, unlike the other crops in the assemblage, it does not belong to the south-west Asian suite of 'founder crops' (Zohary and Hopf 2000). The occurrence of only seven seeds across four pits is hardly convincing evidence for cultivation and use, but added to sporadic evidence elsewhere in south-east and central Europe (e.g. Kreuz *et al*. 2005), it suggests that broomcorn millet occurred widely in later sixth-millennium south-east and central Europe, potentially as a weed of other crops. In the Teleor 03 sequence it occurs only in the Early and Late Dudeşti pits.

The remains of collected fruits/nuts are much less frequent than cereals and pulses. Collected fruits included sloe and *Rubus* (blackberry, raspberry or dewberry). A single fragment of tuber, not as yet identified more specifically, was also recovered.

Of the other wild taxa, dwarf elder (*Sambucus ebulus*) is the most common, occurring in 10 pits, followed by black nightshade (*Solanum nigrum*), small-seeded legumes (e.g. clover) and black bindweed (*Bilderdykia convolvulus*). All of these taxa have uses but could also represent arable weeds harvested with crops.

Identification of on-site activities involving plants

Fig. 6 summarises the composition of pit fills based on percentages (Fig. 6a) and counts (Fig. 6b). It is evident that crop remains predominate in all of the pits, a common observation in charred plant assemblages from farming sites attributable to the greater probability that stored staple foods, cooked throughout the year, come into contact with domestic fires in comparison with collected wild plant foods eaten in season (cf. Maier 2001). Rarity of charred wild plant foods implies that these were not stored staples (cf. Dennell 1976), therefore, rather than that they were not widely consumed.

Given that much of the plant material at Teleor 003 derives from cereals and to a lesser extent pulses, crop processing activities are of potential relevance for understanding the formation of the assemblage. The absence of cereal chaff from the majority of pit fills could be explained by charring bias (Boardman and Jones 1990), and hence is not a reliable indicator that the cereal grains found in virtually all pit fills had been cleaned, particularly given the small numbers of grains often involved. Low grain:glume base ratios *and* reasonably high abundance of glume bases indicate the presence of dehusking residues in complex 7 (Early Dudeşti) and complex 9 (Vădastra). Otherwise, the most reliable inference regarding on-site activity appears to be that cereal grains and pulse seeds were charred and discarded on a small scale throughout the site sequence. Accidental charring during food preparation, in proximity to domestic fires, is consistent with the charcoal data (above).

Comparison with other archaeobotanical datasets

Published archaeobotanical data from Starčevo-Criş-Körös sites, in Serbia, southern Romania and southeast Hungary, have tended to be sparse, dominated by impressions in pottery and daub or small hand-collected samples, but include multiple cereals and pulses (Cârciumaru 1996; Borojevič 2006; Gyulai 2001; 2007). Table 5 summarises crops attested at Starčevo-Körös and Criş sites and compares them with the spectrum recovered from Teleor 003. Though only four pits of this period were excavated at Teleor 003, the results suggest that use of multiple cereals and pulses was characteristic of Starčevo-Criş-Körös communities, extending to southern Romania.

A large archaeobotanical dataset is available from broadly contemporary early Neolithic sites (early-mid 6th millennium cal BC, Karanovo I-II) in Bulgaria (Marinova 2006, 2007), and the crop spectrum attested is included in Table 5 for comparison. With the possible exception of the recently defined 'new type' glume wheat (Jones et al. 2000) and doubtful identifications of spelt (which may in fact belong to the 'new type'), all of the crop types attested at Starčevo-Criş-Körös sites, including Teleor 003, are known from early Neolithic Bulgaria (Marinova 2007). While einkorn, emmer, hulled barley, lentil, bitter vetch and pea are all attested as concentrated 'storage finds' in burnt early Neolithic houses in Bulgaria, broomcorn millet is known only as occasional seeds. Additional crops (also attested as 'stores') in the early Bulgarian Neolithic are grass pea, chickpea, naked barley and flax. Crop remains tend to dominate early Neolithic samples and assemblages in Bulgaria, edible nuts/fruits occurring at low levels (Marinova 2006; 2007).

Recent results from intensive sampling and flotation at multiple early Neolithic sites in Bulgaria (Marinova 2006) shed some light on the impact of site type and depth of deposit on archaeobotanical datasets. Flotation at 'flat' Kovačevo yielded lower densities of plant remains per litre of soil than other sites, perhaps due to its shallower occupation deposit (up to 2 m deep). Thicker deposits (up to 4 m) and burnt house assemblages at 'flat' Slatina yielded higher densities comparable to tell sites. That low densities of plant remains on 'flat' sites are a taphonomic artefact, not an indication that cultivation was unimportant, is further suggested by a major increase in available archaeobotanical data, including burnt house assemblages of diverse crop 'stores', across the north Balkans with the formation of 'tells' in the later Neolithic/Chalcolithic (Gyulai 2007).

Table 6 summarises archaeobotanical data pertaining to the second half of the sixth millennium cal BC and provides a comparative context for the Dudeşti-Vădastra assemblage from Teleor 003. The Teleor 003 material broadens the range of crops known from later 6th millennium cal BC Romania to include emmer, lentil, bitter vetch and millet. Bitter vetch is lacking in the *älteste* LBK of Austria and Germany and has only very rarely been attested in the later LBK despite extensive excavation and sampling. A further contrast with central Europe is the common occurrence of barley at Teleor 003: barley occurs only rarely and at low levels in the LBK, probably as a weed (Kreuz *et al.* 2005). The occurrence of bitter vetch and high frequency of barley in the Teleor 003 assemblage demonstrate continuity with the south-east European crop spectrum and contrast with the narrower range of crops typical of the early Neolithic in central Europe. Of the other crops well attested in the Bulgarian Neolithic and absent at Teleor 003—free-threshing wheat, grass pea, chickpea and flax—bread wheat is attested at Vinča and Dudeşti sites elsewhere while the earliest occurrence of flax in Romania dates to the Chalcolithic-Bronze Age; grass pea is known only from much later periods and chickpea is absent from the Romanian record (Cârciumaru 1996). The absence of grass pea and chickpea in southern Romanian Neolithic, if confirmed by further investigations, would signal continuity with central Europe.

Archaeobotanical remains from another 'flat-extended' site of the late sixth millennium cal BC in the SRAP study area, Boian-period Teleor 008, points to continuity in the use of multiple cereals and pulses (Bogaard 2001).

Implications for crop husbandry
An important inference with regard to the nature of occupation at Teleor 003 is the form of farming practised: were fields abandoned after a brief period or cultivation or relatively permanent, and—if permanent—how intensively were they managed? The permanence of cultivation plots can potentially be inferred from basic ecological characteristics of the weed assemblage (Bogaard 2002): the weeds of cultivation areas newly cleared of woodland tend to be perennial and associated with woodland habitats. At Teleor 003, none of the potential weed taxa identified to species is linked with woodland habitats; the single taxon definitely identifiable as perennial, *Sambucus ebulus*, is instead associated with disturbed habitats (Ellenberg *et al*. 1992).

The other two reasonably frequent wild taxa identified to species, black nightshade (*Solanum nigrum*) and black bindweed (*Bilderdykia convolvulus*), are annuals associated with productive and disturbed soil conditions; these and other potential weed taxa co-occur in complex 7 (Early Dudeşti), which contains the highest counts of cereal chaff and one of the highest counts of wild plant seeds in the assemblage; this deposit resembles the chaff- (and weed-) rich by-products of glume wheat dehusking (Table 2).

Conclusions
The Teleor 003 assemblage provides evidence for the use of cereals and pulses through an extended Neolithic sequence in southern Romania. The Early Dudeşti finds of broomcorn millet from the site echo occasional finds from sixth millennium cal BC sites elsewhere in south-east and central Europe. While the low density of remains in the pit fills at Teleor 003 is likely a result of taphonomy, the *recurrence* of cereal and pulse remains provides positive evidence of their use through the major phases of site occupation. Cereals were recovered from all 28 features analysed. Wild plant taxa such as sloe are also attested but were much less frequently charred/discarded. Potential weed evidence is sparse but suggest that cultivation plots were well established and intensively managed. In each of these respects the Teleor 003 assemblage is reminiscent of well documented assemblages from the sixth millennium cal BC in Bulgaria (Marinova 2006; 2007) as well as emerging data from the Hungarian plain (Bogaard et al. 2007).

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Table 1. Summary of pits or 'complexes', by chronological period

Period	*No. pits*
Starčevo–Criş	4
Early Dudeşti	7
Late Dudeşti	6
Vădastra	7
multi-period	4
Total	28

Table 2. Summarised botanical data per 'complex' or pit

complex (pit)				13A	6	1	35	2	30/38	30	37	38	40	7	L1
date				Starčevo–Criş	Starčevo–Criş	Starčevo–Criş	Starčevo–Criş	Early Dudesti	Early Dudesti	Early Dudesti	Early Dudesti	Early Dudesti	Early Dudesti	Early Dudesti	Late Dudesti
soil volume (l)				108	3	27	204	39	40	31	104	350	112	18	31
total botanical items				114	6	4	292	26	46	26	93	191	132	239	29
density/litre				1.06	2.00	0.15	1.43	0.67	1.15	0.84	0.89	0.55	1.18	13.28	0.94
>2 mm wood charcoal (ml)				27.75	0.25		23.75				25	51.7	28	10	
	no. pits	*max/pit*	*total sum*												
<u>Cereal grain</u>															
Einkorn, 1 grained	15	10	42			1	4	1	2		1	6	4	10	2
Einkorn, 1 grained, cf	12	8	27				1		8		2	2	4	3	1
Einkorn, 2 grained, cf	2	1	2											1	
Einkorn indeterminate	3	1	3							1					
Einkorn indeterminate, cf	1	1	1												
Total einkorn grain	19	14	75			1	5	1	10	1	3	8	8	14	3
Einkorn/emmer grain	8	8	21				1		8	1		1	1	5	
Emmer, cf	1	2	2									2			
Hulled barley grain	2	1	2											1	
Hulled barley grain, cf	1	1	1									1			
Hulled barley grain, twisted	1	1	1										1		
Barley indeterminate	16	32	134	32			21			2	4	8	5		
Barley indeterminate, cf.	1	1	1											1	
Total barley grain	17	32	139	32			21			2	4	9	6	2	
Triticum indeterminate	12	14	56	1			14				9	11	3		
Cereal indeterminate	25	91	346	19	1		91	4	4	8	13	32	23	3	2
Total (large-seeded) cereal grain	26	106	425	20	1		106	4	12	9	22	46	27	8	2
Panicum miliaceum	4	4	7									1	4	1	

Table 2, continued

	no. pits	*max/pit*	*total sum*	13A	6	1	35	2	30/38	30	37	38	40	7	L1
<u>Cereal chaff</u>															
Einkorn	5	36	49		2							5	5	36	
Emmer, cf	1	2	2										2		
New type (including 'cf')	5	37	47								3	4		37	
Terminal	1	2	2											2	
Glume wheat indeterminate	7	16	52								1	11	11	11	
Total glume bases	10	86	152		2						4	20	18	86	
Indeterminate rachis	2	1	2				1							1	
<u>Pulses</u>															
Bitter vetch (including 'cf')	6	8	18	1							2	3			
Lentil (including 'cf')	15	13	51				1		1		8	3	3	2	8
Pea (including 'cf')	2	6	7												
Large legume indeterminate	14	21	53	2		1	6			1	2	3		1	
Total pulses	20	43	129	3		1	7		1	1	12	9	3	3	8
<u>Fruit/nut</u>															
Plum/sloe type fruitstone fragments	1	1	1												
Almond/sloe stone/shell fragments	8	23	47					4			2				
Fruistone/nutshell fragments	3	4	6	4							1	1			
cf. Fruit flesh+skin (ml)	1	0.25	0.25												
cf. Fruit skin (ml)	1	0.75	0.75				0.75								
Rubus	1	1	1												
Parenchyma/tuber fragment	1	1	1										1		

Table 2, continued

	no. pits	*max/pit*	*total sum*	13A	6	1	35	2	30/38	30	37	38	40	7	L1
Other wild															
Bilderdykia convolvulus	4	8	12											2	
Bromus	1	1	1										1		
Carex	1	1	1												
Caryophyllaceae/Chenopodiaceae	1	1	1												
Chenopodiaceae	1	3	3												
Chenopodium indeterminate	2	1	2									1		1	
Cruciferae, small	1	2	2											2	
Galium lg indet	1	1	1										1		
Galium indeterminate	2	1	2											1	
Hordeum, weed	2	1	2												
Hordeum, weed, cf	1	1	1					1							
Hordeum/Lolium type	3	1	3												1
Panicoid grass indeterminate	2	1	2										1	1	
Poa non-annua	1	10	10					10							
Polygonum core	2	4	5									1			
Polygonum indeterminate	1	1	1				1								
Polygonaceae	1	1	1												
Reed culm	1	1	1											1	
Sambucus ebulus	9	10	19				10	1				1			1
Scirpus	1	1	1												
Setaria viridis/verticillata	1	1	1												
Small-seeded legume	5	1	5				1					1			
Solanum nigrum	5	8	14											3	1
Teucrium	2	1	2									1			
Vicia/Lathyrus	1	2	2												
indeterminata	1	8	8												

Table 2, continued

complex (pit)	24	26	31 (pot)	31	34	1	17	6	22	27	32	9	18	30	13	35
date	Late Dudesti	Late Dudesti	Late Dudesti	Late Dudesti	Late Dudesti	Vădastra	Vădastra	Vădastra	Vădastra	Vădastra	Vădastra	Vădastra	mixed	mixed	mixed	mixed
soil volume (l)	15	33	20	47	40	27	78	3	226	40	97	190	288	31	169	55
total botanical items	2	4	10	17	12	3	26	16	47	30	60	126	249	8	169	32
density/litre	0.13	0.22	0.50	0.36	0.30	0.11	0.33	5.33	0.21	0.75	0.62	0.66	0.87	0.26	1.00	0.58
>2 mm wood charcoal (ml)			1			2		0.5	6		3	15.5	19		39.5	0.5
<u>Cereal grain</u>																
Einkorn, 1 grained										4	3	1	1	1	1	
Einkorn, 1 grained, cf							1		1			1	2		1	
Einkorn, 2 grained, cf															1	
Einkorn indeterminate										1			1			
Einkorn indeterminate, cf																1
Total einkorn grain							1		1	5	3	2	4	1	3	1
Einkorn/emmer grain													3		1	
Emmer, cf																
Hulled barley grain													1			
Hulled barley grain, cf																
Hulled barley grain, twisted																
Barley indeterminate	1			3	1		1			1	2	3	21		26	3
Barley indeterminate, cf.																
Total barley grain	1			3	1		1			1	2	3	22		26	3
Triticum indeterminate					2				2		3	1	3	3	4	
Cereal indeterminate		2	5	3	3	1	5	2	15	4	5	8	38		46	9
Total (large-seeded) cereal grain		2	5	3	5	1	5	2	17	4	8	9	44	3	51	9
Panicum miliaceum				1												

Table 2, continued

Cereal chaff																
Einkorn											1					
Emmer, cf																
New type (including 'cf')								2				1				
Terminal																
Glume wheat indeterminate												16	1		1	
Total glume bases								2			1	17	1		1	
Indeterminate rachis																
Pulses																
Bitter vetch (including 'cf')							2					2	8			
Lentil (including 'cf')				1			2	1			1	4	13		1	2
Pea (including 'cf')												6	1			
Large legume indeterminate				1			1		1	1	2	10	21			
Total pulses				2			5	1	1	1	3	22	43		1	2
Fruit/nut																
Plum/sloe type fruitstone fragments											1					
Almond/sloe stone/shell fragments									1	3	23	2	8		4	
Fruistone/nutshell fragments																
cf. Fruit flesh+skin (ml)													0.25			
cf. Fruit skin (ml)																
Rubus										1						
Parenchyma/tuber fragment																

Table 2, continued

<u>Other wild</u>																
Bilderdykia convolvulus												8	1		1	
Bromus																
Carex																1
Caryophyllaceae/Chenopodiaceae													1			
Chenopodiaceae								3								
Chenopodium indeterminate																
Cruciferae, small																
Galium lg indet																
Galium indeterminate								1								
Hordeum, weed							1				1					
Hordeum, weed, cf																
Hordeum/Lolium type							1				1					
Panicoid grass indeterminate																
Poa non-annua																
Polygonum core									4							
Polygonum indeterminate																
Polygonaceae													1			
Reed culm																
Sambucus ebulus								1		1		2	1			1
Scirpus										1						
Setaria viridis/verticillata										1						
Small-seeded legume						1		1					1			
Solanum nigrum									1	1		8				
Teucrium									1							
Vicia/Lathyrus									2							
indeterminata													8			

Table 3. Teleor 003 AMS radiocarbon dates from 4 barley grains and 1 wheat grain; calibrated by OxCal 4.1 (Curve IntCal09); 2-sigma ranges shown

SRAP sample code	Lab code	Type	Context	Date cal BC
2003/17	OxA-21405	Barley	Complex 13, context 810	5840 – 5671
2003/18	OxA-21406	Barley	Complex 13, context 853	5783 – 5641
2003/20	OxA-21407	einkorn/emmer	Complex 13: context 803	5724 – 5625
2003/14	OxA-21403	Barley	Complex 13, context 700	5721 – 5625
2003/15	OxA-21404	Barley	Complex 13, context 751	5344 - 5081

Table 4. Summarised botanical data per chronological period

period	Starčevo–Criş	Early Dudeşti	Late Dudeşti	Vădastra	mixed	TOTAL
soil volume (litres)	342	694	186	661	543	2426
total number of pits	4	7	6	7	4	28
Cereal grain						
Einkorn wheat	2	7	1	5	4	19
Barley	2	5	3	4	3	17
Other (large-seeded) cereal	3	7	5	7	4	26
Broomcorn millet		3	1			4
Cereal chaff						
Einkorn	1	3		1		5
Emmer		1				1
New type glume		3		2		5
Glume wheat indeterminate		4		1	2	7
Pulses						
Bitter vetch	1	2		2	1	6
Lentil	1	5	2	4	3	15
Pisum				1	1	2
Large legume indeterminate	3	4	1	5	1	14
Fruit/nut						
Plum/sloe type fruitstone fragments				1		1
Almond/sloe stone/shell fragments		2		4	2	8
Fruistone/nutshell fragments	1	2				3
cf. Fruit flesh+skin (ml)					1	1
cf. Fruit skin (ml)	1					1
Rubus				1		1
Parenchyma/tuber fragment		1				1
Other wild						
Bilderdykia convolvulus		1		1	2	4
Bromus		1				1
Carex					1	1
Caryophyllaceae/Chenopodiaceae					1	1
Chenopodiaceae				1		1
Chenopodium indeterminate		1				1
Chenopodium core		1				1
Cruciferae, small		1				1
Galium lg indeterminate		1				1
Galium indeterminate		1		1		2
Hordeum, weed				2		2
Hordeum, weed, cf		1				1
Hordeum/Lolium type			1	2		3
Panicoid grass indeterminate		2				2
Poa non-annua		1				1
Polygonum core		1		1		2
Polygonum indeterminate	1					1

Table 4, continued

	Starčevo–Criş	Early Dudeşti	Late Dudeşti	Vădastra	mixed	TOTAL
Polygonaceae					1	1
Reed culm		1				1
Sambucus ebulus	1	2	1	3	2	9
Scirpus				1		1
Setaria viridis/verticillata				1		1
Small-seeded legume	1	1		2	1	5
Solanum nigrum		1	1	3		5
Teucrium		1		1		2
Vicia/Lathyrus				1		1
indeterminata					1	1

Table 5. The occurrence of crops at Teleor 003 and other sites of the early 6th millennium cal BC Starčevo-Criş-Körös complex (based on data summarised in Cârciumaru 1996; Borojevič 2006, Gyulai 2001, 2007; G. Jones *et al*. 2000; Kreuz *et al*. 2005; Marinova 2006, 2007; Bogaard et al. 2007); X = charred macroremains, X* = 'storage' deposit, I = impressions in ceramics/daub, [X] = identification uncertain ('cf.').

	EN Bulgaria (Karanovo I-II)	*Starčevo-Körös (Serbia, Hungary)*	*Criş (Romania)*	Teleor 003 *[4 pits]*
Einkorn	X*	X	I	X
Emmer	X*	X	I	
'New type'		X		
Barley	X*	X		X
Free-threshing wheat	X*	X		
Spelt		X?	I	
Common millet	X	X		
Lentil	X*	X		X
Common pea	X*	X		X
Bitter vetch	X*			X
Grass pea	X*			
Chick pea	X*			
Flax	X*			

Table 6. The occurrence of crops at Teleor 003 and other sites/regions of the later 6th millennium cal BC (based on data summarised in Cârciumaru 1996; Kreuz et al. 2005; Marinova 2006); X = charred macroremains, X* = 'storage' deposit, [X] = identification uncertain ('cf.').

	MN-LN Bulgaria (Karanovo III-IV)	*Vinča (Romania)*	*Dudeşti (Romania)*	Teleor 003 Dudeşti-Vădastra *[20 pits]*	*Teleor 008 Boian*	*älteste LBK*
Einkorn	X*	X	X	X	X	X
Emmer	X*	X		[X]	X	X
'New type'				X		X
Barley	X*	X	X	X	X	X
Free-threshing wheat	X	X	X			
Spelt			X			
Common millet	X			X		X
Lentil	X*	X		X	X	X
Common pea	X*		X	X	X	X
Bitter vetch	X*			X		
Grass pea	X*					
Chick pea						
Flax	X					

Fig. 1. Summary of the density of items per litre soil in pits/complexes

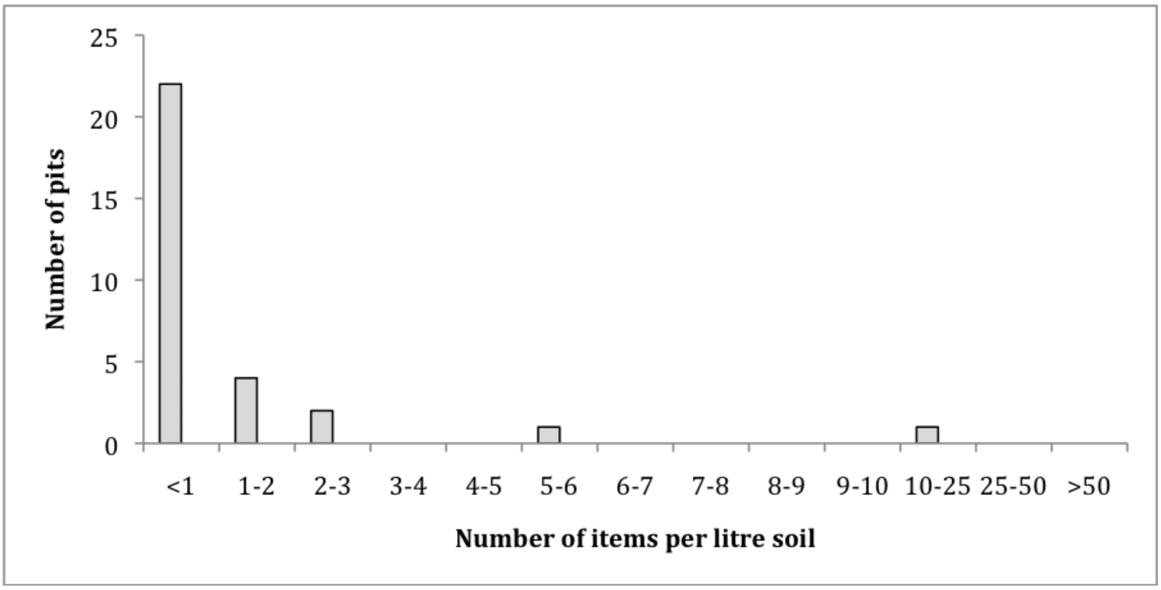


Fig. 2. The relationship between numbers of seed/chaff items and wood volume (ml) per pit/complex

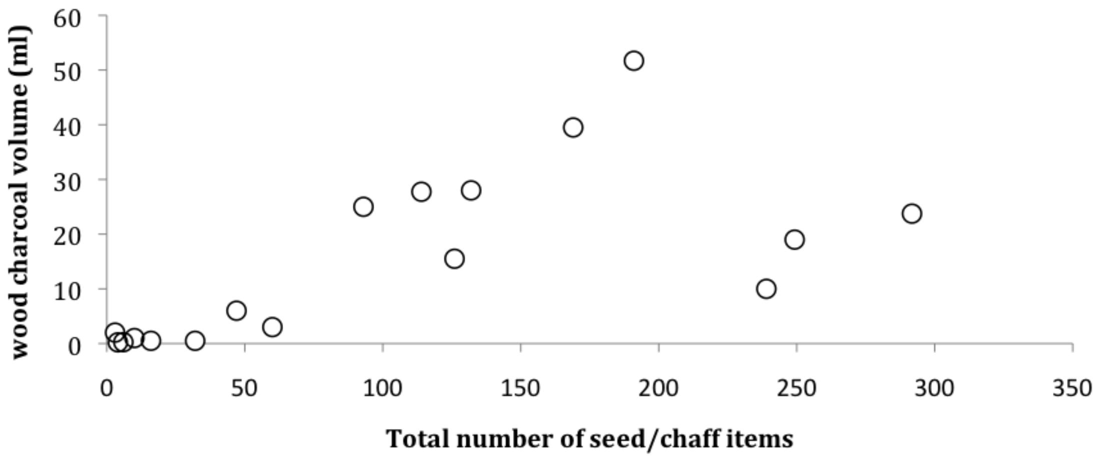


Fig. 3. Drawing of einkorn (*Triticum monococcum*) grain from one-seeded spikelet, Măgura-Buduiasca

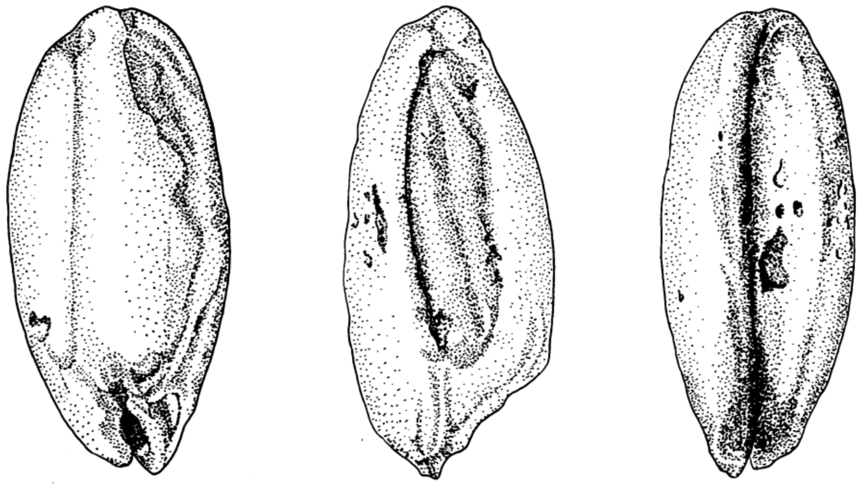


Fig. 4. Drawing of pea (*Pisum sativum*) from Măgura-Buduiasca

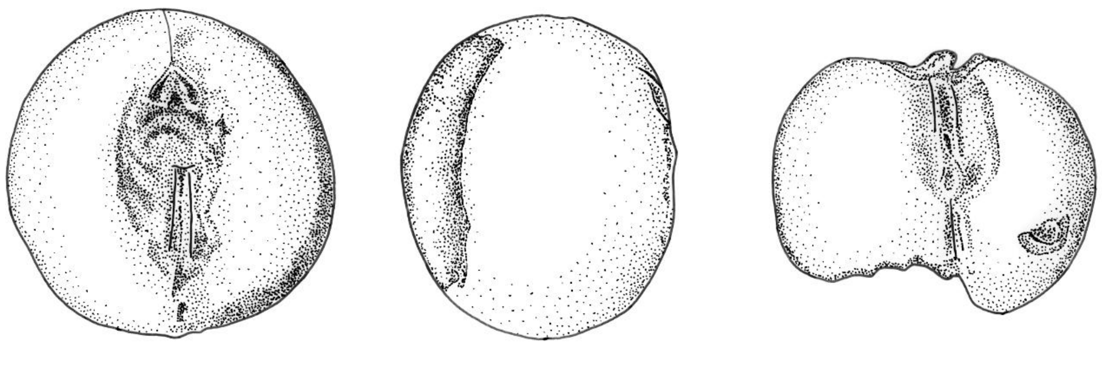


Fig. 5. Drawing of millet seed (*Panicum miliaceum*) from Măgura-Buduiasca

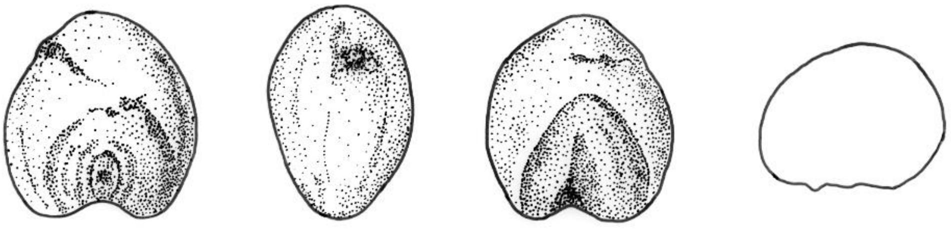
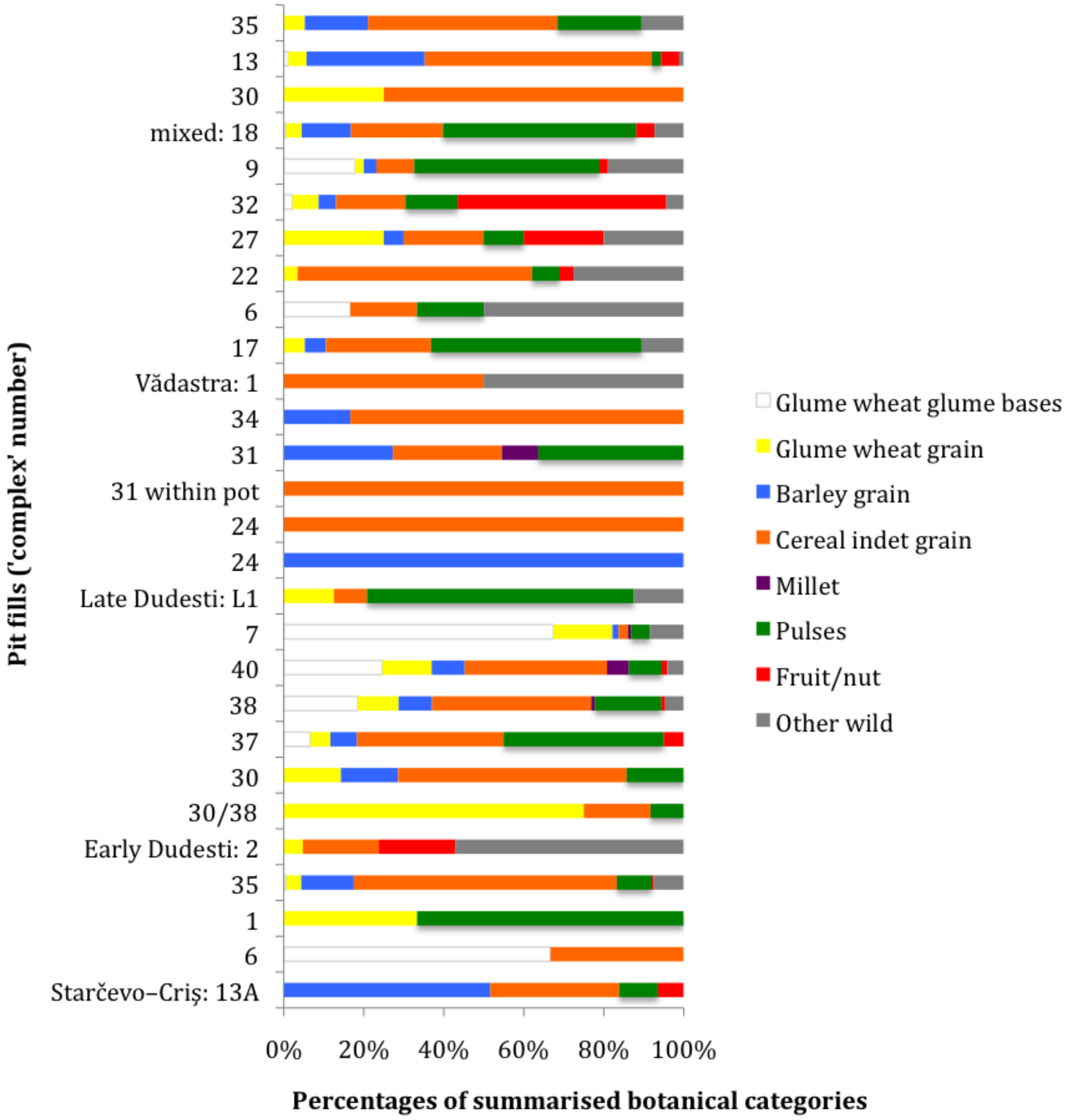
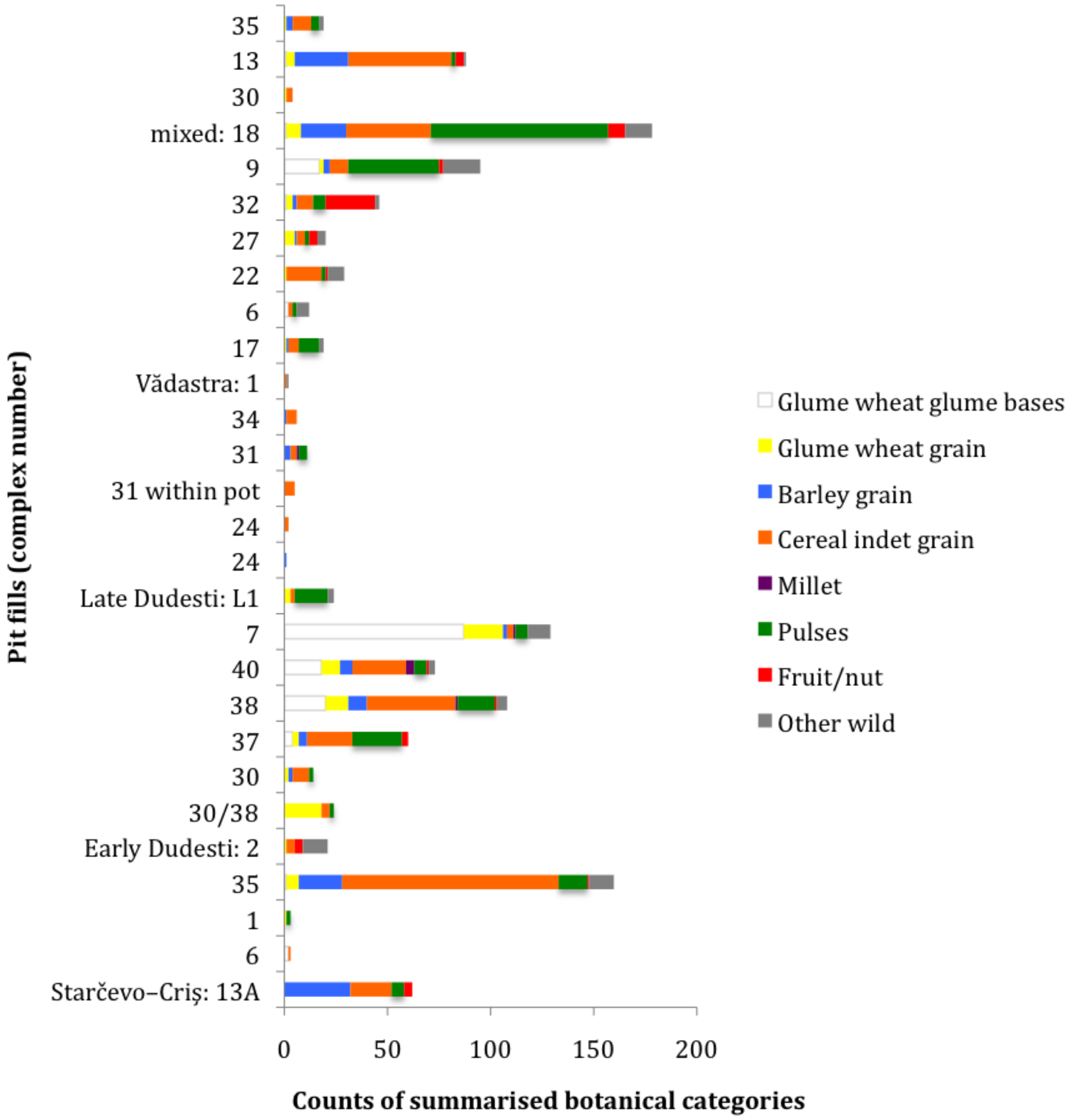


Fig. 6. Summary of botanical composition of pit/complex fills, a. based on percentages; b. based on counts

a.



b.


Pit fills (complex number)
35
13
30
mixed: 18
9
32
27
22
6
17
Vădastra: 1
34
31
31 within pot
24
24
Late Dudesti: L1
7
40
38
37
30
30/38
Early Dudesti: 2
35
1
6
Starčevo–Criş: 13A
0
50
100
150
200
Counts of summarised botanical categories
Glume wheat glume bases
Glume wheat grain
Barley grain
Cereal indet grain
Millet
Pulses
Fruit/nut
Other wild