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Appendix 1, Archaeobotanical sample processing

A I . I M E T H O D O L O G Y : G E N E R A L I N T R O D U C T I O N

Archaeobotanical remains are best preserved in an oxygen-poor or very dry environment, in which the activities of decomposition bacteria are slowed down or stopped altogether. Examples of such environments are bogs, pits, wells, lakes, cesspits, deserts, and sometimes tombs, especially when they are sealed off from the outside air and contain a very dry or wet environment. Archaeobotanical remains also thrive in nutrient-poor and acid soils (but not too acid), in the presence of manganese and the absence of calcium.¹ Sandy soils are usually less suitable. Then again, archaeobotanical material is often saved from degradation because it was carbonized before deposition. In most cases, carbonized plant remains are almost indestructible, at least from a chemical point of view (they can easily be pulverized by mechanical pressure). Therefore, hearths and ovens are particularly suitable contexts to collect archaeobotanical remains. For the same reason, sites that were destroyed by fire or other sources of heat, such as the Vesuvian sites and Akrotiri in Greece, are usually relatively rich in plant remains.

The nature of archaeobotanical remains in an archaeological context can vary between microscopic plant parts, such as pollen, and entire (carbonized) trees. The first category is referred to as microremains, i.e. plant remains that are not visible to the naked eye and have to be magnified at least a 100 times under a microscope to become visible.² The latter category is called that of macroremains, including all plant remains that are visible to the naked eye or under a microscope with a magnification of less than 100 times. Both categories require their own methods of sampling and identification.

Archaeobotanical macroremains and charcoal can be collected by conducting systematic soil sampling. The size of these samples depends entirely on the archaeological context, but there are some general rules that should always be followed. Most importantly, it is recommendable to take soil samples from different types of structures throughout the excavated area, as agricultural activities and food preparation might have taken place on different locations in and around the settlement. For the same reason, it is usually advised to take soil samples from as many excavated structures as possible, and select the most significant ones for analysis later.³ A standard sample contains 10 liters of soil, but it can be decided to take a larger sample from material-rich archaeological features, or a smaller sample when it is not possible to collect enough soil, for instance when the contents of a pottery container are sampled.

A frequently used method to recover ancient plant remains from the soil is wet sieving by means of a flotation machine. This laboratory technique for segregating plant remains from mineral samples by means of buoyancy was first used by Hans Helbaek in 1961 at the excavation of Tepe Ali Kosh in Iran.⁴ The system consists of a water tank, a source of running tap water and two sieves, one inside and one outside the tank. The soil sample is added to the flotation machine in the sieve inside the tank, after which it is filled with water. When the tank is full, the overflowing water pours through the

¹ Kars and Smit 2003, 45, Moore and Webb 1978, 8-15

² Kooistra 2002.

³ Kooistra 2002, 15.

⁴ Helbaek 1969, 385: the floating technique employed in the field was initially just a makeshift arrangement. The

principle of segregation is to exploit the difference in specific weight between the plant matter and the fluid. This difference is not very great when water is used. Carbon tetrachloride is 1.8 times heavier than water and is therefore the agent used in the laboratory.

second sieve. When this happens, the floating charred archaeobotanical remains are caught. Although the success of this method depends entirely on the soil type (heavy clays and moist soils tend to clot together and stop the carbonized plant parts from floating), it has proved to be quite effective in dry sandy environments, and also on the calcareous soils of southern Italy. Among the macroremains that can be collected in this way are charcoal fragments (carbonized wood) and carbonized fruits and seeds. Strictly speaking, plant stems, fibres, leaves and roots also fall into the category of archaeobotanical macroremains, but until now these have not been found at Muro Tenente, l'Amastuola and Li Castelli.

A I . 2 A R C H A E O B O T A N I C A L S A M P L I N G A T L ' A M A S T U O L A , M U R O T E N E N T E A N D L I C A S T E L L I

At these excavations of l'Amastuola, Muro Tenente and Li Castelli, the location of archaeobotanical samples was chosen at random; no grid sample system was used. The volume differed between ca. 10 and 40 liters of soil. Larger units, or the ones that seemed more interesting, were often sampled more thoroughly, whereas units that appeared disturbed were almost never sampled. All samples were floated by means of a flotation machine, of which a series of four was built specifically for use at these sites by the Laboratorio di Archeobotanica e Paleoecologia (LAP) of the Università del Salento in Lecce. These machines contained two sieves with meshes of 2.5 and 1 mm. After flotation, the remaining residue in the large sieve was checked for further carbonized remains that for some reason had not come to the surface. Subsequently, the two fractions (from the 1 mm sieve and remaining carbonized remains from the 2.5 mm sieve) were united and left to dry. The analysis was carried out at the palaeobotanical laboratories of the Università del Salento, Lecce, and of Biax *Consult*, Zaandam. For the analysis of the charcoal fragments, a reflective light microscope with a magnification range between 100 and 400 times was used and for the carbonized fruits and seeds a basic binocular microscope with 4 to 40 times magnification. The seeds and charcoal collection at the Lecce Laboratory and Biax *Consult* were used as reference material, as well as the standard literature for the analysis of archaeobotanical macroremains (including charcoal).⁵

⁵ Berggren 1969; 1981, Anderberg 1994, Cappers *et al.* 2006, Körber-Grohne 1964, 1991, Jacomet 2006, Schweingruber 1982, 1990.

Appendix 2, Archaeobotanical analyses from l'Amastuola, complete results

A 2.1 RESULTS: SEEDS AND FRUITS

period	unknown																						
unit	3	8	15	16	20	43	67	74	78	111	151	157	158	217	218	219	302	320	529	535			
trench	1	1	7	7	5	5	5	5	5	3	4	4	4	2	2	2	6	6	6	6			
context	colluvium/ fill/ disturbed layers																						
taxa																						common name	
cereals																							
Hordeum vulgare	9		4	8	3	13	559	1176			26	6	12		6	3		10		6		hulled barley	
Triticum dicocum	1	1	1	1					1	2			1	1	1					153		4	emmer wheat
Triticum dicocum <i>spikelet fork</i>																	1					emmer wheat	
Triticum sp.	1	1	1													1						wheat	
Cerealia	6					3	26	297			3	4	2							1		cereals	
pulses																							
Lens culinaris																						3	lentil
Vicia faba var. minor					4		16	3	5		6												broad bean
Vicia ervilia					9	1	17			3			2		1	1						12	bitter vetch
Vicia sp.												1											vetch
Fabaceae							14															3	legumes
forage crops																							
Avena sp.										2					1								oat
wild plants																							
Adonis cf. annua							1																(autumn) adonis
subrecent contaminations	*	*			*					*			*	*			*						

period	Early Iron Age										
units	80	85	107	122	220	229	513	620	624	626	
trench	5	5	3	4	2	2	6	6	6	6	
context	floor matrix	floor matrix (?)	? burned outdoors area	leveling material for building ♂	man-made beaten earth surface	ritual deposition?	ritual deposition	floor	hut	rumble on top of hut	hut
taxa											common name
cereals											
Hordeum vulgare	48	127		8	6			3	64	380	hulled barley
Triticum aestivum/compactum						2				2	free-threshing wheat
Triticum dicoccum				8	2	1			32	331	emmer wheat
Triticum dicoccum <i>spikelet fork</i>										2	emmer wheat
Triticum sp.				11					7	10	wheat
Cerealia	20	54		7				4	120	752	cereals
pulses											
Vicia faba var. minor	6	1						13	11	1	broad bean
Vicia ervilia	3		685		8	3		4	49	130	bitter vetch
Fabaceae								5	22	37	legumes
fruits											
Vitis vinifera										1	grape
condiments											
Allium sativum							27				garlic
forage crops											
Secale cereale										1	rye
wild plants											
Adonis cf. annua										2	(autumn) adonis
Lolium cf. perenne/rigidum										6	ryegrass
Malva sp.										1	mallow
Phalaris sp.									1		canarygrass
Poaceae									1		grass family

period	Archaic																										
units	26	33	61	63	72	81	105	109	144	148	152	159	164	166	170	265	274	319	336	346	373	533	534	537	627		
trench	5	5	5	5	5	5	3	3	4	4	4	4	4	4	4	2	2	6	6	6	6	6	6	6	6	6	
context	outdoor area building ζ	fireplace building ζ	part of building θ	floor building θ	floor building θ	floor building ζ	outdoor surface	floor matrix	refuse dump	oven outside building δ	refuse dump	floor oikos ε	work bench (?) oikos ε	burned soil related to /170A	metal oven oikos ε	burnt/dried clay: hearth? Storage pit?	fill of /265A	courtyard potter's workshop	potter's wheel (?)	ash deposit from kiln D	ash deposit from kiln E	surface in structure NE of potter's workshop	charcoal spot	kiln (?)	burned layer		
taxa																										common name	
cereals																											
Hordeum vulgare			2	1	133	332	1		112				2	1	2	4						34	926	3	15		hulled barley
Triticum aestivum/compactum									1												8	1			6		free-threshing wheat
Triticum dicoccum					1				24	1	3	11				1	1		2		5	*					emmer wheat
Triticum dicoccum spikelet fork																											emmer wheat
Triticum sp.							1	1													14						wheat
Cerealia					7	139			39		14					3	2			1	35	49	1	42			cereals
pulses																											
Lens culinaris									1													10	16	5			lentil
Vicia faba var. minor						3						12						1			2	25	1				broad bean
Vicia ervilia	3	186			14	44	71	8		2	3	1					4				3	6	98	4			bitter vetch
Vicia sp.								5		3	23					1											vetch
Fabaceae		42			2	7																19	30	5			legumes
fruits																											
Olea europaea																											olive
Pistacia lentiscus																	1										mastic
Vitis vinifera												2													1		grape
Rosaceae																											Rosaceae
forage crops																											
Avena sp.								1	13		1		1	5													oat
Secale cereale																											rye
wild plants																											
Adonis cf. annua					1																		15				(autumn) adonis
Medicago hispida									1																		bur medick
Rumex sp.													1														sorrel
subrecent contaminations																											
								*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	

period	Classical	
units	313	
trench	6	
context	floor potter's workshop	
taxa		common name
cereals		
Hordeum vulgare	170	hulled barley
Triticum aestivum/compactum	1	free-threshing wheat
Triticum dicoccum	20	emmer wheat
Triticum sp.	2	wheat
pulses		
Vicia faba var. minor	1	broad bean
Vicia ervilia	1	bitter vetch
Fabaceae	4	legumes
fruits		
Olea europaea	10	olive
wild plants		
Bromus sp.	3	brome
subrecent contaminations	*	

A 2.2 RESULTS: CHARCOAL

period	unknown (part 1)																				
unit	3	4	5	8	15	16	18	20	34	38	67	74	77	78	111	116	120	151	157	158	
trench	1	1	1	1	7	7	5	5	5	5	5	5	5	5	3	4	4	4	4	4	
context	colluvium/ fill/ disturbed layers																				
taxa																					common name
Arbutus unedo																			2		strawberry tree
Erica sp.																				1	heath
Juniperus sp.					1						1										juniper
Olea europaea	1			2	2	1	2	6	2	1	20	6	6	10	6			3	7	3	olive
Pistacia sp. (cf. lentiscus)			1	1																	mastic
Quercus sp. (deciduous type)					1	1		2				258		1							oak
Quercus sp. (evergreen type)							1													1	oak
Quercus sp.	4										7				4						oak
Rhamnus/Phillyrea											15			12							Rhamnus/ Phillyrea
unidentifiable hardwood	1	3		2								27			3	4	1	4		1	unidentifiable hardwood

period	unknown (part 2)																								
unit	210	212	215	217	218	219	231	232	234	235	236	238	240	251	259	302	305	320	341	529	534	535	545		
trench	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	6	6	6	6	6	6	6	6		
context	colluvium/ fill/ disturbed layers																								
taxa																									common name
Erica sp.																	2								heath
Juniperus sp.				1	1						5						1			1	1				juniper
Maloideae (incl. cf. Sorbus sp.)																	1	1							Maloideae
Myrtus communis																						13			myrtle
Olea europaea			1	4	19	6		1			17			2	10	5	19	201			22	3	2		olive
Pistacia sp. (cf. lentiscus)											9		4				2								mastic
Prunus sp.																			10						prune
Quercus sp. (deciduous type)				1		2		1		1		1								3		2	11		oak
Quercus sp. (evergreen type)																					1			13	oak
Quercus sp.	1					4											3	4		1		1			oak
Rhamnus/Phillyrea																		2			3	2	5		Rhamnus/Phillyrea
Rosmarinus officinalis																									rosemary
unidentifiable hardwood	2	4		5	1	3	12		2	1							1	7		2		5		unidentifiable hardwood	

period	Early Iron Age																					
unit	31	80	83	84	85	107	122	125	127	163	167	229	233	270	509	513	519	620	624	626		
trench	5	5	5	5	5	3	4	4	4	4	4	2	2	2	6	6	6	6	6	6		
context	wall foundation	floor matrix	floor matrix (?)	floor matrix	floor matrix	? burned outdoors area	leveling material for building 5	eroded soil under floor matrix	dump/fill connected to /122A	outdoor surface	outdoor surface	ritual deposition?	= /229A	floor matrix	circular feature on top of /513A	ritual deposition	burned layer	floor	rubble on top of hut	hut		
taxa																					common name	
Arbutus unedo																						strawberry tree
Erica sp.							1															heath
Juniperus sp.					1		1			1											3	juniper
Maloideae (incl. cf. Sorbus sp.)							1															Maloideae
Myrtus communis																						myrtle
Olea europaea		1	5		7	7	33			26	1	13		1	2			1	4	5	67	olive
Pistacia sp. (cf. lentiscus)							1	1												1	2	mastic
Quercus sp. (deciduous type)							30		1	4		5						2	71			oak
Quercus sp. (evergreen type)		8					4	4	8				1			158					5	oak
Quercus sp.			2		1		3					4				1					49	oak
Rhamnus/Phillyrea	1				1		3			1							5		3	32	32	Rhamnus/Phillyrea
unidentifiable hardwood			3	1	4	5	5			1	1							3	15	143	143	unidentifiable hardwood

period	Archaic (1)																									
unit	26	27	32	33	36	46	61	63	72	75	81	82	105	108	109	112	122	125	144	148	152	159	164	166		
trench	5	5	5	5	5	5	5	5	5	5	5	5	3	3	3	3	4	4	4	4	4	4	4	4		
context	outdoor area building ζ	floor matrix	hearth?	fireplace oikos ζ	floor matrix	unknown	part of building θ	floor building θ	floor building θ	floor building θ	floor building ζ	floor building ζ	floor matrix building θ	outdoor surface	refuse dump?	floor matrix	furnace	leveling material	eroded soil under floor matrix building δ	refuse dump	oven outside building δ	refuse dump	floor oikos ε	work bench (?) oikos ε	burned soil related to /170\	
taxa																										common name
Arbutus unedo																						118	2		strawberry tree	
Erica sp.													2				1									heath
Juniperus sp.		1															1		13			8		4	juniper	
Maloideae (incl. cf. Sorbus sp.)													3				1									Maloideae
Myrtus communis						1					5															myrtle
Olea europaea	3	10	11	13		3	2	4	8		6		36	17	3	6	33		45	12	8	77	4	3	olive	
Pistacia sp. (cf. lentiscus)																	1	1								mastic
Quercus sp. (deciduous type)				3		1		1	166								30		1		1	5	5		oak	
Quercus sp. (evergreen type)			3			1						7					4	4							oak	
Quercus sp.				4	13					2	5	1					3		10			6		3	oak	
Rhamnus/Phillyrea								12			1	1					3					2			Rhamnus/Phillyrea	
unidentifiable hardwood				9		2			2	1	26	5					5		6		2	15			unidentifiable hardwood	

unit	170	220	265	274	328	329	332	335	336	346	348	373	522	533	537	542	625	627	
trench	4	2	2	2	6	6	6	6	6	6	6	6	6	6	6	6	6	6	
context	metal oven oikos ε	beaten earth surface	burnt/dried clay: hearth? Storage pit?	fill of /265\	clay deposit	part of kiln?	part of kiln E?	kiln E	potter's wheel (?)	ash deposit from kiln D	floor/cooking stones	ash deposit from kiln E	part of potter's workshop	surface in structure NE of potter's workshop	kiln (?)	ash refuse from kiln /537\?	unkown	burnt layer	
taxa			1																common name
<i>Arbutus unedo</i>								1											strawberry tree
<i>Erica</i> sp.				25		3			1		9								heath
<i>Juniperus</i> sp.		7					3		2					4					juniper
<i>Myrtus communis</i>																			myrtle
<i>Olea europaea</i>	6	12	18	6	6	1	17		1	1				6	19	15	9	1	olive
<i>Pistacia</i> sp. (cf. <i>lentiscus</i>)		1					3										1		mastic
<i>Quercus</i> sp. (deciduous type)							2							1		118	10	19	oak
<i>Quercus</i> sp. (evergreen type)				1									6						oak
<i>Quercus</i> sp.		7	2												28				oak
<i>Rhamnus/Phillyrea</i>				1			3	4	9	3				6	1	2		1	Rhamnus/ Phillyrea
unidentifiable hardwood		1	5	36	1	5		2				10			11	1	24	10	unidentifiable hardwood

period	Classical	Classical	Early Hellenistic	
unit	374	313	607	
trench	6	6	6	
context	preparation level for /313	floor potter's workshop	fill of dump pit cultic structure blocks	
taxa				common name
Arbutus unedo				strawberry tree
Erica sp.		1		heath
Juniperus sp.	1			juniper
Maloideae (incl. cf. Sorbus sp.)		2		Maloideae
Myrtus communis	3			myrtle
Olea europaea	19	22		olive
Pinus sp.		2		pine
Pistacia sp. (cf. lentiscus)		11		mastic
Prunus sp.				prune
Quercus sp. (deciduous type)		5		oak
Quercus sp. (evergreen type)	3	17	13	oak
Quercus sp.		9		oak
Rhamnus/Phillyrea	1	6	4	Rhamnus/Phillyrea
Rosmarinus officinalis		2		rosemary
unidentifiable hardwood	3	11	1	unidentifiable hardwood

Appendix 3, Archaeobotanical analyses from Muro Tenente, complete results

A 3.1 RESULTS: SEEDS AND FRUITS

period	unknown									
	0	364	365	370	1621	1734	1784	1792	20030	
trench	-	C	C	C	C	C	C	C	E	
disturbed layers/layers of unclear origin										
taxa										common name
cereals										
Hordeum vulgare		2				1				hulled barley
Hordeum vulgare var. nudum	2		2	16		1				naked barley
Triticum aestivum/compactum		20		2				8		free-threshing wheat
Triticum dicoccum				1						emmer wheat
Triticum dicoccum <i>spikelet fork</i>		2								emmer wheat
Triticum sp.				1						wheat
Cerealia		80				3				cereals
pulses										
Vicia ervilia						1				bitter vetch
fruits										
Pistacia lentiscus									1	mastic
Vitis vinifera					6		3			grape

period	Early Hellenistic												
unit	12	89	253	313	363	391	503	1702	2260	2268	1689	2551	
trench	A	C	C	C	C	C	C	C	C	C	C	C	
context	domestic										ritual?		
	floor	fireplace	ash deposit	part of courtyard	burned layer	iron furnace?	ash deposit	charcoal deposit (from kiln /841\ and /598?)	floor matrix room 3	floor matrix room 2	contents buried drinking cup	contents buried plainware pot	
taxa													common name
cereals													
Hordeum vulgare							6			1			hulled barley
Hordeum vulgare var. nudum				1			3			5			naked barley
Hordeum			1										barley
Triticum aestivum/compactum			4				8	2		15			free-threshing wheat
Triticum dicoccum				1	1	3			1				emmer wheat
Triticum dicoccum <i>spikelet fork</i>			1			3				1			emmer wheat
Triticum						10	3				1		wheat
Cerealia			31			2	10	1					cereals
pulses													
Vicia faba var. minor				1									broad bean
fruits													
Olea europaea		9	2									1	olive
Vitis vinifera	1	5175											grape
forage crops													
Secale cereale			5				1						rye

period	Late Hellenistic		
unit	20011	20067	
trench	E	E	
context	domestic		
	burned structure?	floor matrix ambiente 2	
taxa			common name
cereals			
Hordeum vulgare	6		hulled barley
Triticum dicoccum	12		emmer wheat
Cerealia	5		cereals
pulses			
Vicia ervilia	1		bitter vetch
Vicia	4		vetch
fruits			
Olea europaea	13	1	olive
Pistacia lentiscus	1		mastic
Vitis vinifera	2		grape
Rosaceae	2		Rosaceae
forage crops			
Avena	6		oat

period	Early Hellenistic					
unit	447	805	1624	1636	1638	
trench	C	C	C	C	C	
context	grave					
	around grave 22	fill + grave gifts grave 27	grave 30	upper layer grave 30	lower layer grave 30	
taxa						common name
cereals						
Hordeum vulgare						hulled barley
Hordeum vulgare var. nudum			1			naked barley
Hordeum						barley
Triticum aestivum/compactum	2		1			free-threshing wheat
Triticum dicoccum			1		1	emmer wheat
Triticum dicoccum <i>spikelet fork</i>				2	1	emmer wheat
Triticum	1					wheat
Cerealia	7		2	4		cereals
pulses						
Vicia faba var. minor			2	1		broad bean
Vicia ervilia				11		bitter vetch
Vicia sp.	1					vetch
fruits						
Olea europaea		2	8	1	1	olive
Vitis vinifera			30	36	2	grape

A 3.2 RESULTS: CHARCOAL

period	unknown				
unit	370	1689	20015	20030	
trench	C	C	E	E	
context	disturbed layers/layers of unclear origin				
taxa					common name
Erica sp.	1				heath
Olea europaea			19	1	olive
Quercus sp. (deciduous type)			5	12	oak
unidentifiable hardwood		8	3		unidentifiable hardwood

period	Early Hellenistic																
unit	5	15	54	253	314	455	458	459	503	593	1603	1656	1702	2255	2258	2263	
trench	A	A	A	C	C	C	C	C	C	C	C	C	C	C	C	C	
context	domestic																
taxa																	common name
Ephedra sp.	13																ephedra
Erica sp.		17		23		65	45	10	10	6			102		10		heath
Erica arborea							55										tree heath
Erica multiflora													100				Mediterranean heath
Myrtus communis											6			27			myrtle
Olea europaea	3			49	11					7	14				4		olive
Pistacia sp. (cf. lentiscus)				19													mastic
Pyrus/Malus													7				pear/ apple
Quercus sp. (ever-green type)																10	oak
Quercus sp.							201										oak
Rhamnus/Phillyrea												18					Rhamnus/ Phillyrea
Salvia sp.			10														sage
unidentifiable hardwood	40	15		136		86	364		28	62	14	2	1650		18	10	unidentifiable hardwood

period	Late Hellenistic										
unit	20011	20022	20023	20028	20039	20054	20056	20063	20067		
trench	E	E	E	E	E	E	E	E	E		
context	domestic										
	burned structure?	contents of pithos	wall	floor matrix ambiente 2	contents of pithos	outside surface area	posthole	floor matrix ambiente 1	floor matrix ambiente 2		
taxa											common name
Erica sp.	5							1			heath
Juniperus sp.							373				juniper
Myrtus communis											myrtle
Olea europaea	55	2	7	2		1	10	5	16		olive
Pinus sp.							10				pine
Pistacia sp. (cf. lentiscus)	4	2			3						mastic
Quercus sp. (evergreen type)	62										oak
Quercus sp.	91	4				2		2	1		oak
Rhamnus/Phillyrea					1						Rhamnus/Phillyrea
unidentifiable hardwood	53	4			2	1					unidentifiable hardwood

period	Early Hellenistic						
unit	34	441	447	805	1638		
trench	A	C	C	C	C		
context	grave						
	grave 45	grave 25	around grave 22	fill + grave gifts grave 27	lower layer grave 30		
taxa							common name
Erica sp.		8		11			heath
Olea europaea			7	2	1		olive
Pinus pinea/halepensis				29			umbrella/ Aleppo pine
Punica granatum	14						pomegranate
unidentifiable hardwood	12	21	16	23	29		unidentifiable hardwood
unidentifiable softwood				107			unidentifiable softwood

Appendix 4, Archaeobotanical analyses from Li Castelli di San Pancrazio Salentino, complete results

A 4.1 INTRODUCTION TO THE SITE¹

The site known as Li Castelli, or I Castiedd', is located at a distance of about one kilometer east of the modern village San Pancrazio Salentino. Its position on a natural platform, that reaches a height of 60 meters above sea level, gives it a somewhat elevated position overlooking the surrounding countryside. This landscape is mostly covered with vineyards, interrupted only occasionally by small olive groves and fields with cereals, tomatoes and artichokes. Large-scale archaeological research at Li Castelli started in 1991, when the VU University Amsterdam carried out a systematical field survey in the area.² The surveys revealed a settlement that was occupied from the 8th century BC until the late 1st century AD. It was estimated that the whole habitation area extended over ca. 50 hectares, but the absence of a standing fortification wall complicated the delineation of the site's contours.³ It appears that the site reached its maximum expansion in the Early Hellenistic Period, when the settlement was probably composed of a series of separate habitation clusters.⁴ These clusters all seem to circle around one hypothetical core, a land ridge of some 14 hectares. The excavations by the VU University Amsterdam concentrated on this ridge, which was thought to constitute the centre of the site. Two excavation campaigns were carried out in 1999 and 2001, in collaboration with the Soprintendenza per i Beni Archeologici della Puglia.

Among the structures brought to light was a road of hard-pressed calcareous grit from the Early Hellenistic period. In addition, several wall foundations were found that consisted of large limestone blocks. The walls formed a series of 'rooms', six of which were (partially) excavated in 2007. A second excavation campaign was started at Li Castelli in 2009, involving the extension of the 2007 excavation trench (1), and the opening of a second trench northeast of the previous excavations (2). The rooms, named A, B, C, D, E and F, were all rectangularly shaped and made up of large, neatly cut limestone blocks. The construction of room A, B and C showed evidence for at least three building phases, with the pottery indicating a domestic function at least in the Hellenistic phase. Room E was added to room C in the latest phase, creating an L-shaped building. Rooms D and F are located in the southeastern area of the trench, parallel to the northeastern limit of the road. The upper part of the layers investigated in room D contained the remains of collapsed walls and a roof. In the middle of the room,

¹ This introduction is based on the preliminary excavation reports of A. Fontana, G. Carluccio and J. Waagen, personal communications from A. Fontana, and Burgers and Waagen 2010.

² Burgers 1998, 129-159. These surveys followed several reports of archeological finds at Lo Castelli, for instance in the 1960s by Cosimo Pagliara, who collected a diverse collection of Iron Age pottery from the surface.

³ Only faint traces of fortification walls were identified at Li Castelli. If the settlement did have a defensive system, it is likely to have been obliterated by modern agricultural practices and in particular the arrangement of the vineyards that dominate the present-day landscape. Burgers and Waagen 2010, 60.

⁴ Burgers and Waagen 2010, 62.

a medium-sized pithos was found that was filled with pottery datable to the 4th-3rd centuries BC. Underneath the room, traces of an earlier phase of habitation came to light in the form of a curvilinear hut that was probably in use in the 7th/6th centuries BC.

All in all, room B remained the most interesting one. It measured 7.1 x 6.3 meters and had walls that at least in the room's latest phase were decorated with red plaster, which was found in considerable quantities in the surface accumulation. However, the archaeological strata related to room B were also much disturbed, showing several intrusions that revealed materials ranging from the 7th/6th century BC to the 1st/2nd centuries AD. Most of these disturbances were probably caused by recent deep-ploughing activities. As a result, only a few remains were excavated *in situ* in room B, including a floor level that contained an *enchytrismos* child burial. The other 'rooms' showed similar signs of post-depositional disturbances, which made the interpretation of their stratigraphy often very difficult.

During the 2009 excavation campaign, two other roads were found that were oriented NW-SE, and also seemed to be flanked by limestone drainage channels. The intersection with the Early Hellenistic road in the southwest of the trench was not found, but has to be located somewhere outside the trench. The 2007/2009 excavations also uncovered six burials, including the above-mentioned *enchytrismos*. The oldest two burials, I and III, are of the *fossa* (pit) type. They are located in the northern half of the trench and date between the early 5th and the first half of the 4th century BC. The remaining three burials, II, IV and T20, are relatively simple cist-graves with buried infants, datable to the 4th and the first half of the 3rd century BC, respectively.

Apart from the planned excavations in the large trench, a small rescue operation was carried out in an area where the municipality of San Pancrazio planned to place a series of drainage tubes. This small (6.52 x 2.54 meters) excavation trench revealed limestone wall foundations similar to the ones found in the central trench. Adjacent to one of these walls, a terracotta bath tub (/571\, fill /574\ was found. The bath tub probably dates from the same habitation phase as the impasto *pithos* (RA 26) that was found *in situ* next to it. The pithos was placed inside the layer of abandonment that covered the limestone walls, so both the bath tub and the *pithos* date from a period posterior to the use of the stone structures.

Summarizing, it can be stated that the excavations at Li Castelli confirm the existence of a substantial village with a long continuity of occupation, at least from the Early Iron Age to the Roman period. The investigations also made it clear, however, that deep-ploughing and other recent activities have had a devastating impact on the site.

Archaeobotanical samples were only taken during the field campaigns in 2007 and 2009. In 2007, 89 soil samples were collected in 37 different stratigraphical units, and in 2009, 19 samples from 13 units. The 89 soil samples from the excavation campaign in 2007 have provided 969 charcoal fragments and only 27 seeds. Unfortunately, it must be concluded that the results of the archaeobotanical analysis have limited value for the reconstruction of the characteristics of the surrounding vegetation. Based on the archaeobotanical evidence collected so far, we could propose as a working hypothesis that the settlement was surrounded by high and middle high *macchia* vegetation, notably olive, oak trees and *Rhamnus/Phillyrea*. As for the settlement's means of subsistence, we are almost completely in the dark. The samples contained sporadic finds of wheat, barley, pulses and grape pips, but we have no idea how, where and on what scale these crops were cultivated. Charcoal remains from the Maloideae/Rosaceae and Prunoideae families were found, but the samples contained no actual fruit remains except for the above mentioned grape pips. The present evidence is also too scarce to determine whether some of these crops were used as grave gifts.

A 4.2 RESULTS: SEEDS AND FRUITS

period	Early Hellenistic			
	763	901	905	
unit				
trench				
context	grave			
	fill of Tomb 4	fill of tomb 3	contents of trozzella in Tomb 3	
taxa				common name
cereals				
Hordeum sp.			2	barley
Triticum aestivum/compactum	1			free-threshing wheat
Triticum dicoccum		1		emmer wheat
pulses				
Vicia sp.	1		1	vetch
fruits				
Vitis vinifera		5	1	grape

A 4.3 RESULTS: CHARCOAL

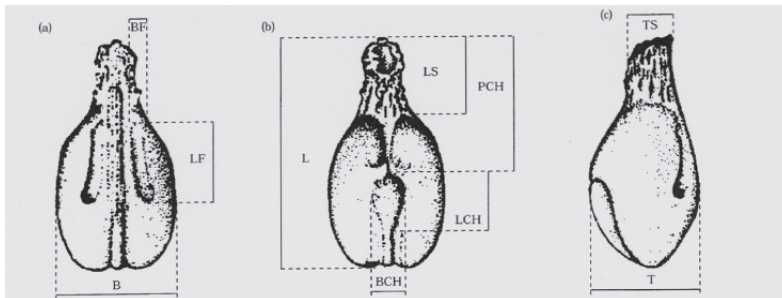
period	(Sub)recent/unknown																						
unit	500	501	517	566	572	573	574	593	599	731	760	773	782	784	790	791	843	852	858	864	913		
trench	1	salvage excavation	1	1	salvage excavation	salvage excavation	salvage excavation	salvage excavation	salvage excavation	1	1	1	1	1	1	1	1	1	1	1	1		
context	samples from the top layers, strata of abandonment and collapse, disturbed and more recent layers, including the well found at the north side of excavation trench 1																						
	top layer	contents of pithos (after abandonment)	pottery dump	pottery dump	layer of abandonment	wall collapse	contents of bath tub (after abandonment)	wall collapse	unknown	fill of a (sub)recent pit in room B	layer underneath the top layer (500) in room E.	wall collapse	fill of a (sub)recent pit in room B	accumulation layer south of room C	fill of a (sub)recent pit in room B	fill of a (sub)recent pit in room B	layer of abandonment	wall collapse in room F	wall collapse in room D	layer underneath /858\	fill of well		
taxa																						common name	
Erica sp.	2									4		7	8	4		6	2	1		1			heath
Juniperus sp.																2							juniper
Rosaceae/ Maloideae								25															Rosaceae/ Maloideae
Myrtus communis		1																					myrtle
Olea europaea	4	1	41							2	6	9		1	16		3			1	204		olive
Pistacia sp. (cf. lentiscus)			31	12				1		1	1					1							mastic
Prunoideae																		2					Prunoideae
Quercus sp. (deciduous type)																							oak
Quercus sp. (evergreen type)		2																					oak
Quercus sp.												5					2	8					oak
Rhamnus/Phillyrea								1				2											Rhamnus/ Phillyrea
unidentifiable hardwood	5	2		11	3	3				2	2	4	20	5		6	14	27	6	3	7		unidentifiable hardwood

period	Early/Late Hellenistic								
unit	638	748	756	772	786	787	855	864	
trench	1	1	1	1	1	1	1	1	
context	rubbish pit	floor matrix room B	floor matrix room D	floor matrix room B	floor matrix room B	floor matrix room B	fill of pithos in room D	floor matrix room D	
taxa									common name
Erica sp.	1	3					4	1	heath
Rosaceae/Maloideae					1				Rosaceae/Maloideae
Myrtus communis		2				1	1		myrtle
Olea europaea	40	7	9			1	1	1	olive
Pistacia sp. (cf. lentiscus)	42		4		1	2			mastic
Quercus sp. (deciduous type)			2						oak
Quercus sp.	4	1							oak
Rhamnus/Phillyrea	1	4	10			3			Rhamnus/Phillyrea
unidentifiable hardwood	22	8	19	7	1	15	3	3	unidentifiable hardwood

period	5th century BC	Early Hellenistic	Early Hellenistic	Early Hellenistic	Early Hellenistic	Early Hellenistic	
unit	568	763	764	769	901	905	
trench	1	1	1	1	1	1	
context	grave						
	contents of grave gifts Tomb 1	fill of tomb 4	contents of grave gifts Tomb 4	contents of enchytrismos burial	fill of tomb 3	contents of trozzella in Tomb 3	
taxa							common name
Erica sp.	1						heath
Myrtus communis		3					myrtle
Olea europaea	6	4			1		olive
Pistacia sp. (cf. lentiscus)			4				mastic
Prunoideae		1					Prunoideae
Quercus sp.	1	2					oak
Rhamnus/Phillyrea		1	2				Rhamnus/Phillyrea
unidentifiable hardwood	2	5	7	2	6	3	unidentifiable hardwood

Appendix 5, Grape measurements Muro Tenente and l'Amastuola¹

A 5.1 MORPHOMETRIC ANALYSIS METHODS TO DISTINGUISH BETWEEN CULTIVATED AND WILD GRAPES (VITIS VINIFERA VAR. VINIFERA VS. VITIS VINIFERA VAR. SYLVESTRIS).



Sketch of a grape seed and seed dimensions. Mangafa and Kotsakis 1996, 411.

The Stummer Index² only requires breadth (B) and length (L) measurements. The four formulae by Mangafa and Kotsakis³ require measurements of length (L), breadth (B), length of the stalk (LS) and the distance from the base of the chalaza (the spoon-shaped structure on the dorsal side of a grape pip), to the tip of the stalk (PCH).

		WILD	wild with great (64,7%) probability	cultivated with great (76,2%) probability	CULTIVATED
Mangafa and Kotsakis 1996 Formula 1	$-0.3801 + (-30.2LS/L + 0.4564PCH - 1.386L + 2.88PCH/L + 9.4239LS)$	< -0.2	between -0.2 and 0.2	Between 0.2 and 0.8	> 0.8
Mangafa and Kotsakis 1996 Formula 2	$0.2951 + (-12.64PCH/L - 1.6416L + 4.5131PCH + 9.63LS/L)$	< -0.2	Between -0.2 and 0.4	Between 0.4 and 0.9	> 0.9
Mangafa and Kotsakis 1996 Formula 3	$-7.491 + (1.7715PCH + 0.49PCH/L + 9.56LS/L)$	< 0	Between 0 and 0.5	Between 0.5 and 0.9	> 0.9
Mangafa and Kotsakis 1996 Formula 4	$0.7509 + (-1.5748L + 5.297PCH - 14.47PCH/L)$	< -0.9	Between -0.9 and 0.2	Between 0.2 and 1.4	> 1.4
Stummer index (Stummer 1911)	B/L	Between 0,44 and 0,53			Between 0,76 and 0,83

¹ These measurements were carried out in the Laboratorio di Archeobotanica e Paleoecologia (LAP) of the Università del Salento in Lecce, Italy, with the kind help of dr.

Anna Maria Grasso.

² Stummer 1911.

³ Mangafa and Kotsakis 1996.

A 5.2 RESULTS: MURO TENENTE

pip number	1	2	3	4	5	6	7	8	9	10
L	5,8	4,8	5,5	5,9	5,3	5,9	4,4	4,9	5,2	5,5
B	3	3,2	3,6	3,6	3,3	3,5	2,9	3,1	3,3	3,5
LS	1,6	1,4	1,8	1,3	1,5	1,6	1,2	1,3	1,7	1,6
PCH	3	2,6	2,9	3,1	2,7	2,7	2,4	2,4	3	2,7
Formula 1	1,187161	0,098867	1,918389	-0,03261	0,56223	0,881156	-0,73991	-0,4267	1,590992	0,935784
Formula 2	0,431741	0,111563	0,841199	0,080778	0,066216	-0,37785	-0,36468	-0,55342	1,154042	0,048034
Formula 3	0,71419	0,16865	1,033441	0,364548	0,247333	0,10883	-0,36485	-0,46307	1,231577	0,313686
Formula 4	0,023577	-0,87386	-0,17884	0,277399	-0,66515	-0,86038	-1,35815	-1,34017	0,104863	-0,71205
Formula 5 (Stummer)	0,517241	0,666667	0,654545	0,610169	0,622642	0,59322	0,659091	0,632653	0,634615	0,636364

pip number	11	12	13	14	15	16	17	18	19	20
L	5,4	4,6	6,1	5,5	5,7	5,5	5,5	4,9	5,5	5
B	3,2	2,8	3,7	3,7	3,2	3,1	3,4	3,2	3,6	3,8
LS	1,8	1,4	2,1	1,6	1,7	1,6	1,5	1,2	1,5	1,5
PCH	3	2,3	3,1	3	2,9	2,9	3,1	2,7	2,9	2,6
Formula 1	2,001053	-0,26382	3,437215	1,229795	1,522136	1,131791	0,934499	-0,43952	0,738492	0,44999
Formula 2	1,157538	-0,26526	1,163589	0,712509	0,467198	0,491017	0,75891	-0,1699	0,315926	0,13736
Formula 3	1,282389	-0,26198	1,540814	0,871864	0,746876	0,685805	0,884105	-0,09673	0,511986	0,2377
Formula 4	0,099091	-1,54508	0,211713	0,087773	-0,22609	-0,17884	0,354382	-0,63699	-0,17884	-0,8753
Formula 5 (Stummer)	0,592593	0,608696	0,606557	0,672727	0,561404	0,563636	0,618182	0,653061	0,654545	0,76

pip number	21	22	23	24	25	26	27	28	29	30
L	5	5	4,6	5,1	5,6	5,4	4,5	5,7	5	5
B	3,1	3,2	2,9	3,2	3,1	3,5	3,5	3,3	2,8	2,9
LS	1,4	1,5	1,4	1,7	1,7	1,5	1,2	1,7	1,4	1,7
PCH	2,3	2,6	2,3	3	3,1	2,4	2,7	3	2,5	2,9
Formula 1	-0,19812	0,44999	-0,26382	1,568581	1,720199	0,257821	-0,40147	1,618302	0,00836	1,43649
Formula 2	-0,65077	0,13736	-0,26526	1,236946	1,019	-0,68088	0,07727	0,696754	-0,25375	1,11809
Formula 3	-0,51435	0,2377	-0,26198	1,298402	1,174043	-0,36607	0,135383	0,932623	-0,14045	1,18095
Formula 4	-1,5962	-0,8753	-1,54508	0,098655	0,342541	-1,47133	-0,7158	0,049751	-1,1156	-0,1544
Formula 5 (Stummer)	0,62	0,64	0,630435	0,627451	0,553571	0,648148	0,777778	0,578947	0,56	0,58

pip number	31	32	33	34	35	36	37	38	39	40
L	6	5,6	5	5,1	5,1	5,3	5,4	4,8	4,5	5,2
B	3,3	3,2	3,6	3,4	3,2	2,9	3,4	3,2	2,8	3,2
LS	2,5	1,7	1,7	1,7	1,6	1,7	1,6	1,4	1,2	1,2
PCH	3,4	3,3	3,1	2,7	2,8	3	2,8	2,5	2,2	2,4
Formula 1	5,464077	1,914336	1,64297	1,262249	1,014127	1,607326	1,036845	-0,00677	-0,94967	-0,82326
Formula 2	2,639873	1,470191	1,51511	0,626545	0,641189	1,068071	0,366399	-0,07641	-0,77484	-1,02132
Formula 3	2,7931	1,545843	1,55485	0,738128	0,737435	1,167274	0,555867	-0,01871	-0,80481	-0,80709
Formula 4	1,112233	0,885156	0,3262	-0,63927	-0,39329	0,104894	-0,42438	-1,1021	-1,75652	-1,40372
Formula 5 (Stummer)	0,55	0,571429	0,72	0,666667	0,627451	0,54717	0,62963	0,666667	0,622222	0,615385

pip number	41	42	43	44	45	46	47	48	49	50
L	5	5,5	5,1	5,7	5,6	5,1	5,5	5,6	5,2	5,2
B	3,1	3,3	3,1	3,2	3,1	3,2	3,4	3,6	3,1	3,2
LS	1,6	1,4	1,5	2	1,6	1,3	1,5	1,7	1,5	1,6
PCH	2,5	2,7	2,5	3,2	2,4	2,4	2,5	3	2,9	2,8
Formula 1	0,68514	0,149185	0,357562	3,048331	0,637614	-0,44502	0,346477	1,62313	0,766725	1,027322
Formula 2	0,13145	-0,30215	-0,15804	1,662707	-0,73213	-0,73915	-0,57004	0,793404	0,575424	0,552383
Formula 3	0,24195	-0,03395	-0,01029	1,807274	-0,29797	-0,57195	-0,23225	0,988143	0,677312	0,674585
Formula 4	-1,1156	-0,71205	-1,13122	0,601431	-1,55661	-1,37719	-1,24527	0,071234	-0,14657	-0,398
Formula 5 (Stummer)	0,62	0,6	0,607843	0,561404	0,553571	0,627451	0,618182	0,642857	0,596154	0,615385

pip number	51	52	53	54	55	56	57	58	59	60
L	5,6	5,7	4,3	5,2	5,5	5,2	4,9	4,6	5	5
B	3,2	3,4	3	3,3	3,1	2,9	3,2	2,9	3,2	3,1
LS	1,5	1,8	1	1,3	1,7	1,5	1,5	1,4	1,3	1,6
PCH	2,7	2,9	2,2	3	2,8	2,6	2,6	2,4	2,8	2,5
Formula 1	0,525716	1,934701	-1,46169	0,144508	1,427086	0,463652	0,434255	-0,15558	-0,02031	0,68514
Formula 2	-0,22731	0,636145	-1,0624	0,413272	0,444616	-0,04928	0,22634	-0,08873	0,14918	0,13145
Formula 3	0,089014	0,914596	-1,11975	0,496192	0,673564	0,117592	0,301431	-0,07418	0,2292	0,24195
Formula 4	-0,74269	-0,22609	-1,7706	0,104863	-0,44545	-0,90086	-0,87138	-1,32995	-0,3947	-1,1156
Formula 5 (Stummer)	0,571429	0,596491	0,697674	0,634615	0,563636	0,557692	0,653061	0,630435	0,64	0,62

pip number	61	62	63	64	65	66	67	68	69	70
L	4,6	4,9	5,5	5,2	5,5	5,8	4,9	5,3	4,9	5,6
B	3,3	3,4	3,3	3,1	3,2	3,1	3,2	3,2	3,2	3,5
LS	1,2	1	1,7	1,4	1,5	2	1,5	1,6	1,4	1,5
PCH	2,2	1,9	2,8	2,2	2,8	3,1	2,4	2	2,3	2,8
Formula 1	-0,94381	-1,92697	1,427086	-0,30207	0,640488	2,969257	0,225424	0,234951	-0,20505	0,622784
Formula 2	-0,86048	-2,10977	0,444616	-1,0674	0,094435	1,329258	-0,16036	-1,24182	-0,55024	-0,00172
Formula 3	-0,86544	-1,98413	0,673564	-0,81255	0,325927	1,559098	-0,07287	-0,87706	-0,45512	0,274914
Formula 4	-1,76021	-2,51214	-0,44545	-1,90658	-0,44545	0,303794	-1,34017	-2,46192	-1,57456	-0,47138
Formula 5 (Stummer)	0,717391	0,693878	0,6	0,596154	0,581818	0,534483	0,653061	0,603774	0,653061	0,625

pip number	71	72	73	74	75	76	77	78	79	80
L	5,6	5,4	5,1	5,5	5,3	4,5	5,1	6,1	5,2	5,2
B	3,4	3,5	2,8	3	3,1	2,9	3,6	3,5	3,5	3,3
LS	2	1,3	1,3	1,5	1,3	0,9	1,5	1,9	1,3	1,7
PCH	3,2	2,6	2,6	3	2,6	2	3,1	3,4	2,9	2,8
Formula 1	3,02658	-0,31049	-0,24079	0,836495	-0,28291	-1,98279	0,970225	2,821159	0,043484	1,388942
Formula 2	1,760489	-0,60307	-0,33222	0,537418	-0,51	-1,75768	1,062766	1,580142	0,205039	0,737575
Formula 3	1,872086	-0,34769	-0,19843	0,698045	-0,29982	-1,81822	1,110258	1,78292	0,309619	0,858431
Formula 4	0,613849	-0,94786	-0,88524	0,087773	-0,92183	-2,17281	0,34463	1,089174	-0,14657	-0,398
Formula 5 (Stummer)	0,607143	0,648148	0,54902	0,545455	0,584906	0,644444	0,705882	0,57377	0,673077	0,634615

pip number	81	82	83	84	85	86	87	88	89	90
L	5,3	6,5	4,4	5,2	5	5,2	5,3	4,2	5	4,9
B	3,3	3	2,9	3,3	3,3	3	2,8	3,5	2,9	3
LS	1,3	1,4	1,1	1	1,2	1,5	1,5	1,3	1,3	1,9
PCH	2,7	3,2	2	2,5	2,5	2,6	2,9	2,4	2,7	2,5
Formula 1	-0,18293	0,178071	-1,44032	-1,44548	-0,66842	0,463652	0,762189	-0,55677	-0,12355	1,634094
Formula 2	-0,29718	-0,082	-1,23969	-1,18347	-0,63895	-0,04928	0,491855	-0,01032	-0,04933	0,819112
Formula 3	-0,11342	0,478108	-1,33527	-0,98821	-0,52285	0,117592	0,620124	-0,00035	0,04225	0,894689
Formula 4	-0,66515	0,341408	-2,16149	-1,15229	-1,1156	-0,90086	-0,15179	-1,41903	-0,635	-1,10577
Formula 5 (Stummer)	0,622642	0,461538	0,659091	0,634615	0,66	0,576923	0,528302	0,833333	0,58	0,612245

pip number	91	92	93	94	95	96	97	98	99	100
L	4,9	5,1	4,6	4,7	4,3	5,3	4,9	5	5,6	5,6
B	3,2	3,4	3,2	3	2,8	3,6	3,3	3,4	3,4	3,8
LS	1,3	1,3	1,2	1,3	1,1	1,3	1,3	1,2	2,1	1,6
PCH	2,3	2,8	2,3	2,5	2	2,7	2,8	2,1	3,1	2,9
Formula 1	-0,53112	-0,03657	-0,83556	-0,32351	-1,44686	-0,18293	-0,00904	-1,08138	3,332616	1,122957
Formula 2	-0,74677	0,074718	-0,68396	-0,19746	-1,15316	-0,29718	0,219981	-1,43299	1,706857	0,395844
Formula 3	-0,65022	0,175082	-0,67764	-0,15736	-1,27451	-0,11342	0,285527	-1,27065	1,8569	0,631529
Formula 4	-1,57456	-0,39329	-1,54508	-1,10497	-2,15697	-0,66515	-0,40259	-2,0768	0,342541	-0,20007
Formula 5 (Stummer)	0,653061	0,666667	0,695652	0,638298	0,651163	0,679245	0,673469	0,68	0,607143	0,678571

pip number	101	102	103	104	105	106	107	108	109	110
L	4,9	5,5	5,5	5,9	5,1	4,5	5,8	5,4	5,1	4,7
B	3,2	3,1	3,5	3,8	3,5	2,7	3,2	3,5	3,1	2,8
LS	1,3	2	1,6	1,8	1,5	1,4	1,7	1,6	1,1	1,1
PCH	2,5	2,9	3	2,8	2,6	2,4	2,7	2,4	2,4	2,1
Formula 1	-0,32229	2,704987	1,229795	1,83666	0,459672	-0,18784	1,322976	0,640952	-1,14548	-1,35085
Formula 2	-0,36007	1,191381	0,712509	0,185662	0,045431	-0,00599	-0,10236	-0,50254	-1,1168	-1,33674
Formula 3	-0,27592	1,381077	0,871864	0,618353	0,176469	-0,00384	0,322222	-0,18903	-0,94685	-1,31447
Formula 4	-1,10577	-0,17884	0,087773	-0,57594	-0,88524	-1,34023	-0,81707	-1,47133	-1,37719	-1,99228
Formula 5 (Stummer)	0,653061	0,563636	0,636364	0,644068	0,686275	0,6	0,551724	0,648148	0,607843	0,595745

pip number	111	112	113	114	115	116	117	118	119	120
L	5,3	4,7	5	4,7	4,5	4,5	5,8	5,2	5,8	5,4
B	3	3,1	3,6	2,5	3	3,1	3,3	3,3	3,1	3,4
LS	1,8	1,3	1,2	1,2	1,2	1,2	1,7	1,6	1,7	1,5
PCH	2,5	2	2,4	2	2,2	2,2	3	2,8	2,9	2,7
Formula 1	1,480007	-0,85809	-0,77166	-1,15793	-0,94967	-0,94967	1,608861	1,027322	1,513566	0,554741
Formula 2	0,185672	-1,10933	-0,83746	-1,31422	-0,77484	-0,77484	0,597775	0,552383	0,364396	-0,02917
Formula 3	0,415675	-1,09523	-0,7098	-1,29864	-0,80481	-0,80481	0,879017	0,674585	0,693419	0,192606
Formula 4	-1,17851	-2,21411	-1,3559	-2,21411	-1,75652	-1,75652	0,023577	-0,398	-0,25664	-0,68612
Formula 5 (Stummer)	0,566038	0,659574	0,72	0,531915	0,666667	0,688889	0,568966	0,634615	0,534483	0,62963

A 5.3 RESULTS: L'AMASTUOLA

pip number	1	2
L	5	4,3
B	3,2	2,5
LS	0,9	1
PCH	2	2,1
Formula 1	-2,19979	-1,5743
Formula 2	-2,2093	-1,21976
Formula 3	-2,0312	-1,30829
Formula 4	-2,3171	-1,96378
Formula 5 (Stummer)	0,64	0,581395

Appendix 6- Ancient written text fragments¹

HESIOD (8TH CENTURY BC)

A 6.1

Also the eleventh and twelfth [day of the month] are both excellent, alike for shearing sheep and for reaping the kindly fruits; but the twelfth is much better than the eleventh, for on it the airy-swinging spider spins its web in full day, and then the Wise One gathers her pile. On that day a woman should set up her loom and get forward with her work.²

A 6.2

If you plow the glorious ground at the turning of the sun [the summer solstice, 21 July], you will reap seated, grasping a little bit in your hand, tying together the sheaves head to foot, covered in dust, not overly rejoicing, and you will carry it off in a basket.³

A 6.3

Let a brisk fellow of forty years follow them [the oxen pulling the plough], with a loaf [of bread] of four quarters and eight slices for his dinner (...)⁴

A 6.4

After him the shrilly wailing daughter of Pandion, the swallow, appears to men when spring is just beginning. Before she comes, prune the vines, for it is best so.⁵

A 6.5

But when Orion and Sirius are come into mid-heaven, and rosy-fingered Dawn sees Arcturus [around September 9] then cut off all the grape-clusters, Perses, and bring them home. Show them to the sun ten days and ten nights: then cover them over for five, and on the sixth day draw off into vessels the gifts of joyful Dionysus.⁶

A 6.6

She [a tender-skinned virgin] washes her delicate neck well and rubs herself richly with olive oil (...)⁷

A 6.7

But then [in June] let me have shade from a rock and bibline wine and emmer [μαζα] soaked in milk (...)⁸

¹ These fragments are listed in order of appearance in this study, not in chronological order.

² *W&D* 770-779, translation by Evelyn-White, <http://ancienthistory.about.com>.

³ *W&D* 479, translation by Tandy and Neale 1996, 105.

⁴ *W&D* 442, translation by Evelyn-White, <http://ancienthistory.about.com>.

⁵ *W&D* 570, translation by Evelyn-White, <http://ancienthistory.about.com>.

⁶ *W&D* 616, translation by Evelyn-White, <http://ancienthistory.about.com>.

⁷ *W&D* 521, translation by Tandy and Neale 1996, 109.

⁸ *W&D* 583, translation by Tandy and Neale 1996, 113-115.

LEONIDAS OF TARAS (330/320-260 BC)

A 6.8

Theris the old, the waves that harvested,
More keen than birds that labour in the sea,
With spear and net, by shore and rocky bed
Not with the well-mannered galley, labored he;
Him not the Star of Storms, nor sudden sweep
Of wind with all his years hath smitten and bent.
But in his hut of reeds he fell asleep,
As fades a lamp when all the oil is spent:
This tomb nor wife nor children raised, but we
His fellow-toilers, fishers of the sea.⁹

A 6.9

Vex not thyself if thou hast a little hut to cover thee, warmed by a little fire, if thou hast a poor cake of no fine meal kneaded by thy hands in a stone trough, if thou hast mint or thyme for a relish or even coarse salt not unsweetened.¹⁰

A 6.10

Lathrian goddess [Aphrodite], accept these offerings from Leonidas the wanderer, the pauper, the flour-less: rich barley-cakes, olives easy to store, and this green fig from the tree. Take, too, lady, these five grapes picked from a rich cluster, and this libation of the dregs of the cup.¹¹

A 6.11

Out of my hut, ye mice that love the dark! Leonidas' poor meal-tub has not wherewith to feed mice. The old man is contented if he has salt and two barley-cakes.¹²

A 6.12

Theris, the cunning worker, on abandoning his craft, dedicates to Pallas his straight cubit-rule, his stiff saw with curved handle, his bright axe and plane, and his revolving gimlet.¹³

A 6.13

These are the tools of the carpenter Leontichus, the grooved file, the plane, rapid devourer of wood, the line and ochre-box, the hammer lying next them that strikes with both ends, the rule stained with ochre, the drill-bow and rasp, and this heavy axe with its handle, the president of the craft; his revolving augers and quick gimlets too, and these four screwdrivers and his double-edged adze—all these on ceasing from his calling he dedicated to Athene who gives grace to work.¹⁴

⁹ Translated by Andrew Lang, www.blackcatpoems.com.

¹⁰ *Anth.* VII 736, translation by W.R. Paton.

¹¹ *Anth.* VI 300, translation by W.R. Paton, www.ancientlibrary.com.

¹² *Anth.* VI 302, translation by W.R. Paton.

¹³ *Anth.* VI 204. Translation by W. R. Paton, www.ancientlibrary.com.

¹⁴ *Anth.* VI 205. Translation by W. R. Paton, www.ancientlibrary.com.

A 6.14

To the must-bibbing Satyrs and to Dionysus the planter of the vine did Heronax consecrate these three casks of fresh wine filled from three vineyards, the first-fruits of his planting. We, having first poured what is right from them to purple Dionysus and the Satyrs, will drink more than the Satyrs.¹⁵

A 6.15

Wine-bibbing old Maronis, the jar-drier, lies here, and on her tomb, significant to all, stands an Attic cup. She laments beneath the earth not for her husband and children whom she left in indigence, but solely because the cup is empty.¹⁶

ANACREON (582 BC – 485 BC)

A 6.16

For breakfast I broke off a bit of sweet sesame cake; I've drunk a whole flagon of wine, and in luxury now, I play my sweet harp, making merry beside my dear girl.¹⁷

STESICHORUS (CA. 640–555 BC)

A 6.17

... sesame-cakes and spelt, sweetflan and other bakes and yellow honey.¹⁸

HIPPONAX OF EPHESUS (6TH CENTURY BC)

A 6.18

... I have to dig the rocky hillside, munching modestly on a few figs and barley cobs – slave's fodder – not champing hare and francolin, not I, not tarding up pancakes with sesame, or dripping waffles into honeycombs.¹⁹

A 6.19

... figs, barley-cake, and cheese, like scapegoats²⁰ eat.²¹

¹⁵ Vandermersch 1994, 28. *Anth.* VI 44. Translation by W.R. Paton, www.ancientlibrary.com.

¹⁶ *Anth.* VII 455. Translation by W.R. Paton.

¹⁷ F373 Page, F373 West.

¹⁸ West 179a.

¹⁹ F26–26a West.

²⁰ In the Ionian 'scapegoat' ritual, which was performed to purify the town, some friendless wretch was first given a meal and then driven out of town. West 1993, 206.

²¹ West 8. Cf. also Columella's references to barley, which

he seems to consider an inferior cereal in comparison to wheat, and more suitable as animal fodder ('Next to these [wheat] grains in utility is that variety of barley which country people call *hexastichum* [six-rowed barley]; some also call it *cantherinum* because it is a better food than wheat for all animals that belong on a farm'), although he admits that it is 'more wholesome for humans than is bad wheat'. *RR* II, 14, translation by Bill Thayer, penelope.uchicago.edu.

ARCHILOCHUS (CA. 680-645 BC)

A 6.20

I am a servant of the lord god of war,
and one versed in the Muses' lovely gifts.
On my spear's my daily bread,
on my spear my wine (...) ²²

ANONYMOUS

A 6.21

Toss me the mostest sheaf, toss me a sheaf!

A 6.22

Grind, mill, grind:
even Pittacus [ca. 640-568 BC] used to grind,
the ruler of great Mytilene.

A 6.23

The swallow, the swallow is here
bringing a fine new year
white belly, dark back;
so from your rich pack
roll out a fruit-pack,
a cup of wine, please
and a punnet of cheese;
or a bran-loaf or pulse-loaf or so (...) ²³

A 6.24

... and that both [female] archontes together give the offering for the festival and the care for the Thesmophoria one half ekteus [1/6 medimnos, a weight measure for corn] of barley, one half ekteus of wheat, one half ekteus of pearl barley, one half ekteus of dried figs, with a libation [probably refers to a measure here] of wine, half a libation of olive oil, two cups of honey, a choinix [a weight measure for (dry) corn] of white sesame, a choinix of black [sesame], a choinix of poppy [seeds?], of cheese two fresh cheeses, each weighing no less than a stater [both a weight measure and form of currency, so it could also mean 'a stater worth of...'] and two staters of garlic and pine wood. ²⁴

A 6.25

Then Metaneira filled a cup with sweet wine and offered it to her [Demeter] but she refused it, for she said it was not lawful for her to drink red wine. ²⁵

²² F2 West.

²³ West 848.

²⁴ *IG* II2 1184, 15. For the translation and notes, I am grateful to Michiel van der Keur.

²⁵ Homeric Hymn to Demeter, 206-207. Translation by Hugh G. Evelyn-White, www.sacred-texts.com.

SEMONIDES (7TH CENTURY BC)

A 6.26

A fancy mare was mother to another [type of woman],
who baulks at chores or anything that's hard
and wouldn't touch a millstone, lift a sieve,
or clear the shit out, or sit at the stove
for fear of soot; and yet compels a man
to love her.²⁶

ATHENAEUS (LATE 2ND-EARLY 3RD CENTURY AD)

A 6.27

... when I saw the golden, sweet, large, round, thick child of Demeter coming, a baked *plakous*...²⁷

A 6.28

... a flat covering of the maiden daughter of chaste Demeter [flour] luxuriating in countless delicately-compounded wrappings [spices], or shall I say plainly to you, a *plakous*.²⁸

A 6.29

[Quoting Timaeus:] And some of the roads which led to their villas in the country were covered with awnings all over; and a great many of them had [wine] cellars near the sea, into which their wine was brought by canals from the country, and some of it was then sold out of the district, but some was brought into the city in boats.²⁹

PLINY THE ELDER (23-79 AD)

A 6.30

Theophrastus, one of the most famous among the Greek writers, who flourished about the year 440 of the City of Rome [ca. 313 BC], has asserted that the olive does not grow at a distance of more than forty miles from the sea.³⁰ Fenestella tells us that in the year of Rome 173 [ca. 580 BC], being the reign of Tarquinius Priscus, it did not exist in Italy, Spain, or Africa; whereas at the present day it has crossed the Alps even, and has been introduced into the two provinces of Gaul and the middle of Spain. In the year of Rome 505 [ca. 248 BC], Appius Claudius, grandson of Appius Claudius Cæcus, and L. Junius being consuls, twelve pounds of oil sold for an as; and at a later period, in the year 680 [ca. 73 BC], M. Seius, son of Lucius, the curule ædile, regulated the price of olive oil at Rome, at the rate of ten pounds for the as, for the whole year. A person will be the less surprised at this, when he learns that twenty-two years after [ca. 51 BC], in the third consulship of Cn. Pompeius, Italy was able to export olive oil to the provinces.³¹

²⁶ West 7.

²⁷ Athen. 137b-c, translation by Brumfield 1997, 152.

²⁸ Athen. 449c, translation by Charles Burton Gulick.

²⁹ Zancani Montuoro 1982, 559. Athen. XII, 519d. Translation by C.D. Yonge (1854), www.attalus.org.

³⁰ Theophrastus does not literally mention this, but describes some other limiting factors in the cultivation of olive trees in *Hist. Plant.* IV, 14, 9.

³¹ *NH* 15.1. Translation and notes by John Bostock and H.T. Riley, www.perseus.tufts.edu.

A 6.31

Those [fruit trees] which have been hitherto mentioned, are, nearly all of them, exotic trees, which it is impossible to rear in any other than their native soil, and which are not to be naturalized in strange countries. It is now for us to speak of the more ordinary kinds, of all of which Italy may be looked upon as more particularly the parent. (...) With what then ought we to begin in preference to the vine, the superiority in which has been so peculiarly conceded to Italy (...)³²

A 6.32

The regions of Italy that are at a greater distance from the Ausonian Sea, are not without their wines of note, such as those of Tarentum, Servitia [San Severino?], and Consentia [Cosenza], and those, again, of Tempsa, Babia, and Lucania, among which the wines of Thurii hold the pre-eminence.³³

A 6.33

Each kind of tree remains immutably consecrated to its own peculiar divinity, the beech to Jupiter, the laurel to Apollo, the olive to Minerva, the myrtle to Venus, and the poplar to Hercules.³⁴

A 6.34

Beans are mostly eaten together with other food, but it is generally thought that they dull the senses, and cause sleepless nights attended with dreams. Hence it is that the bean has been condemned by Pythagoras; though, according to some, the reason for this denunciation was the belief which he entertained that the souls of the dead are enclosed in the bean: it is for this reason, too, that beans are used in the funereal banquets of the Parentalia [sacrifices offered to the spirits of deceased relations]. According to Varro, it is for a similar cause that the Flamen abstains from eating beans: in addition to which, on the blossom of the bean, there are certain letters of ill omen to be found.

There are some peculiar religious usages connected with the bean. It is the custom to bring home from the harvest a bean by way of auspice, which, from that circumstance, has the name of “referiva.” [“brought home.”] In sales by public auction, too, it is thought lucky to include a bean in the lot for sale.³⁵

A 6.35

The very smell of it [garlic] drives away serpents and scorpions, and, according to what some persons say, it is a cure for wounds made by every kind of wild beast, whether taken with the drink or food, or applied topically.³⁶

MARCUS PORCIUS CATO (234-149 BC)

A 6.36

In heavy, warm soil plant olives — those for pickling, the long variety, the Salentine (...)³⁷

³² *NH* 14.1 and 14.2. Translation and notes by John Bostock and H.T. Riley, www.perseus.tufts.edu.

³³ Vandermersch 1994, 33. *NH* XIV 8, 41-47. Translation by John Bostock and H.T. Riley, www.perseus.tufts.edu.

³⁴ *NH* 12.2. Cf. also De Cleene and Lejeune 1999, 203-211; 608-621; 805-826; 740-751; 903-915.

³⁵ *NH* 18.30 (12). Translation and notes by John Bostock

and H.T. Riley, www.perseus.tufts.edu.

³⁶ *Pl. NH* 20.XXIII. Translation by John Bostock and H.T. Riley, www.perseus.tufts.edu.

³⁷ Lombardo 1992, 38-39, no. 65, Burgers 1998, 257. Translation by W. D. Hooper and H. B. Ash (1922), penelope.uchicago.edu.

A 6.37

This is the proper equipment for an oliveyard of 240 iugera [ca. 65 ha]: An overseer, a housekeeper, 5 laborers, 3 teamsters, 1 muleteer, 1 swineherd, 1 shepherd- a total of 13 persons; 3 yoke of oxen, 3 pack-asses to carry manure, 1 ass for the mill, and 100 sheep; 5 complete oil-pressing equipments (...)³⁸

This is the proper equipment for a vineyard of 100 iugera [ca. 27 ha]: An overseer, a housekeeper, 10 laborers, 1 teamster, 1 muleteer, 1 willow-worker, 1 swineherd- a total of 16 persons (...)³⁹

DIONYSIUS OF HALICARNASSUS (60 BC - AFTER 7 BC)

A 6.38

To what olive orchards are those of the Messapians, the Daunians, the Sabines and many others inferior?⁴⁰

PUBLIUS TERENTIUS VARRO (VARRO ATACINUS) (82 - 35 BC)

A 6.39

There remains the question of number; but there really are no herds of these animals [asses] except of those which form pack trains, for the reason that they are usually separated and sent to the mills, or to the fields for hauling, or even for ploughing where the land is porous, as it is in Campania. The trains are usually formed by the traders, as, for instance, those who pack oil or wine and grain or other products from the region of Brundisium or Apulia to the sea in donkey panniers.⁴¹

HORACE (QUINTUS HORATIUS FLACCUS) (65 - 8 BC)

A 6.40

Long springs, mild winters glad that spot
By Jove's good grace, and Aulon, dear
To fruitful Bacchus, envies not
Falernian cheer.⁴²

³⁸ Cato, *De Agricultura* X.1-2. Translation by W. D. Hooper and H. B. Ash, penelope.uchicago.edu.

³⁹ Cato, *De Agricultura* XI.1. Translation by W. D. Hooper and H. B. Ash, penelope.uchicago.edu.

⁴⁰ Lombardo 1992, 78, no. 133, Burgers 1998, 257. Translation by Earnest Cary (1950), penelope.uchicago.edu.

⁴¹ Lombardo 1992, 50-52, nos. 81, 82 and 84, Burgers 1998,

257. Translation by W. D. Hooper and H. B. Ash (1934), penelope.uchicago.edu.

⁴² Falernian wine came from Mt. Falernus, near the border of Latium and Campania. Vandermersch 1994, 32. Horace, *Od.*, II 6, 17-20. Translation by John Conington, ancienthistory.about.com/library.

OVID (PUBLIUS OVIDIUS NASO) (43 BC - 17/18 AD)

A 6.41

One may try the white bulb that comes from the Pelasgian town of Alkathoos [Megara, Greece], or the lascivious leaf grown in gardens [rocket], or eggs, or honey from mount Hymettus, or the nuts that are found on the sharp fronds of pine trees.⁴³

PAUSANIAS (2ND CENTURY AD)

A 6.42

They say that the plain called Rharium was the first to be sown and the first to grow crops, and for this reason it is the custom to use sacrificial barley and to make cakes for the sacrifices from its produce. Here there is shown a threshing-floor called that of Triptolemus and an altar.⁴⁴

A 6.43

Upon the altar of Zeus Polieus they place barley mixed with wheat and leave it unguarded. The ox, which they keep already prepared for sacrifice, goes to the altar and partakes of the grain.⁴⁵

A 6.44

There is a legend that in this place Phytalus welcomed Demeter in his home, for which act the goddess gave him the fig tree. This story is borne out by the inscription on the grave of Phytalus:—"Hero and king, Phytalus here welcome gave to Demeter, August goddess, when first she created fruit of the harvest; Sacred fig is the name which mortal men have assigned it."⁴⁶

EURIPIDES (CA. 480 - 406 BC)

A 6.45

Send the maiden out to join her father, for the lustral water stands there ready, and barley-meal to scatter with the hand on the cleansing flame, and heifers to be slain before the marriage, in honor of the goddess.⁴⁷

A 6.46

Begin the sacrifice with the baskets, let the fire blaze for the purifying meal of sprinkling, and my father pace from left to right about the altar (...).⁴⁸

⁴³ *Ars Amatoria* 2, 420-424. Translation by Andrew Dalby, dalby.pagesperso-orange.fr.

⁴⁴ Pausanias I 1.38.6. Translation by W.H.S. Jones, www.theoi.com.

⁴⁵ Pausanias I 24, 4 and 28, 10. Translation by W.H.S. Jones and H.A. Ormerod, www.perseus.tufts.edu. Cf. Van Straten 1997, 51.

⁴⁶ Pausanias 1.37.2, cited in Ciaraldi 1999, 84. Translation

by W.H.S. Jones and H.A. Ormerod, www.perseus.tufts.edu

⁴⁷ *Iphigenia Aulidensis* 1111-2. Translation by E.P. Coleridge, www.perseus.tufts.edu.

⁴⁸ *Iphigenia Aulidensis* 1470-1. Translation by E.P. Coleridge, www.perseus.tufts.edu.

A 6.47

Then your mother's bed-fellow took barley for sprinkling, and cast it upon the altar with these words (...).⁴⁹

ARISTOPHANES (C.A. 446–386 B.C.)

A 6.48

Slave: 'Got everything here, Master! Let's see. The basket, the barleycorn, a wreath, a knife, kindling, me... nope, nothing's missing... Ah! Except the lamb!'

(Runs off to get it.) (...)

Master (To the slave): 'Quick, now hand me some barleycorn.' (Slave obeys and Master sprinkles the barleycorn all over the lamb.)⁵⁰

ARISTOTLE (C.A. 384–322 B.C.)

A 6.49

... for he [Phaleas of Chalcedon, 4th century BC?] says that the citizens' estates ought to be equal and he thought that this would not be difficult to secure at the outset for cities in process of foundation, while in those already settled, although it would be a more irksome task, nevertheless a leveling would most easily be effected by the rich giving dowries but not receiving them and the poor receiving but not giving them.⁵¹

LIVY (TITUS LIVIUS PATAVINUS) (59 B.C.–17 A.D.)

A 6.50

Sextius Digitius, T. Juventius, and M. Caecilius were sent into Apulia and Calabria to purchase corn for the fleet and army.⁵²

SAPPHO (C.A. 630–570 B.C.)

A 6.51

And chickpeas grew there golden on the banks.⁵³

⁴⁹ *Electra* 803–4. Translation by E.P. Coleridge, www.perseus.tufts.edu

⁵⁰ Van Straten 1995, 33–40. Aristophanes, *Pax* 937–8 and 962. Translation by G. Theodoridis, www.poetryintranslation.com.

⁵¹ Aristotle, *Politika*, Book 2 1266a–b. Translation by W.H. Fyfe, www.perseus.tufts.edu.

⁵² Titus Livius, *Ab urbe condita*, 42.27.8. Translation by Canon Roberts, mcadams.posc.mu.edu

⁵³ West 143.