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research

Brescian archaeobotanical studies, Romanization to Early Medieval periods

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We present the results of the analysis on plant materials (charcoal and seeds/fruits) and other remains (textiles and wattle remains) from various excavations in Brescia (Northern Italy), referable to the Romanization and the Early Middle Ages. The carpological data indicates a gradual assimilation of the Roman culture by the local populations. Between 3rd and 5th c. new changes in food production seem to have occurred with the introduction of species that would then characterize the medieval economy. Between the 5th and 8th c., when the Empire was declining with a general impoverishment in Northern Italy, the establishment of an authority in Brescia (first Goth and then Lombard) seems to have guaranteed a still high supply of products, albeit almost exclusively locally sourced.
Keywords: Brescia, Northern Italy, plant remains, Romanization, Early Middle Age

Si presentano i risultati delle analisi su materiali vegetali (carboni di legna e semi) e su altri resti (tessuti e incannucciato) provenienti da diversi scavi di Brescia, dalle fasi di romanizzazione all'alto medioevo. I dati carpologici indicano un'assimilazione graduale, da parte delle popolazioni locali, della cultura romana. Tra III e V secolo sembrano intervenire nuovi cambiamenti nelle produzioni alimentari con l'introduzione di specie che caratterizzeranno poi l'economia medievale. Tra V e VIII secolo, quando con il declino dell'Impero si assiste ad un impoverimento generale, a Brescia la presenza di una autorità, prima gota e poi longobarda, sembra garantire una disponibilità di prodotti ancora elevata, anche se quasi esclusivamente di provenienza locale.
***Parole chiave**: Brescia, Italia settentrionale, resti botanici, romanizzazione, alto medioevo*

1. Introduction

The city of Brescia (45°33'20" N – 10°13'13" E) stands on the upper Lombardy plain at the edge of the Alpine foothills, about 100 km east of Milan. Built in an area occupied since the Bronze Age, ancient Brescia

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became an important town in the 5th century BC, when it was inhabited by the Cenomani Gauls (Solano 2015). The process of Romanization began during the 3rd century BC and accelerated at the beginning of the following century, after the defeat of the northern Po Plain (Transpadana) Gauls by the Roman army, and was later legally ratified by the granting of Latin Rights and Latin colony status in 89 BC and later – in 49 BC – Roman citizenship (Rossi 2014, pp. 153-164).

By the reign of Augustus, Brescia had acquired a well-defined structure (Rossi 2005); the canonical Roman system based on a right-angled grid was adapted to the geomorphological conditions of the site, on slightly sloping ground south of Cidneo Hill, at the base of which the main public buildings (*Capitolium*, theatre and forum) were located. The city maintained an important role during the Roman period due to its position on important communication routes at the foot of the mountains and giving access to Alpine valleys.

At the end of the 4th century AD the temple lost its religious function and the public buildings began to deteriorate (Rossi 2014); subsequently (in the 5th and 6th century AD) the town itself fell into disrepair, with fires and the collapse of buildings in various parts in around the mid-6th century (Brogiolo *et al.* 2005). The settlement was reorganized during the Lombard period (from 569), when the western portion became more important due to the presence of the ducal court, while the areas near the forum and *Capitolium* were in part reoccupied by small constructions made of poor-quality building material (Brogiolo *et al.* 2005). In 753 this part of the town acquired a new importance when Desiderius founded the monastery of San Salvatore.

Over several decades, above all during the archaeological excavations carried out at the base of Cidneo Hill – where the most substantial evidence of Roman occupation has been found – samples were collected for archaeobotanical analysis, at times with greater regularity, at others occasionally. Numerous data have been collected on seeds, fruits and charcoal, especially for the Romanization and Early Medieval periods. In contrast to the abundant and particularly important architectural documentation, there are few archaeobotanical data from the Imperial epoch, in part because the excavations have been in areas that were also occupied in late-antique and Early Medieval times, with the partial demolition and reuse of Roman buildings.

The quantity of archaeobotanical data available for Brescia, especially for the Early Medieval period, is exceptional for northern Italy, because the data derive from quite large-scale excavations and from well-preserved settlement contexts, at times covered by colluvial material and not particularly disturbed by later buildings.

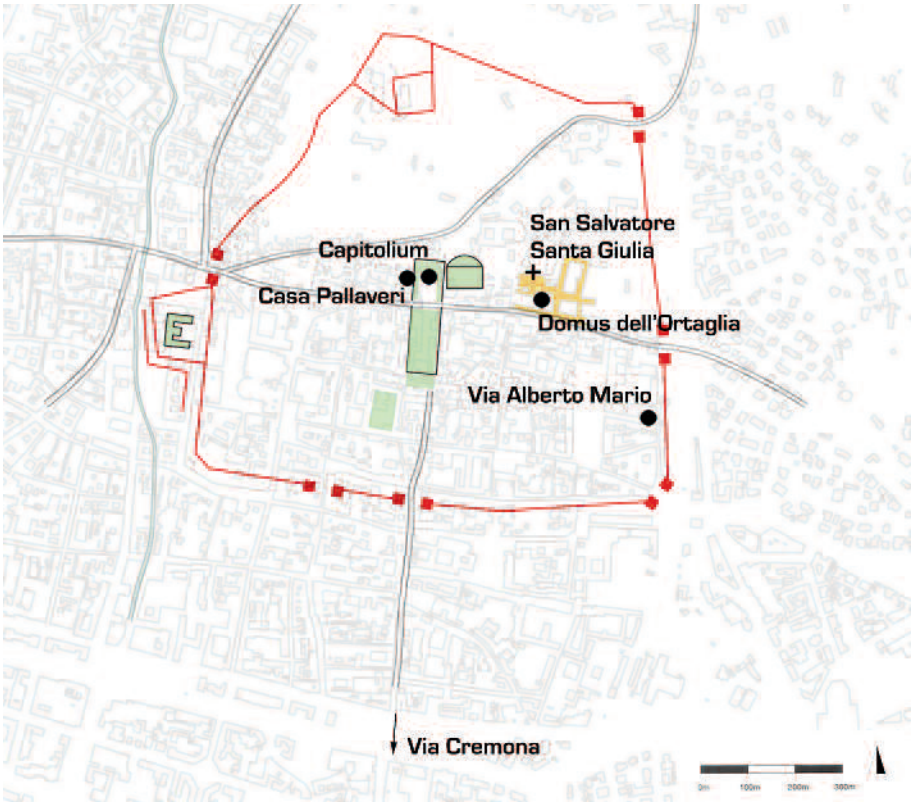

Fig. 1. The centre of Brescia showing excavation areas from which the botanical material studied came.

Below are summarized all the data, published and unpublished, related to analyses conducted by the authors or others at the Laboratorio di Archeobiologia of Como Civic Museums, both on botanical remains as such, and on other organic (and non-organic) materials, and textile and wattle remains from the Romanization and Early Medieval periods.

2. Sites and materials analyzed

Samples from excavations in Brescia (fig. 1) have been taken over a long time period by various archaeologists. The techniques used for sample collection are therefore inhomogeneous, whereas the analyses – carried out in the same laboratory, even if by different people – exhibit greater uniformity. Here the unpublished analyses are described in greater detail, while for published data we refer readers to the original articles.

The botanical material collected from Brescian excavations is almost entirely preserved as burnt remains, with the exception of a single context (an Early Medieval latrine) which also contained mineralized material. The absence of a near-surface water table means that waterlogged remains were not preserved.

2.1. The Capitolium *area*

Excavations conducted between 2009 and 2011 in four different sectors of the *Capitolium* area brought to light a sequence of remains ranging in date from the Bronze Age to the medieval period (Rossi 2014; fig. 2, tab. 1, tab. 2). In the zone in front of the *Capitolium*, at the foot of the entrance stairway, a sunken room belonging to a pre-Roman building, and a pit/deposit, probably a ritual structure linked to the foundation of

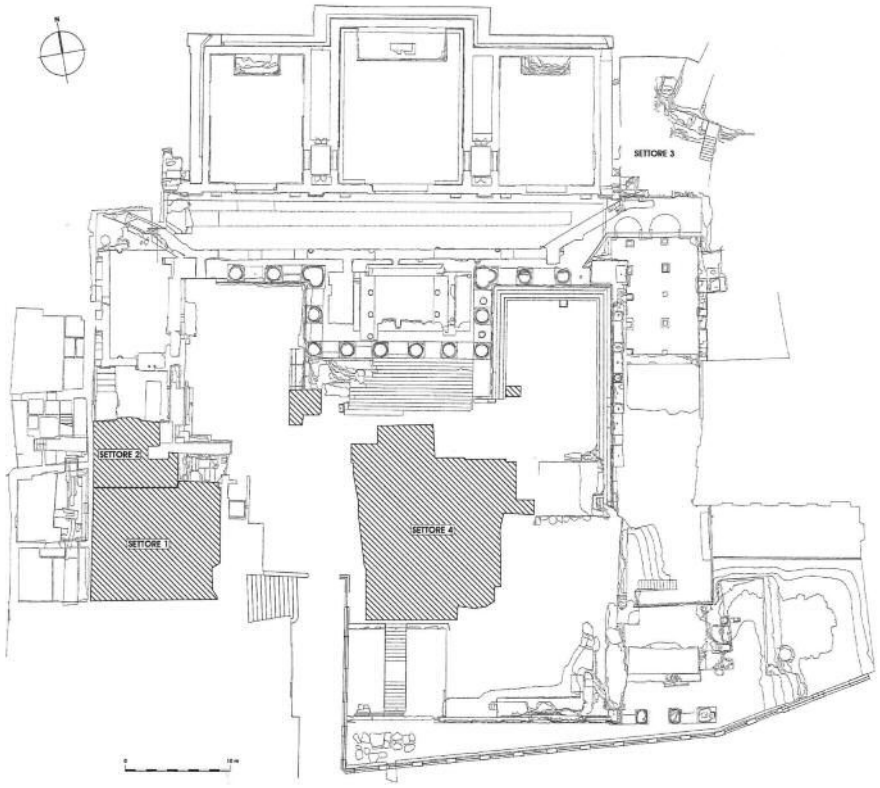

Fig. 2. The *Capitolium* area showing excavation areas (after Rossi 2014, p. 17).

		3rd cent. BC				3rd/2nd cent. BC		2nd cent. BC							1st cent. BC									
taxon	SU	351	385	386A	284	361	363	346	273B	343	283	279	341	strato N*	327	332	321	324	263	250	260	268	270	total
Acer sp.																1								1
Alnus glutinosa/ A. incana						2								1							2	10		15
Carpinus betulus																6								6
Castanea sativa																			1cf.					1
Castanea/ Quercus																							2	2
Cornus mas/ C. sanguinea				4																	4			8
Fagus sylvatica																					1			1
Fraxinus cf. *excelsior*					2																			2
Fraxinus sp.					3																			3
cf. *Hedera helix*								1																1
Ostrya/ Carpinus						1	1																	2
Pomoideae																					4			4
Populus sp.														5										5
Quercus sez. *Cerris*							2cf.			2								2cf.	5				1cf.	12
Quercus sez. *Robur*		69	10	11	28	26	17	14	25	47	20	17	15	15	3	20	10	13	33	2	12		7	414
Quercus sp.		5			2cf.					2+2cf.														11
Tilia cf. *cordata*														1										1
Ulmus sp.						1		11		3				30		3			1					49
total		**74**	**10**	**15**	**35**	**30**	**20**	**26**	**25**	**56**	**20**	**17**	**15**	**52**	**3**	**30**	**10**	**15**	**40**	**2**	**23**	**10**	**10**	**538**

Tab. 1. Charcoal from 3rd-1st century BC *Capitolium* contexts (* from Castelletti 1987).

		century	3rd BC	3rd/2nd BC		2nd BC		
		site	*Capitolium*					
taxon	**remains**	**SU**	**351**	**361**	**363**	**strato N***	**386A**	**346**
CEREALS								
Hordeum vulgare	grain				2		2	
Secale cereale	grain							
Secale cereale	rachis fragment							5cf.
Triticum aestivum s.l	grain					2		4
Triticum monococcum	grain					3		1+25cf.
Triticum monococcum	spikelet fork				3			7+3cf.
Triticum dicoccum	grain				1	8		14+3cf.
Triticum dicoccum	spikelet fork				2	1		60+4cf.
Triticum monococcum/ dicoccum	grain							5
Triticum monococcum/ dicoccum	spikelet fork				1			3
Triticum spelta	grain			1cf.				9cf.
Triticum spelta	spikelet fork							4
Triticum dicoccum/spelta	grain							
"new glume wheat"	spikelet fork							11
Triticum sp. ("hulled")	spikelet fork							100
Triticum sp.	grain				3			13
Cerealia	grain			7	8			41
Cerealia	straw fragment							221
Panicum miliaceum	grain				3cf.			3
Panicum miliaceum	rachis fragment							5cf.
Setaria italica	grain			2	3cf.			52+4cf.
Setaria italica	rachis fragment							8cf.
Panicoideae	grain			11	32		5	1cf.
PULSES								
Lathyrus sativus/cicera	seed							1
Lens culinaris	seed				3			
Pisum sativum	seed							1cf.
Vicia ervillia	seed				1			1
Vicia faba var. minor	seed			1	1			
Leguminosae	seed			2	6			1
FRUITS								
Cornus mas	stone							
Corylus avellana	nutshell			1	1			5+2cf.
Fagus sylvatica	fruit			3				
Ficus carica	nutlet							
Juglans regia	nutshell							
Olea europaea	stone							
Sambucus sp.	stone				1			
Vitis vinifera	pip		1		19			7
total			**1**	**28**	**90**	**14**	**7**	**624**

Tab. 2. Seed/fruit remains (food species) from the *Capitolium* (3rd century BC-1st AD) and Santa Giulia (1st-5th century AD).

1st BC											1st AD		1st-5th AD	
Capitolium													S. Giulia	
263	**332**	**243**	**244A**	**246A**	**260**	**263**	**268**	**270**	**277**	**266**	**592**	**111**	**1371**	**total**
	1				1cf.								2	**8**
											4+14cf.			**18**
														5
													3+2cf.	**11**
														29
														13
														26
														67
														5
														4
														10
														4
									1					**1**
														11
														100
														16
			1		1						14			**72**
													3	**224**
							1		1					**8**
														5
	1		1		1			1cf.		1				**66**
														8
					1									**50**
														1
												1cf.	1	**5**
														1
														2
														2
										1cf.	3cf.		4	**17**
				1										**1**
														9
														3
						1cf.								**1**
		6		1cf.							2		24	**33**
													1	**1**
														1
1						1							1	**30**
1	**2**	**6**	**2**	**2**	**4**	**2**	**1**	**1**	**2**	**2**	**37**	**1**	**41**	**868**

the 2nd century BC temple, were found. From the room, burnt wood (SU 351) from planking that had fallen from the floor above was sampled; from the pit (SU 361, 363), remains of seeds, fruits and charcoal, perhaps the products of sacrifice ceremonies (Castiglioni *et al.* 2014a, 2014b). From a wooden building next to the 2nd century BC temple, burnt down and demolished to make room for construction of the later temple (Dander 2014), structural timbers were sampled (SU 283, 343), as well as material from the fill of a cut (SU 346) inside one of the rooms, with a considerable accumulation of burnt material comprising charcoal and seeds (Castiglioni *et al.* 2014c, 2014d). Another series of samples, with charcoal and a few seeds, was collected from a group of short-lived wooden huts, probably shacks and workshops, used for various activities in the construction site of the late Republican temple[1] (1st century BC; Castiglioni *et al.* 2014e); while a further two samples from the Flavian age building were analyzed; they contained a few seeds (SU 111, 592).

In an earlier trial excavation (Arslan 1973), a small sample containing charcoal, a few seeds and some ash was taken from a 2nd century BC deposit, probably associated with a hearth inside a dwelling (Castelletti 1987).

From the phases of deterioration of the Flavian *Capitolium*, two contexts were sampled: a 7th century AD latrine and a deposit produced by the collapse of a house, following a fire in the 8th century AD. In the latrine (SU 583; Castiglioni *et al.* 2014g) mineralized and burnt material was preserved, including a textile fragment[2]. In a small food store (SU 557; Castiglioni *et al.* 2014f) identified in the collapsed 8th century dwelling, 416 burnt fruit/seed remains were found.

2.2. The Santa Giulia complex

The analyses (Castiglioni *et al.* 1999) were conducted on material taken from various buildings, perhaps servants' huts in which foodstuffs were stored, excavated in the Santa Giulia complex near the monastery of San Salvatore, in an area previously occupied by Roman *domus* (Brogiolo 1999). In all there were 23 samples: one Roman, from one of the *domus* (1st-5th century AD, tab. 2), eleven from the period of Goth occupation (450-569) and eleven from after the Lombard conquest (569-

[1] SU 243, SU 244A, SU 246A, SU 260, SU 263, SU 266, SU 268, SU 270, SU 277, SU 327, SU 332.

[2] This fragment of mineralized plain-weave cloth was only a few millimetres wide; OY direction: Z-twisted threads, diameter 0.6 mm, 15 threads/cm; OX direction: Z-twisted threads, diameter 0.5-0.7-(0.8) mm, 10 threads/cm. The fibre could not be identified.

680). Around 15,000 carpological remains were identified (tab. 3)[3], of which 13,000 from the pre-Lombard phase; a total of 593 charcoal fragments from various contexts[4] were examined, including charcoal from six structural elements (tab. 4).

From Early Medieval contexts of the same excavation about 400 fragments of daub fragments with wattle impressions were also examined (Castiglioni, Rottoli 2005), which showed that branches were used for the interlaced structure, in both horizontal and vertical positions. One group, with a transverse weave, seems of higher quality and has a series of raised and engraved decorations and were probably placed at the base of the walls; a second type, without decorations, is of inferior quality. Since this material was mostly found in collapse deposits and pit fills, it was not possible to establish whether the dissimilarity was due to chronological diversity or different building functions.

2.3. The Kitchen-Garden (Ortaglia) Domus

From Early Medieval deposits in the Kitchen-Garden *Domus* (located just to the east of Santa Giulia), two small samples were analysed (Castiglioni unpublished); they contained a total of 807 burnt carpological remains. The sample containing more material (SU 172) was a posthole fill, and the other (SU 244) the fill of a wall foundation trench (tab. 3).

2.4. Via Alberto Mario

Excavations conducted in 1983 in Via Alberto Mario, on the eastern edge of the town, yielded (Castelletti, Maspero 1988) charcoal fragments (181 were analyzed, tab. 4) and seeds/fruits (c. 22,000 remains, tab. 3). Samples taken from an Early Medieval building[5] (5th-6th century AD), from layers that accumulated during a long period of disuse (7th-12th century AD; SU 1003) and during the area's subsequent reoccupation from the 12th to 15th century AD (SU 1065, 1147). The Early Medieval charcoal came from wooden building parts (beams and minor components) and occupation deposits. Charcoal from subsequent disuse deposits was probably associated with waste used to enrich the soil. Some of the Late Medieval charcoal was derived from charcoal burning, for use

[3] The tables (tab. 2 and tab. 3) list only species used as food, for a total of 12,612 remains.

[4] This number comprises 311 charcoal fragments from the 5th-6th century phase, 254 from the 6th-7th century and 28 from the 7th-11th century. The table does not include unidentified charcoal fragments or those from one poorly-dated context.

[5] SU 1225, SU 1214, SU 1163, SU 1117.

		cent. AD	5th-6th	450-569	569-680	6th-7th	7th	7th	8th	12th-13th	
		site	*AM*	*SG*	*SG*	*Ort*	*CP*	*Cap*	*Cap*	*AM*	
taxon	**remains**	**SU**	**1225**	**several**	**several**	**172, 244**	**–**	**557**	**583**	**1065**	**total**
CEREALS											
Hordeum vulgare	grain			1091+14cf.	95+2cf.	358+3cf.		1+7cf.		1	**1572**
Secale cereale	grain		62	2447+13cf.	54	166		4	X		**> 2747**
Secale cereale	rachis frag.			2cf.							**2**
Triticum aestivum s.l	grain		3	1334+13cf.	144+5cf.	30		146+6cf.		3	**1684**
Triticum monococcum	grain		750	652+43cf.	12	6+2cf.					**1465**
Triticum monococcum	spikelet fork		140	28+7cf.	1					1	**177**
Triticum dicoccum	grain		2	5+11cf.	1+3cf.	1					**23**
Triticum monococcum/ dicoccum	grain			9							**9**
Triticum monococcum/ dicoccum	spikelet fork			2							**2**
Triticum spelta	grain			2cf.							**2**
Triticum sp.	grain			39	18	2	1	26			**86**
Avena sativa	grain		7cf.	>17+1cf.	1+2cf.	3					**> 31**
Cerealia	grain			>377	74	29		192			**> 672**
Panicum miliaceum	grain		21000	>368	119+1cf.			15	Xm		**> 21504**
Setaria italica	grain		3	>4cf.	2cf.	1					**> 10**
Sorghum bicolor	grain			269		7					**276**
Sorghum bicolor	rachis frag.			1+3cf.							**4**
Panicoideae	grain			>3							**> 3**
PULSES											
Lathyrus cicera/sativus	seed			1496+7cf.	4+1cf.				Xm		**> 1509**
Lens culinaris	seed		9	514	11+1cf.	1+2cf.		2		1	**541**
Pisum sativum	seed			145+3cf.		6+12cf.			Xm cf.		**> 167**
Vicia faba var. minor	seed		16	1077+704cf.		141			Xm cf.		**> 1939**
Vicia sativa agg.	seed			856+4cf.	36	12			X		**> 909**
Vigna unguiculata	seed			6+1cf.							**7**
Leguminosae	seed			156+2cf.	9	22		8	Xm		**> 198**
FRUITS											
Castanea sativa	fruit		5		3						**8**
Cornus mas	stone			7+1cf.	1						**9**
Corylus avellana	nutshell			2	9					1	**12**
Ficus carica	nutlet								Xm		**> 1**
Fragaria vesca	achene			1							**1**
Juglans regia	nutshell			105+4cf.	30+3cf.	1		10	X		**> 154**
Malus/Pyrus	seed								Xm		**> 1**
Morus nigra	achene			1cf.							**1**
Prunus avium/cerasus	stone			2+3cf.							**5**
Prunus persica	stone			10+2cf.	1	1					**14**
Prunus spinosa	stone				1						**1**
Prunus sp.	stone			1cf.					Xm		**> 1**
Rubus sp.	stone								Xm		**> 1**
Sambucus sp.	stone								Xm		**> 1**
Vitis vinifera	pip		1	13	34+7cf.	1	61m	1	Xm		**> 119**

		cent. AD	5th-6th	450-569	569-680	6th-7th	7th	7th	8th	12th-13th	
		site	*AM*	*SG*	*SG*	*Ort*	*CP*	*Cap*	*Cap*	*AM*	
taxon	**remains**	**SU**	**1225**	**several**	**several**	**172, 244**	**–**	**557**	**583**	**1065**	**total**
VEGETABLES											
Cucumis melo/sativus	seed								Xm		**> 1**
Lagenaria siceraria	seed								Xm		**> 1**
Allium sativum	clove			8							**8**
Ammi majus	seed								Xm		**> 1**
Anethum graveolens	seed								Xm cf.		**> 1**
Coriandrum sativum	seed								Xm cf.		**> 1**
Foeniculum vulgare	seed								Xm		**> 1**
Petroselinum sativum	seed								Xm		**> 1**
Daucus carota	seed								Xm cf.		**> 1**
total			**21998**	**11886**	**685**	**807**	**62**	**417**	**22**	**7**	**35884**

Tab. 3. Seed/fruit remains (food species) from Brescian medieval contexts.
AM: Via Alberto Mario; *SG*: Santa Giulia Ort; *Domus* Ortaglia; *CP*: Casa Pallaveri; *Cap*: *Capitolium*; m, mineralized.

by metalworkers. The carpological remains from the Early Medieval context perhaps belonged to a small food store that was carbonized during a fire. Scarce seed/fruit remains were found in a 12th-13th century levelling layer.

2.5. Casa Pallaveri

During excavations in 1990 in this building, erected on top of Roman ruins just west of the *Capitolium*, a small sample (SU 140) was taken from a 7th century AD deposit in which was found a metal spear point (SU 259), associated with mineralized wood remains (Rottoli 1996). The sediment contained a few mineralized and burnt seeds (tab. 3). Adhering to the metal tip were splinters of deciduous oak wood, partly carbonized and partly mineralized, probably associated with a fire that led to the collapse of a wooden building. A piece of the wooden shaft that survived inside the spear point came from a large branch or small trunk, almost certainly of chestnut.

During later work in the same building (1998 excavation), in another 7th century AD context a burnt textile fragment[6] was found, folded and resting on a tablet of deciduous oak (Castiglioni, Rottoli unpublished).

[6] The fragment measures 25 x 18 cm, in rather loose Basket Weave, i.e. plain-weave fabric with double threads in both directions, Z-twisted, diameter 0.8-0.9 mm with 9 threads/centimetre, in plant fibre. The use of this weave in Early Medieval times is exceedingly rare; the only other similar recorded cloth comes from the Lombard graveyard at Collegno (Rottoli, Castiglioni 2014).

	cent. DC	5th-6th	5th-6th	6th-7th	7th		7th-11th	7th-12th	8th-10th	13th	15th
	site	*AM*	*SG*	*SG*	*CP*		*SG*	*AM*	*Cap*	*AM*	*AM*
taxon	**SU**	**1225**	**several**	**several**	**layer**		**several**	**1003**	**545**	**1065**	**1147**
Abies alba				20+2cf.							
Acer sp.			1				1	x			
Alnus glutinosa/ A. incana			4	1							
Carpinus betulus				4+1cf.			6+1cf.				
Castanea sativa		x	116+4(s)+3cf.	109+2cf.	1cf.		3+1cf.	x	2	x	x
Castanea/Quercus			6	4							
Cornus mas/ C. sanguinea			1								
Cornus/Viburnum				3+1cf.							
Corylus avellana			4+1cf.	1				x	1		x
Fagus sylvatica		x	1	3			2	x		x	x
Fraxinus angustifolia			1(s)								
Fraxinus cf. excelsior			5	2							
Fraxinus sp.				1			1	x	1	x	x
Juglans regia			4	1					1		
Larix decidua		x(s)	1cf.								
Ostrya carpinifolia		x		2				x			x
Ostrya/Carpinus			5	13					1		
Picea excelsa		xcf.									
Pinus sylvestris/ P. mugo			10								
Pomoideae			25	14+1cf.						x	
Populus sp.			5	1cf.							
Prunus sp.			1	1							
Quercus sez. *Cerris*			2+2cf.	1							
Quercus sez. *Robur*		x	40+1cf.	34+1(s)	x			x	4	x	x
Quercus sp.			19+1cf.	24+2cf.			13				
Sambucus sp.			5								
Ulmus sp.			43	5				x			x
total		**66**	**311**	**254**	**>5**		**28**	**25**	**10**	**30**	**60**

Tab. 4. Charcoal from Brescian medieval contexts.
AM: Via Alberto Mario; *SG*: Santa Giulia Ort; *Domus* Ortaglia; *CP*: Casa Pallaveri; *Cap*: *Capitolium*; m, mineralized.

2.6. The Via Cremona cemetery

In 2002 in Via Cremona, on the *Cardo maximus* outside the southern Roman town wall, a number of monumental burials were found. Tomb 2 (3rd century AD; Rossi 2004), in which a 42-55 year old male was buried (Cattaneo, Mazzucchi 2004), contained – above and below the skeleton – abundant but poorly preserved textile remains, sometimes with over-

lapping layers (Castiglioni, Rottoli 2004)[7]. No plant offerings were found inside the grave, although these are known from other inhumation cemeteries of the same period (Milan Catholic University cemetery; Maspero, Rottoli 2005) as well as – and more frequently – cremation cemeteries, such as those around Brescia (see for example burials at Nave, Manerbio and Desenzano Faustinella locality; Rottoli, Castiglioni 2011).

2.7. San Salvatore, Lombard stuccoes

From the Lombard stuccoes in the church of San Salvatore, and from a stucco Madonna kept in the Brescia Civic Museum samples were taken for ^{14}C dating of a straw-like material (cf. *Phragmites australis*) of 7th-8th century AD date (Brogiolo, Morandini 2014).

3. Results of the analyses

The contexts that furnished the most information are those of the *Capitolium* for the Romanization and Early Medieval periods, and those of the Santa Giulia complex for the Early Medieval. The other contexts examined have added detail, and allowed us to make comparisons with other situations in different parts of the town, especially for the Early Medieval period. The prevalence of burnt material (in some cases from storerooms fires), provides almost exclusively information of an economic nature, regarding production and consumption; environmental information, on the other hand, is very scarce. Data on cereals and pulses are more detailed, while those concerning the consumption of fruit and vegetables are very limited. Information from charcoal, often related to structural timbers or fuel used for specialized craft activities, throws light above all on technical preferences and only indirectly gives indications on the composition of woodlands.

3.1. Wood use

Romanization period

For the older phases over 500 charcoal analyses are available (tab. 1, fig. 3) from samples taken in various contexts in the *Capitolium* area and dating from the 3rd to 1st century BC. The material examined comes

[7] The best-preserved fragments (from near the shoulders) are in a compact plain weave, with Z-twisted threads in both directions. One series, perhaps the warp, seemed to have thinner threads (diameter 0.4 mm), regular and spaced; the other (the weft?) had threads of rather variable diameter (0.4-0.6 mm; 20 threads/cm) and was denser; the fibre could not be determined.

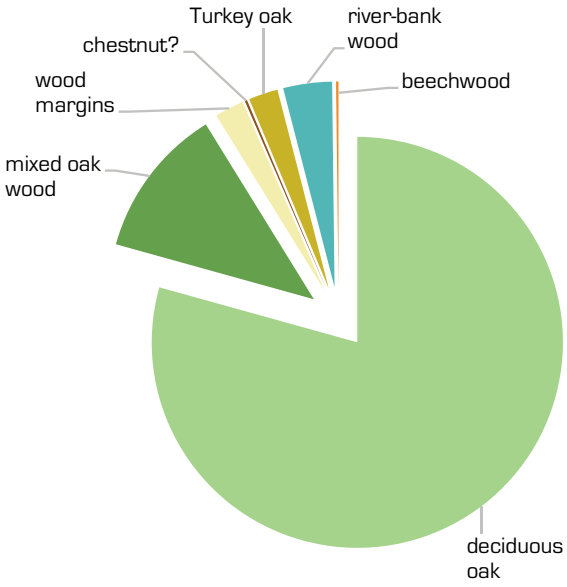

Fig. 3. Areas where timber was obtained in the 3rd-1st centuries BC (based on data from the *Capitolium*).

largely from structural timbers (beams, planks etc.) and was found in collapse deposits. Charcoal fragments pertaining to hearths, occupation surfaces and dumping are smaller, but these contexts often contain fragments that come from large pieces, so it is possible that these are also from structural timbers. This would account for the high percentage and abundance of deciduous oak (*Quercus* sect. *Robur*), probably sessile oak (*Quercus petraea*): recognizable timbers are usually made from wood of this species, apart for a few in elm (almost certainly *Ulmus minor*) and Turkey oak (*Quercus cerris*). The choice of oak was due to its well-known physical properties, in addition to its common presence on the plain at this time, as abundantly demonstrated by pollen studies and other work on charcoal (Fredella *et al.* 2011; Castelletti, Rottoli 1998). With the exception of elm, found slightly more frequently, the species that occurred together with oak in the mixed oak woodland – maples (*Acer* sp.), ashes (*Fraxinus* cf. *excelsior*; *Fraxinus* sp.) and lime (*Tilia* cf. *cordata*) – are scarcely represented. The importance of elm, in addition to demonstrating the occasional use of this species as well as oak in buildings, might point to the felling of timber in lowland areas south of the city, with heavy, clayey soils in which the elm grows preferentially. Indicative of river-bank (or high-water-table) habitats are the alder (almost certainly *Alnus glutinosa*) and, to a lesser extent, the poplar (*Populus* sp.). The rarity of charcoal from these species may be due to the reduced pres-

ence of wetland areas, or to the selection of other wood types for technical reasons. Similarly scarce are species typically found in clearings and wood margins – dogwood (*Cornus mas/sanguinea*) and *Pomoideae* – which are only found occasionally.

In summary, these data suggest that in this period the forest was still compact, given the dominance of oak woodland species and the small number of those associated with the fragmentation of woodland cover. Other environments (apart from the plain) are documented by scarce charcoal fragments: the infrequent Turkey oak may come from the best-drained parts of the plain and/or from the first foothills; beech (*Fagus sylvatica*, a single piece from a 1st century BC context) is associated with somewhat higher altitudes, although in the past the species was present on the plain, if only sporadically. As for the chestnut, its presence in this period is uncertain (cf. *Castanea sativa*, *Castanea/Quercus*), and in any case limited to a few fragments from 1st century BC contexts.

Early Medieval period

Early Medieval charcoal data comes from the 5th-6th century buildings in Via Alberto Mario, 5th-7th century buildings at Santa Giulia and a single context in Casa Pallaveri (in total 636 charcoal fragments; tab. 4). Most of the charcoal comes from a variety of situations: hearths and other specialized pyrotechnic installations, occupation surfaces, collapsed

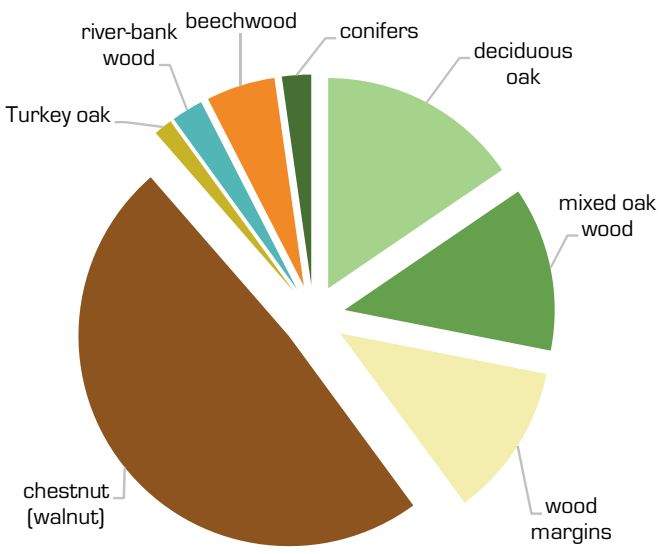

Fig. 4 - Areas where timber was obtained in the Early Medieval period (based on data from Santa Giulia).

structures, and rarely from structural timbers. Probably due to these diverse sources, the body of material as a whole shows more diversity (fig. 4). The most significant change is the drastic reduction of oaks, replaced by chestnuts, a phenomenon that is found throughout the Alpine foothills between Como and Brescia. Although it is now clear that the spread of chestnut was due to human action, the reasons and methods are still uncertain. The most probable hypothesis (Conedera *et al.* 2004) seems to be that chestnuts were initially planted in place of oak woods, first on the plain and then in hilly areas, for the production of structural timber, above all the poles and stakes used to support vines and for other agriculture purposes. Only later, with the selection of varieties giving higher quality and productivity, was it also appreciated as a fruit tree. The planting of chestnut trees, which began in the early centuries of the Empire, reached its peak in about the 5th-6th century AD, as is evident in Brescia, and also in the Goth period settlement of Monte Barro (Lecco; Castelletti, Castiglioni 1991; Castiglioni *et al.* 2001), about 80 km west of Brescia, where chestnut was predominant both as timber and firewood. Four of the six beams recognized at Santa Giulia are also made of chestnut. Further evidence of the spread of this tree in the plain is the almost exclusive use of chestnut boards for the construction of the burial chamber of a Lombard warrior in Caravaggio (about 50 km west of Brescia, Fortunati *et al.* 2018).

Notwithstanding the reduction of oak woods, oak and other mixed oak woodland species are still recorded in Brescian Early Medieval layers, with elm still relatively common, whereas the use of maple, white hornbeam (*Carpinus betulus*) and ash is less frequent. Floodplain species remain rare, with alder and poplar joined by the narrow-leafed ash (*Fraxinus angustifolia*), while photophilous trees of margins and clearings are more common, with the *Pomoideae* lightly more abundant, followed by hazelnuts (*Corylus avellana*), dogwoods, perhaps viburnum (*Cornus*/*Viburnum*), plums (*Prunus* sp.) and elderberry (*Sambucus* sp.). The relative abundance of *Pomoideae* members suggests the presence of fruit trees (apples, pears or rowans), either singly or in small orchards in uninhabited areas inside the town (urban plots) or outside but nearby. Similarly the walnut (*Juglans regia*) – also introduced several centuries before and used, like the chestnut, both for timber (for furniture) and as firewood and for its fruit – may have been grown inside the town as well.

The presence of wood from higher altitudes during the Early Medieval period, documented by some specimens of hornbeam (*Ostrya carpinifolia*), rather more beech, and by the occasional presence of silver fir

(*Abies alba*) and pine (*Pinus sylvestris/mugo*)[8], seems to indicate the greater exploitation then of woodland resources also in the hills and low mountains located immediately north of Brescia. The identification of charcoal from high-altitude conifers, larch (*Larix decidua*) and Norway spruce (cf. *Picea excelsa*), which were used for some beams in Via Alberto Mario and Santa Giulia, seems to have a different explanation: the reuse of building material from dismantled Roman houses. It is rather unlikely that coniferous logs were transported from distant mountain locations – activities that require the complex organization of both men and transport and suitable river routes – in an era of political instability, when trade languished.

The few charcoal fragments examined from later medieval contexts (153 in total), not always dated with precision, show no substantial changes, with the exception of perhaps a higher consumption of beech. Chestnut remained dominant, followed by oak and other mixed oak woodland species.

3.2. Economy

Pre-Roman and Roman periods

For the older part (pre-Roman and Roman), 868 burnt remains were identified (tab. 2) from 20 contexts, almost all belonging to the Romanization phase and Republican period (3rd-1st century BC); two samples are of Flavian age (1st century AD) and one, from the Santa Giulia *domus*, is later but not precisely dated (1st-5th century AD). The sample with most material is a dump of cereal-processing waste found in a pit inside the 2nd century BC building situated next to the *Capitolium*; other samples contained from several tens of finds to just a few. Cereals are the most common category, while remains of fruit and pulses are limited.

In the most abundant sample, hulled wheats and foxtail millet (*Setaria italica*) predominated with respect to naked wheats (*Triticum aestivum/durum*), broomcorn millet (*Panicum miliaceum*) and rye (*Secale cereale*); barley (*Hordeum vulgare*) was not present, while "new" glume wheat was present. Very few remains of pulses (pea, *Pisum sativum*; bitter vetch, *Vicia ervilia*; and grasspea/chickling vetch, *Lathyrus sativus/cicera*) – and fruits (hazelnut) were found.

The small numbers of finds from the other samples makes statistical considerations impossible, but provide indications of the frequency of dif-

[8] It proved impossible to understand the significance of the silver fir charcoal fragments, which showed no signs of working and retained portions of bark. The pine was probably used for furnishings.

ferent species. Most common are foxtail millet, barley and broomcorn millet, followed by the hulled wheats (emmer, *Triticum dicoccum*; einkorn, *Triticum monococcum*) and naked wheats; rye occurs in two contexts, one of which is a small, almost pure deposit of Flavian age. Spelt (*Triticum spelta*) is occasionally present. Pulses are limited to few remains of various types, whose relative importance is impossible to estimate, with grasspea/chickling vetch, lentil (*Lens culinaris*), faba bean (*Vicia faba minor*), bitter vetch and pea. Fruit remains are rare, with grape seeds (*Vitis vinifera*) and walnuts a little more numerous and widespread. A single olive stone (*Olea europaea*) was found in Santa Giulia's Roman deposits.

Early medieval period

About 36,000 Early Medieval finds were obtained from five excavation areas (tab. 3), representing 28 contexts mainly from the Santa Giulia complex, from the period of Goth occupation and following Lombard phases. Cereal cultivation was based on rye and naked wheats, accompanied by barley, broomcorn millet and einkorn. Cultivation of emmer seems to have been minimal, together with that of foxtail millet. The resumption of interest in einkorn appears to have been due to the use of straw from this hulled wheat, which is longer and thinner than others, for the construction of thatched roofs and as a temper in the walls of clay. In this regard, it is worth noting the presence of this cereal inside a fragment of daub from the Santa Giulia complex (Castiglioni, Rottoli 2005).

Spelt seems not to have been grown, whereas oat (*Avena sativa*) appears to become more important. In 5th-6th century deposits at Santa Giulia sorghum is found (*Sorghum bicolor*), and also in the Kitchen Garden (Ortaglia) in a Lombard period context.

Although lentil is the most common pulse, more consistent quantities are found of faba bean and grasspea, followed by common vetch (*Vicia sativa* agg.) and pea; bitter vetch is absent. In 5th-6th century deposits from Santa Giulia, a few cowpeas (*Vigna unguiculata*) were also found.

Fruits are scarce amongst the burnt material, with grape and walnut the most common; other fruits – both cultivated and gathered in the wild – are very sparsely represented. A better picture of fruit and vegetable consumption is given by the latrine found in the *Capitolium* area; here – due to mineralization – in addition to a greater variety of fruits, even some vegetables and aromatic plants were preserved. Among the burnt material from Santa Giulia there are several cloves of garlic (*Allium sativum*).

The only later medieval sample (Via A. Mario, 12th-13th century AD) yielded very few remains of little significance.

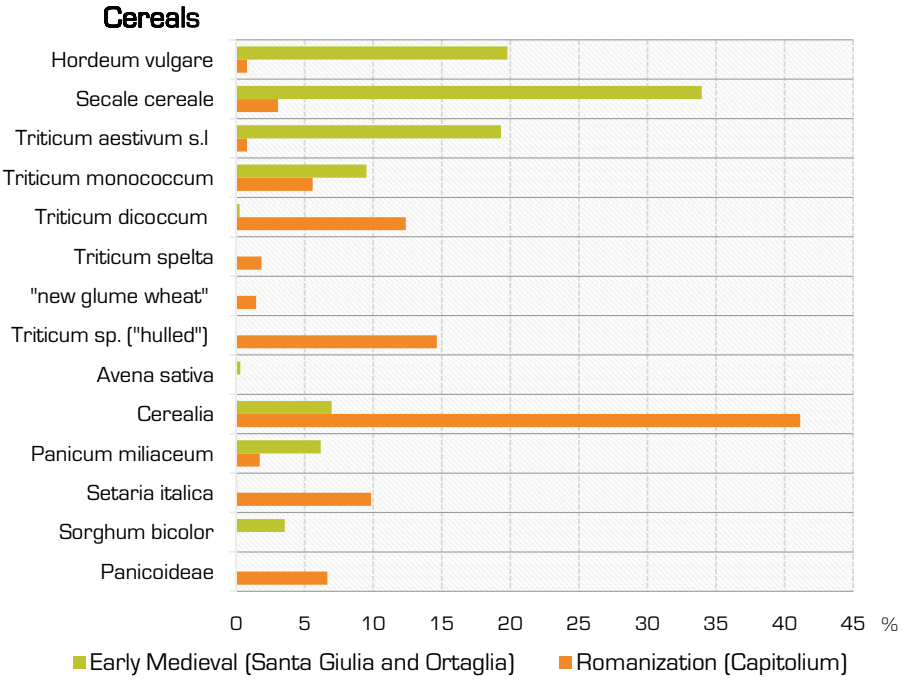

Fig. 5. Comparison of cereals recorded in the Romanization epoch (based on data from the *Capitolium*) and Early Medieval period (based on data from Santa Giulia and the Ortaglia).

4. Discussion

The archaeobotanical information gives an understanding of the economy of two precise moments in Brescia's history: the Romanization period (3rd-1st centuries BC) and the epoch immediately after the fall of the Roman Empire (5th to 8th centuries AD). These are interesting data because they were collected within an urban fabric that has been thoroughly studied from historical and archaeological perspectives.

The economic background relating to Romanization (fig. 5) is less detailed than for Early Middle Ages and perhaps somewhat distorted, since the material comes from contexts linked to an area important for religion and political representation, the *Capitolium*, in its various rebuilds. The collected data nevertheless seem to describe a situation that does not differ from the general panorama of northern Italy for this period (Rottoli *et al.* 2016), above all for territories north of the Po. Cereal cultivation,

both on the plain and in Alpine valleys, was principally based on hulled cereals (especially emmer, einkorn and barley) and millets (broomcorn and foxtail millet). Among these minor cereals the former is usually most common, but the prevalence of foxtail millet – as seen in Brescia in the *Capitolium* deposits – is also found in other towns in Veneto and Trentino-Alto Adige (e.g. Padova-Questura; Laives-Reif; Rottoli *et al.* 2016). Given the limited number of remains, little may be said regarding the pulses from Brescia, where however almost all the species cultivated in this period are recorded.

Production and consumption in Brescia do not seem to undergo substantial changes during the three centuries under consideration, notwithstanding significant changes in the political framework during this period. This would suggest the Cenomanian Gauls' gradual assimilation of Roman culture – which however only later was associated with marked changes, during the Empire, undoubtedly after the onset of the centuriation of the countryside around Brescia in the 1st century BC. Confirmation of the slow adoption by non-Roman peoples of Roman habits emerges from the comparison with data from Cremona, a city founded by the Romans (in 219 BC) where, in a late 2nd century BC context (dumping from a craft workshop where bone was carved; Castiglioni, Rottoli 2017), alongside traditional cereals (hulled wheats), typically "Roman" plant species were also found, such as jujube, mulberry and olive.

Of these fruits, in Brescia, olives are attested from Santa Giulia by a single pit from the *domus* in later layers. The other fruits found come from both cultivated and wild plants belonging to older traditions. A few remains of walnuts are documented in the *Capitolium* from the 1st century BC onwards; their cultivation (or at least consumption of the fruit) is a more ancient practice around Brescia, however, as shown by the discovery of shells in 5th-3rd century BC layers in the religious area of Breno, in Valcamonica (Castiglioni, Rottoli 2010a).

The identification is worthy of note, in the 2nd century BC building situated next to the *Capitolium*, of some parts of ears of so-called "new" glume wheat (Jones *et al.* 2000), believed to be *Triticum timopheevii* (Timopheev's wheat), an hulled wheat, similar to emmer but with a different genome, currently grown only in Georgia. This wheat has been reported in northern Italy in some Neolithic and Bronze Age sites, sometimes constituting a significant proportion of cereals present. The lack of finds on Iron Age sites had led to the supposition that its cultivation had been abandoned at the beginning of the 1st millennium BC. Its discovery at the *Capitolium* – and in another Roman context in Luni-Casale Menchelli (on the border between Liguria and Tuscany, Castiglioni, Rot-

toli, unpublished data) – may be interpreted in different ways: the cultivation of this cereal could have continued during the Iron Age, although greatly reduced; or it could have effectively ceased at the end of the Bronze Age, with the cereal's re-introduction in Roman times; or again, the kernels found might have come from non-local crops, perhaps grown in geographical areas closer to this wheat's current area of cultivation, and have been purchased commercially (still hulled[9]).

The presence of substantial accumulations of grains in Early Medieval contexts gives a more detailed picture of the town's economy. With respect to the Romanization epoch, the change is evident (fig. 5); cereal cultivation, based on hulled cereals in the earlier phase, is now dominated by rye and naked wheats, often with a notable amount of barley. A marked reduction in the cultivation of emmer is evident, and in contrast the greater popularity of einkorn. An inversion of proportions also occurs for minor cereals, with broomcorn millet becoming more important than foxtail millet. The identification of sorghum in both Santa Giulia and the Kitchen Garden (Ortaglia) area is interesting: these are two of the oldest finds in Italy of this cereal, mentioned earlier by Pliny the Elder, but never found in Imperial Roman deposits (Castiglioni, Rottoli 2010b; Castiglioni, Rottoli 2013). With regard to pulses, lentils are most common, but found in smaller accumulations than faba bean and grasspea; common vetch, peas and cow pea were less important. The latter species too, although known to classical authors, has never been found in Imperial Roman contexts, and is however rare in later epochs (Castiglioni, Rettore 2004). Combining the data from the two largest accumulations (Santa Giulia and Ortaglia), preference seems to have been for consumption of grasspea, fababean and common vetch (fig. 6). Compared to what is known from other sites of this era (Bosi *et al.* 2016), the sum total of the stratigraphic units investigated (5th-8th AD) indicates a rather varied and complete picture of these food resources, with eleven species of cereal and six of cultivated pulses, including species whose identification is rare or even exceptional, such as sorghum and cow pea.

Due to the lack of relatively abundant archaeobotanical data for the 1st-3rd century AD from Brescia, it is not possible to specify when and how the changes occurred that determined the differences found between the Romanization period and the Early Middle Ages. Comparison with other sites (Bosi *et al.* 2013), both in Brescia's hinterland and in

[9] This hulled cereal may be identified from parts of the ear. The distinction of its caryopses from those of emmer and spelt is still debated (but see Perego 2017).

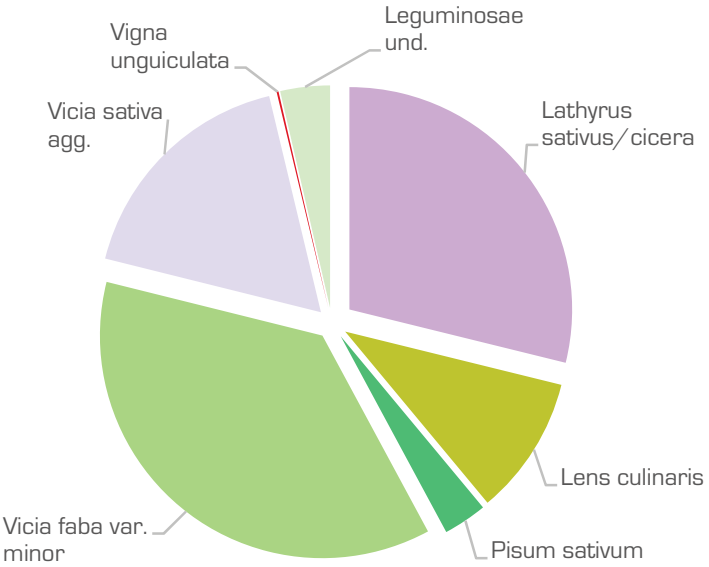

Fig. 6. Pulses in Brescia during the Early Medieval period (based on data from Santa Giulia and the Ortaglia).

a wider area north of the Po, suggests that in the 1st-2nd century AD all the "fashionable" Roman products were extremely widespread here too, while from about the late 3rd to 4th century, at least in northern Italy, certain progressive changes in diet may be detected. These included the increased spread of rye, especially on the plain, and the rapid expansion of the chestnut, as mentioned. Later, with the general decline of the Empire, coinciding with the deterioration of urban centres and a progressive reduction in trading, other dietary changes occurred: in particular medium-to-long-distance imports disappeared from dining tables.

However, this general impoverishment does not seem to have involved the areas of Santa Giulia and the Ortaglia; even if no "exotic" species are found here, the archaeobotanical data still show that a diversity of products was available. This variety could perhaps be linked to the presence in the area of an organized community which, although of servant status (see Brogiolo *et al.* 2005), was directly dependent on high authority, first "Goth" and then Lombard. These powers would have had relatively unlimited access to foodstuffs from far afield (currently not precisely definable) rather than from the urban market gardens that grew up following the town's partial ruralization. Data (not

presented here) furnished by the seeds and fruits of non-food plants, mostly cereal weeds and ruderal species, do not provide information that permits the size and distribution of cultivated areas to be evaluated. Evidence regarding olive trees is contradictory; this crop was introduced in Roman times in various areas around Lake Garda, i.e. less than 30 km from Brescia – where, however, no olive pits were found in the Early Medieval layers investigated. This may be a random occurrence, or due to conservation problems or even to limited trade in foodstuffs with quite nearby areas; but a similar lack of olives in the Early Medieval layers of a *Villa* at Desenzano (Castiglioni, Rottoli 2007) and the presence of just a single uncertain fragment in Sirmione (Rottoli 1998), would seem to indicate that there was a temporary crisis in olive production, although this production is in fact documented by archive data towards the end of the 8th century[10].

5. Conclusions

The botanical remains found in Brescia – apart from some samples from the *Capitolium* that are hypothesized to have been connected with ritual activities – are from contexts in inhabited areas or construction sites. Their carbonization and preservation was due to combustion that was in part accidental and in part intentional.

That the numerous samples studied come from different archaeological areas and contexts makes the data more reliable and limits possible distortions due to random events. Close collaboration between archaeologists and archaeobotanists, with reciprocal exchange of information, has allowed a more precise archaeological interpretation of the sampled contexts and a greater understanding of the mechanisms involved, and of the significance and importance of the botanical material examined.

Since – in addition to wooden structures – the burnt materials were stored foodstuffs, rubbish and cereal-processing waste, most of the information obtained regards diet and the economy. Given that the town appears to have existed since the 5th century BC and seems to have included limited uncultivated areas within its perimeter – both in the older epoch and during the partial abandonment and ruralization of the Early Middle Ages – it may be assumed that most of the botanical

[10] Anselperga, abbess of San Salvatore in Brescia, in 771 exchanged estates near Vicenza for others near Sirmione, which contained olive groves (Montanari 1979).

material derives from productive areas outside the city. The position and sizes of these areas, both in pre-Roman and medieval times, remains uncertain. Data derived from charcoal suggest the prevalence of the plain as a source area in pre-Roman and Early Medieval periods, although in the later phases it seems that more wood may have come from hilly areas.

Archaeobotanical data seem to indicate that during the Romanization phase a gradual adoption of Roman customs and habits occurred, but tell us little about resource management systems and the relationship between the town and the surrounding countryside. For the Early Middle Ages – a period of decline and uncertainty – the archaeobotanical data seem to confirm a decrease in trade but at the same time testify to the wide availability of foodstuffs. This variety and quantity of products suggests, as do to the archaeological data, the existence of authorities and organizations capable of controlling production in the countryside and managing it within the town.

These hypotheses may be further refined with the continuation of investigations in both new areas within the city and in the surrounding territory, but at present the research carried out in Brescia already constitutes an exemplary case of how the interdisciplinary nature of research can yield a more detailed understanding, especially when historical and archive records are not abundant.

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