

Ecology and Food Consumption of Late Medieval Tartu, Estonia (14th -15th Centuries)

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Archaeobotany in the context of food investigation

For the investigation of food of the Middle Ages, both written and non-written sources are used. From the archaeological point of view, cesspits or latrines¹ are excellent deposits due to the large number of plant as well as animal remains preserved. Although plants from natural habitats are also represented in the latrines, major attention is concentrated on the investigation of edible plants, parts of which had passed through the human stomach, or were designated as kitchen refuse. In latrines, these edible plant remains are the most reasonable field of study.

If possible, the interpretation of archaeobotanical data is carried out in accordance with written sources. Referring to Schofield and Vince, the natural scientific analyses in the investigations of latrines only produce uncertainties and "local anecdotal information."² Such an impression can be explained by the fact that frequently, when trying to reconstruct the historical picture, the results of research in many different disciplines are insufficiently used. These auxiliary disciplines are in our case, for example, geobotany, ecology and plant sociology, palaeo-ecology, and ethnobotany. Ethnographic models, contemporary sources, settlement geography, settlement archaeology, and experimental studies are also to be included, as listed by Willerding.³ Nevertheless, there are good examples of investigation of latrines from a natural scientific point of view. Knörzer

¹ In the archaeological context the term 'wooden construction' is used. The archaeological investigation of latrines is presented by Betty Arndt, "Methodische und interdisziplinäre Fragestellungen bei Untersuchungen an städtischen Kloaken: Forschungsstand und Perspektiven" (Hausarbeit zur Erlangung des Magistergrades (M.A.) des Fachbereichs Historisch-Philologische Wissenschaften der Georg-August-Universität Göttingen, 1986), typewritten.

² John Schofield and A. Vince, *Medieval Towns* (London: Leicester University Press, 1994), 180.

³ Ulrich Willerding, "Paläo-ethnobotanische Befunde über die Lebens- und Umweltverhältnisse im Mittelalter," in *Determinanten der Bevölkerungsentwicklung im Mittelalter*, eds. Bernd Herrmann and Rudolf Sprandel (Weinheim: Acta Humaniora, 1987), 109-125.

analysed four latrines from the first to the eighteenth centuries in Cologne and nine deposits from the ninth to the eighteenth centuries in Duisburg, producing reasonable evidence of the proportions of various plants consumed during those time periods.⁴ For instance, the ratio of cultivated and wild fruits for Cologne was 10:1, for Duisburg 1.8:1. Differences occur not only among the individual constructions, but between the towns as well, probably due to their dissimilar size and importance. At the investigation in Kiel, a valuable spice, melegueta-pepper, known as paradise grain in medieval cookbooks, was found in the plot which belonged historically to a wealthy merchant and ship owner in the sixteenth century.⁵ However, if valuable information is to be gained, archaeological material has to be put into its historical context in order to avoid the "local anecdotal information" and the misunderstandings caused by the different approaches of the investigation methods.

Non-written sources have their advantages and disadvantages. One of the disadvantages has already been mentioned, the question of interpretation being different from the language used in the historical research. Moreover, there are many complications concerning the preservation of plant material which was used for food. In archaeological excavations, less plant species are found than the written sources record. In Göttingen, 33 plant species are recorded in the medieval account roll, 23 of them are archaeologically proven.⁶ The number of plants in a low German cook book from the fifteenth centuries is 42.⁷ Knörzer has outlined the main reasons why many plants cannot be preserved.⁸ He lists:

- 1) the treatment of foodstuff during the preparation, grinding and smashing in mortar (crops and spices);
- 2) cooking or boiling (vegetables), chewing when eating;
- 3) digestion;
- 4) activity of insects who live on the faeces;
- 5) bacterial destruction and rotting of the material.

⁴ Karl-Heinz Knörzer, "Koproanalyse, ein neuer Beitrag zur Geschichte der Ernährung," in *Recent Developments in Palaeoethnobotany*, ed. Jane M. Renfrew (Edinburgh: Edinburgh University Press, 1991), 39-50.

⁵ Julian Wiethold, "Plant Remains from Town-Moats and Cesspits of Medieval Kiel (Schleswig-Holstein, Germany)," in *Res archaeobotanicae: Proceedings of the Ninth Symposium, Kiel 1992*, eds. H. Kroll and R. Pasternak (Kiel: Oetker-Voges-Verlag, 1995), 359-384, as well as Maren Hellwig, "Paradieskörner *Aframomum melegueta* (Roscoe) K. Schum. – Ein Gewürz aus Westafrika im frühneuzeitlichen Göttingen," in *ibid.*, 39-47.

⁶ Ulrich Willerding, "Ernährung, Gartenbau und Landwirtschaft im Bereich der Stadt," in *Landesaustellung Niedersachsen 1985, Stadt im Wandel: Kunst und Kultur des Bürgertums in Norddeutschland 1150-1650, Ausstellungskatalog*, vol. 3, ed. Cord Meckseper (Stuttgart and Bad Cannstatt: Edition Cantz, 1985), 569-605.

⁷ Hans Wiswe, ed., "Ein mittelniederdeutsches Kochbuch des 15. Jahrhunderts," *Braunschweigisches Jahrbuch*, 37 (1956), 19-51.

⁸ Karl-Heinz Knörzer, "Aussagemöglichkeiten von paläoethnobotanischen Latrinenuntersuchungen/The prospects of the palaeo-ethnobotanical examination of cesspits," in *Plants and Ancient Man*, eds. W. van Zeist and W. A. Casparie (Rotterdam: Balkema, 1984), 331-344.

Different plants have varying resistance to these destructive factors; therefore, not all plants eaten are present in the archaeological material. Nevertheless, there are excellent conditions for the preservation of material in waterlogged sites where the last two factors are reduced to a minimum. The information is complemented by the plant remains from other types of preservation conditions, for example, crops. Although they usually do not occur in latrines, they are perfectly preserved in a charred condition, and useful for food investigation from the point of view of staples.

The advantages of archaeobotanical research are that it can provide accurate information about plant species: the scientific names and the stage of domestication. In archaeological material wild fruits, seldom found in written sources, are presented. Moreover, archaeological material provides information in a higher concentration, while written evidence is often isolated and scattered in various documents.⁹ The investigation also provides hypotheses about the differences and similarities between towns and countryside. It has been considered that rural people had to be content with the crops cultivated on their own lands and gathered from the surroundings.¹⁰ Even then, they first had to accomplish the duties requested by their landlords before adding comfort to their own lives.¹¹ According to Behre, trading in food was predominantly done between towns or a town and several villages. Investigations have demonstrated that food in individual villages could differ more than the food in individual towns as far apart as the Mediterranean and North Germany.¹² The consumption of food in towns included goods attained by long-distance trade and by trading in the market places, and therefore townspeople enjoyed a richer selection than people in the countryside.

The investigation of medieval food based on archaeobotanical evidence in medieval towns can answer similar questions as archaeological excavations in general, and allows conclusions to be drawn about long-distance and local trade, the exploitation of natural resources, and the social differentiation of the inhabitants of the sites. In addition, with the help of archaeobotanical investigation environmental aspects of everyday life are to be discovered, because, beside providing information of what was eaten, plant remains reflect the environment in which they were growing.

⁹ Francis J. Green, "The Archaeological and Documentary Evidence for Plants from the Medieval Period in England," in *Plants and Ancient Man*, 99-114.

¹⁰ Karl-Ernst Behre, "Die ersten Funde von Nahrungspflanzen aus dem Mittelalter Bremens," *Bremisches Jahrbuch*, 70 (1991), 207-227.

¹¹ Kerstin Griffin, "Plant Remains," in *De arkeologiske utgravninger i Gamlebyen, Oslo* [The archaeological excavations in the Old Town, Oslo], vol. 5, ed. Erik Schia (Ovre Ervik: Akademisk Forlag, 1988), 98-99.

¹² Behre, *Die ersten Funde*.

Fig. 1: The excavations of medieval latrines in Tartu

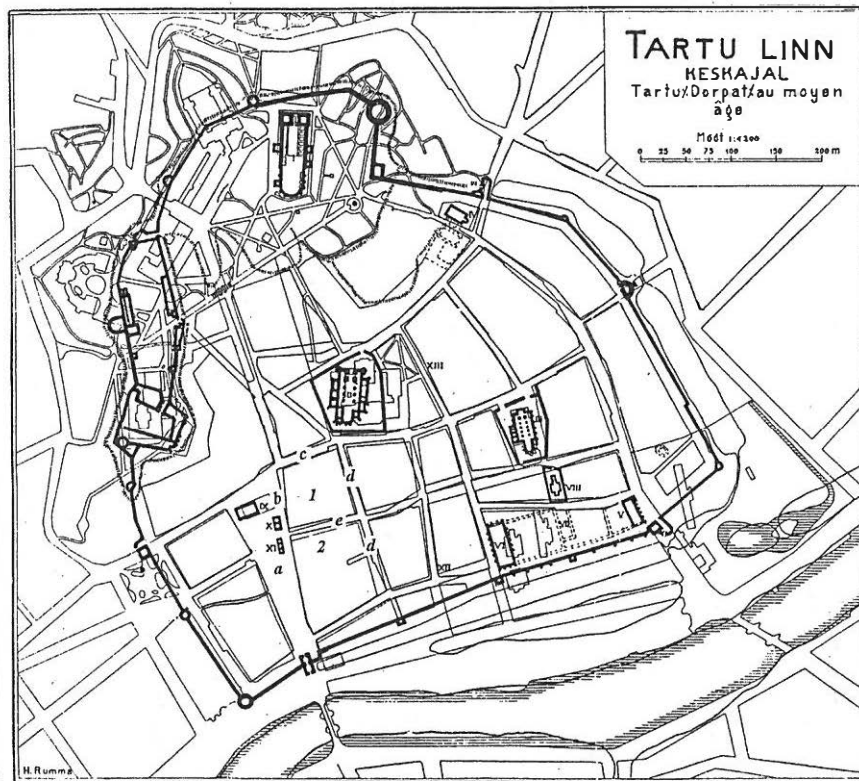


Fig. 1 Tartu (Dorpat) in the Middle Ages: I-VIII, Churches; IX, Town Hall; X, Public Scales; XI, Pharmacy; XII, Merchant Guild; XIII, Craftsman Guild; XIV, and 2, excavation sites; a, the market; b, the bakers' street; c, the pedlars' street; d, the butchers' streets; e, street to Public Scales.

Material and Method of Investigation

The archaeological excavations under consideration were carried out in two areas in Tartu (see fig. 1). On site one (I) the work was in progress during 1988-1989 and 1991-1992, on site two (II) in 1992. Both areas were situated in the centre of the town near the market-place, and in both of the sites, well-like wooden constructions were unearthed. They were identified as latrines due to the great amount of berry seeds in the fill material, and, on the first site, due to the building methods which were also characteristic of them.¹³ The general information from the sites and the preliminary analysis of the constructions were in accordance with the different approaches of the archaeologists who worked on the sites. On the first site, the archaeological investigation of the constructions was designed to answer questions about

- 1) hygiene,
- 2) disposal of garbage,
- 3) the nature of food, and
- 4) living conditions.¹⁴

On the second site, the investigation was intended to answer questions about

- 1) the possibilities of usage of the construction other than as a latrine;
- 2) the origin of the remains in the construction.¹⁵

In this contribution, mainly the questions concerning the nature of food will be answered.

On site I,¹⁶ six constructions with eight samples (1a, 1b, 4, 5, 6a, 6b, 7, and 11), and in site II, one construction with three samples from different layers (A, B, and C) were deemed appropriate for further investigation. The dating and the preliminary archaeological analysis of these constructions were the major determinants for making this choice. These constructions were dated back to the fourteenth and fifteenth centuries.¹⁷ The amount of the material in each sample was 300 ml. This was presumed to be sufficient, if not for a thorough investigation, then at least to characterise the constructions and to draw general conclusions. The samples were broken down into water, soaked, washed on

¹³ This comment was made by Rünno Vissak, one of the archaeologists at the site.

¹⁴ Rünno Vissak, "Tartu VII kvartali jäätmekastid suletud leiukompleksidena: Diplomitöö" [Cesspits of the VII. quarter in Tartu] (Graduation work, Tartu University, 1992).

¹⁵ Toivo Aus, "Tartu Rüütli ja Küütri t. nurgakrunt. 1992. a. linna-arheoloogiliste kaevamiste aruanne" [Results of the archaeological excavation at the corner of Rüütli and Küütri streets] (Tartu: The Archive of Tartu Museum, 1993), typewritten.

¹⁶ Ülle Sillasoo, "Tartu 14.-15. sajandi jäätmekastide taimelidudest" [Plant remains in latrine samples of Tartu in the fourteenth and fifteenth centuries], in *Tartu arheoloogias ja vanemast ehitusloost/Zur Archäologie und älteren Baugeschichte Tartus*, Tartu Ülikooli Arheoloogia Kabineti Toimetised, 8, ed. Heiki Valk (Tartu: Tartu Ülikooli Kirjastus, 1995), 116.

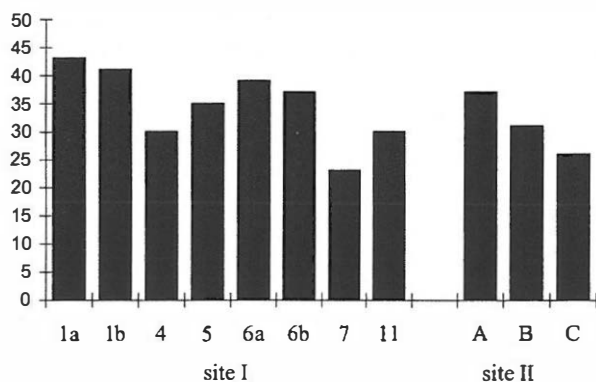
¹⁷ Rünno Vissak, "Der Fundstoff aus den Holzkästen des VII. Quartals in Tartu," *TA Toimetised, Ühiskonnateadused*, 1 (1994), 71-77.

sieve meshes of 0.5 and 1 mm aperture, and dried. The plant remains, mainly seeds, were separated from the material and identified.

The results of archaeobotanical research of latrine samples

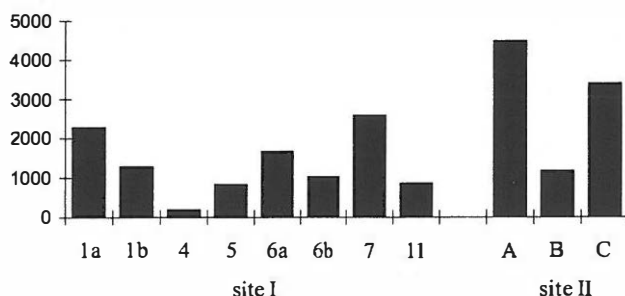
In the samples, 90 taxa of plant remains were distinguished. For the representativeness of the number of taxa in the samples, see fig. 2. 69 taxa were identified as species, and 13 as genera or groups of species. The rest corresponded to other units of classification. The total number of taxa from site I was 79, 58 of which were identified as species; the number of taxa varied from 23 to 43 per sample. On site II, the total number of taxa found was 51, 41 of which were identified as species. The number of taxa varied between 26 and 37 per sample.

Fig. 2: Number of taxa in the samples from site I and site II



Predominantly, the plant remains were seeds or seed fragments in an uncarbonised state. For further quantitative analysis the fragments were recounted into plausible number of whole seeds on the basis of previous practical experience. The same was done at the evaluation of amounts of seeds which during the identification procedure were designated in some cases as numerous, for example strawberry and poppy seeds. Consequently, the number of seeds in the samples varied from 180 to 2266 on site I, and from 1161 to 4463 on site II (see fig. 3).

Fig. 3: Number of seeds in the samples from site I and site II



A few leaves and fruit skins of berries, and the fragments of apple endocarps were found. For the list of species found in different constructions, the number of seeds, and the detailed categorization of the findings, see table 1.¹⁸ Edible plants are shaded.

In addition to the plant remains from soil samples, a number of bigger pips and fruit-stones were unearthed separately in the wooden constructions. In construction #1, the shells of hazelnut and walnut, and the fruit-stones of bullaces and sour cherries occurred. In construction #6 and #7, which are considered together here, the fruit-stones of sour cherries and bullaces, the shells of hazelnut and walnut, and the pips of apples and grapes were found. In construction #11, the remains of sour cherry, hazelnut, and grape were uncovered.

The state of the findings

In most cases, the seeds were in a non-carbonised state, which is to be expected in waterlogged sites. Nevertheless, among the plant material, the charred and half-charred remains of oats, barley, pea, sedge, meadow sweet, timothy grass and creeping buttercup appeared. The condition of the oat and barley seeds indicates their potential usage. They were probably meant to be in the food prepared on the hearth, but had met with some misfortune. The fact that timothy grass and creeping buttercup were also found in a carbonised state can be explained in that they were weeds among the cereals. At the same time, meadow sweet could have been dried in a warm place near the hearth in the kitchen and had perhaps fallen down to become a part of the carbonised refuse.

¹⁸ For the English names of weed plants, see Gareth Williams and Károly Hunyadi, *Dictionary of Weeds of Eastern Europe: Their Common Names and Importance in Latin, Albanian, Czech, German, English, Greek, Hungarian, Polish, Romanian, Russian, Serbo-Croat, and Slovak* (Budapest: Akadémiai Kiadó, 1987).

Table 1: Plant remains in the Tartu samples

Abbreviations

s	seeds	l	leaf
f	fragment	g	glumes
sf	seed fragment	p	pressed
shf	shell fragment	c	carbonised
sk	skin of fruit	nc	non-carbonised
ef	fragments of endocarp	hc	half-carbonised
d	diaspore	n	numerous findings

Species	Site I								Site II				
	1a	1b	4	5	6a	6b	7	11	English name	A	B	C	Comment
Agrostemma githago L.	f (6)	f	1c	f	f	f		2, f=2	corn cockle	f	F		s, f=2
Alchemilla vulgaris group		l							common lady's mantle				S
Anethum graveolens L.				1	13.f.p			2	dill	9p, f			s, f=1, p
Anthemis arvensis L.		1							corn chamomile				S
Anthemis tinctoria L.	?		1			f			dyer's chamomile				s, f=1
Apium graveolens L.	1		cf.1			1			celery	1			S
Arctostaphylos uva-ursi L.		1							bearberry				S
Avena sativa L.					2c, g				common oat				s, g, c
Avena sp.			1c, g		g	3		3g	oat				s, g, nc, c
Betonica officinalis L. (cf.)	1								common betony				S
Brassica campestris L.	9	10	11	7	3, f	5	7, f	5	wild turnip		1	1, f	s, f=1

Species	Site I								English name	Site II			Comment
	1a	1b	4	5	6a	6b	7	11		A	B	C	
<i>Cannabis sativa</i> L.	2, f	2, f(3)			f	f		3, f	hemp	7, ff	38, ff		s, f=1 or 50
<i>Carex</i> sp.	6	25	4, c	9	3	1	1	1	sedges				s, nc, c
<i>Carum carvi</i> L.					1	of 3			caraway	1p	2p	3p	s, p
<i>Centaurea cyanus</i> L.	ff (50)	7, f						f	comflower				s, f=1
<i>Chenopodium album</i> L.	96	46	23	30	19	7	5	28	fat-hen	12	17	11	S
<i>Chenopodium</i> cf. <i>urbicum</i> L.									upright goosefoot			1	S
<i>Chenopodium rubrum</i> L.		1							red goosefoot				S
<i>Cirsium arvense</i> L.									creeping thistle		1		S
Compositae	1												S
<i>Corylus avellana</i> L.									hazelnut	f			shf=1
<i>Eleocharis palustris</i> group	1	2	2						common spike rush	1	2	1	S
<i>Ficus carica</i> L.	5	16	4	56	20	26	5	14	fig	44	42	227	s, sk
<i>Filipendula ulmaria</i> L.			4	f	1	1, lc			meadowsweet	f			s, f=1, nc, c
<i>Fragaria vesca</i> L.	1117	334	73	162	1017	712	1627	142	wild strawberry	n	703	43	s, n=2000
<i>Galeopsis</i> sp.	12	4	6	3		1	f	14	hemp-nettle	5, f	2, f		s, f=1
<i>Galium aparine</i> L.									cleavers	12, f, p	6, f, p	3, f, p	s, f=1, p
<i>Galium</i> sp.							1		bedstraw	6			S
Gramineae/cereals	1sk	g	g	g	f, g	sk	4sk, g	g	grasses/cereals	6sk, g, p	3sk	1sk	s, f=1, g, sk, p
Gramineae/Poa sp.				1					grasses				s, g
Gramineae/other	7		1, g		1				grasses/meadow-grass		2		S
<i>Hieracium pilosella</i> group	1								tp. hawkweed		1		S
<i>Hordeum vulgare</i> L.			1, c						barley				s, c
<i>Humulus lupulus</i> L.				2	4, f	1		8	hop	f			s, f=1
<i>Hyoscyamus niger</i> L.					1				common henbane				S

Species	Site I								Site II				Comment
	1a	1b	4	5	6a	6b	7	11	English name	A	B	C	
Labiatae	3	1		2									S
Lapsana communis L.	10		1					3	nipplewort		1	1	S
Leucanthemum vulg. Lam.	50	5						2	oxeye daisy				S
Linum usitatissimum L.								1	flax	f			s, f=1
Lycopus europaeus L.				2					gipsywort				S
Lynchnis flos-cuculi L.		1							cockooflower				S
Malus sp.	1, e	1, e	1	2, e	f, e	1, e	1, e	2, e	apple	5, e	5, e	1, e	s, f=1, ef
Mentha sp.		2				1		1	mint			1	S
Myosotis sp.	3								forget-me-not				S
Panicum miliaceum L.									millet	f			sf=1
Papaver somniferum L.	29	22	2	233	91	60	29	66	opium poppy	7	6	n, p	s, p, n=3000
Pedicularis palustris L.				1					marsh lousewort				S
Petroselinum segetum L.									parsley	12			S
Phleum pratense L.				1, g	2	1		cf. 1c	timothy				s, g, nc, c
Piper nigrum L.		1							black pepper				S
Pisum sativum L.					f				pea				sf, h, hc
Plantago sp.									plantain	d			D
Polygonum aviculare L.			1						knotgrass		1	1	S
Polygonum cf. amphibium L.		1							amphibious bistort				S
Polygonum convolvulus L.	1		f	f	f	f	1	3	black-bindweed	1, f	4	f	s, f=1
Polygonum hydropiper L.									water-pepper			f	sf=1
Polygonum lapathifolium L.	7	7	7	6	1	6	1	2	pale persicaria	3, f	6	1	s, f=1
Potentilla anserina L.	2								silverweed				S
Potentilla erecta L.								1	tormentil				S
Prunella vulgaris L.	1	3		1		1			common selfheal		22		S

Species	Site I								English name	Site II			Comment
	1a	1b	4	5	6a	6b	7	11		A	B	C	
<i>Prunus cerasus</i> L.		f							sour cherry				s f=1
<i>Ranunculus repens</i> L.	3	f	1, 1c			1	1	f	creeping buttercup	1, f			s, f=1, nc, c
<i>Ranunculus sceleratus</i> L.		1, f	1	2	1				celery-leaved buttercup				s, f=1
<i>Ribes nigrum</i> L.	6	6		32	27	27	43		black currant	94	8	6	S
<i>Ribes rubrum</i> L.					5				red currant	5			S
<i>Rubus chamaemorus</i> L.	2			f	1	f	18		cloudberry	1			s, f=1
<i>Rubus fruticosus</i> L.									blackberry	1	1		S
<i>Rubus idaeus</i> L.	404	66	1	18	24	17	89	57	wild raspberry	147	12	17	S
<i>Rubus saxatilis</i> L.						1			rock bramble	1			S
<i>Rumex acetosella</i> L.	37	5			1				sheep's sorrel				S
<i>Rumex crispus</i> L./obtusifolius L.	1	f							curled/broad-leaved dock		1	f	s, f=1
<i>Sceleranthus annuus</i> L.					1				German knot-grass				S
<i>Scirpus sylvaticus</i> L.		2	1	2	1				wood club-rush				S
<i>Silene</i> sp.				1	f	f				1			s, f=1
<i>Sinapis arvensis</i> L. (cf.)		2					2		charlock				S
<i>Salvia</i> sp. (cf.)							13						S
<i>Sonchus asper</i> L.					1	2	1		prickly sow-thistle				S
<i>Sorbus aucuparia</i> L.	8	7	2	6	6	6	4	2	rowanberry	9		1	S
<i>Spergula arvensis</i> L.	3	12	2	5	2, f	3	1	6	corn spurrey	f	28, f	1	s, f=1
<i>Stellaria graminea</i> L.	1					1			lesser stichwort				S
<i>Stellaria media</i> L.	7	3		4	1	2		3	common chickweed	5	10		S
<i>Thlaspi arvense</i> L.	1, f	f			1				field pennycress				s, f=1
<i>Tussilago farfara</i> L. (cf.)				1					coltsfoot				S
<i>Urtica dioica</i> L.			1	1					common nettle		1		S
<i>Urtica urens</i> L.		2							annual nettle	1		1	S

Species	Site I						Site II						
	1a	1b	4	5	6a	6b	7	11	English name	A	B	C	Comment
<i>Vaccinium myrtillus</i> L.	43	19	12	84	52	55	455	317	blueberry		11	5	S
<i>Vaccinium oxycoccos</i> L.	18	16		2	8.1	8	16	17	cranberry			14	s, 1
<i>Vaccinium</i> sp.	303	123, sk	101 sk	132	331, sk	59	243	137	cowberry/cranb./blueb.	n. sk.	169 sk	45, sk	s, sk, n=2000
<i>Viola</i> sp.	1								violet				S
Total taxa on site I:	79	43	30	35	39	37	23	30	Total taxa on site II:	51	37	26	
Total species on site I:	58	30	21	27	33	29	17	25	Total species on site II:	29	22	26	
Total seeds on site I:	10639	2266	1270	820	1658	1020	2574	851	Total seeds on site II:	4463	1161	3390	
													9014

In the material, the fragments of many species were found. On the one hand, this is generally the normal state of archaeological findings deposited in the earth during this relatively long period of time. On the other hand, the state of the seeds is probably connected with the preparation of food, for instance in the case of dill seeds, which were recorded to be compressed, hemp seeds, which are strong enough to be resistant to full damage, flax, corn cockle, cornflower and hazelnut. The state of the half-carbonised pea can be explained by the treatment of the seeds before cooking. Corn cockle and cornflower, as weeds, were probably contained in flour, possibly made of rye; whereas the fragments of hazelnuts resulted when the nuts were shelled. In many cases, though, the fragments were produced on entrance to the digestive tract of a human being.

Numerous stones of sour cherry accompanied by fewer ones of plums and bullaces were found separately from the soil samples inside the constructions. A few nut shells were unearthed, walnut shells usually divided in two, and hazelnut shells frequently intact. The other finds separate from the soil samples were found in the surrounding earth. A few grape pips were also revealed there.

Other remains inside the constructions

In addition to seeds, several other remains occurred in the fill material of the constructions. They were pieces of brownish woolen cloth, fragments of feathers, hairs, eggshells, fragments of a crayfish, fish bones and scales, leaves and stems of mosses, spruce needles, and the manure of smaller animals. The remains can be interpreted as the residue of food or of food preparation (feathers, hairs, eggshells, fragments of the chitin crust of crayfish, fish scales and bones) and of hygiene (cloth and mosses). The examples of animal manure prove the mixed function of the constructions, confirmed by the occurrence of spruce needles, the remains of tree bark, and pieces of yarn. Insects as well were present among the finds. They are typical components of latrine material.

The frequency of occurrences of edible plants

The frequency of occurrences of edible plants in the samples was evaluated (table 2). In the table, the second column (NS) shows the number of samples from site I and II, in which the plant occurred, the second column (%) shows their frequency of occurrence in percents. The composition also included some species of weed plants, which are not edible, but are quite well-known in the yields of cereals, for instance, rye (corn cockle and cornflower). In the table, the finds separate from the soil samples are incorporated. The task of the evaluation was to examine the regularity of the potential foodstuffs in the samples.

Table 2. Frequency of occurrences of edible plants in the samples¹⁹

Species	NS	%	Species	NS	%
fig	11	100	sour cherry	3(4)	27
strawberry	11		cornflower	3	
cereals ²⁰	11		bullace and plum	2(3)	18
apple	11		walnut	2(3)	
opium poppy	11		red currant	2	
raspberry	11		blackberry	2	
bilberry/cowberry/cranberry	11		rock bramble	2	
black currant	10	91	grape	2	
rowanberry	10		flax	2	
corn cockle	9	82	parsley	2	
hemp	7	64	oat	1 (4)	9
cloudberry	6	55	bearberry	1	
caraway	6		barley	1	
hop	5	45	millet	1	
dill	4	36	pepper	1	
celery	4		pea	1	
hazelnut	4(5)				

Ecological analysis of the material

In further analyses, the plant species were divided into anthropogenic and ecological groups; the former stressing plant usage, the latter indicating natural conditions at the sites. The division into ecological groups was made according to Jacomet et al.²¹ The purpose of the anthropogenic analysis was to examine the proportions of various human related plants in samples, for example locally cultivated and imported plants, weeds, ruderals, and wild plants. Figs. 4 and 5 show that groups of edible plants formed 38% of the plants on site I, and 52% of the plants on site II. This indicates how important it is to interpret the finds from the wooden constructions in terms of food. Among the other plants, wild plants dominated on site I, while on site II both weeds, ruderals, and wild plants were equally present. In conclusion, when ruderals, weeds, and especially wild plants indicate the natural conditions around the constructions, then a relatively manifold vegetation was developing on site I, while on site II the analysis revealed only the modest importance of local vegetation. When

¹⁹ The number in brackets indicates that sour cherry, bullaces and plums, walnuts and hazelnuts were found in not differed constructions #6 and #7; the identification of oat species was not always clear, 1 is of common oat, 4 are of the species of oat.

²⁰ One of the cereals was identified as wheat *Triticum sp.*, see above.

²¹ Stefanie Jacomet, Christoph Brombacher, and Martin Dick, *Archäobotanik am Zürichsee*, Berichte der Züricher Denkmalpflege, Monographien, no. 7 (Zürich: Orell Füssli Verlag, 1989), 259-276.

examining the division of the number of seeds in the anthropogenic groups, the seeds of wild fruits predominated in both sites.

Fig. 4: Anthropogenic division of species from site I

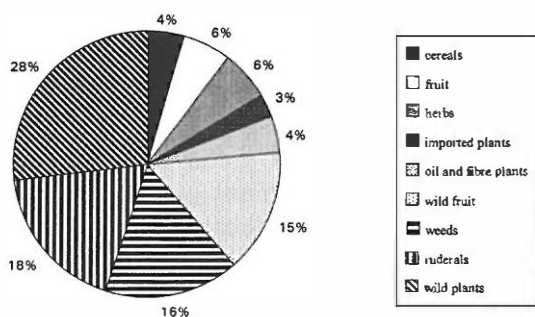
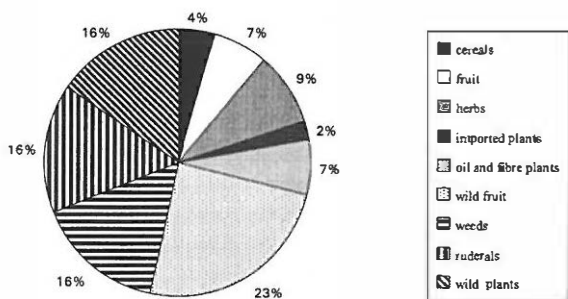


Fig. 5: Anthropogenic division of species from site II



The object of ecological analysis was to reveal differences in the composition and the proportion of various ecological groups of plants (see figs. 6 and 7). Their variety may lead to the conclusion that wild plants did not belong to the local vegetation on the site only, as they were from many ecological groups, but that they were introduced to the site by people or their domesticated animals as the traces of consumption. When considering ruderal plants, the importance was more or less the same in both sites as well as the representativeness of high sedge, shore plants, and shore pioneers, which is related to the situation of the town on the river. Plants from high-moors, forest

groves, sparse mixed forests, shady forests, and forest clearings indicate the circumstances adjacent to the town, the areas where the wild fruit were collected. Weeds which occurred in the samples are related to cultivation and the consumption of the plants, the traces of which were not discovered from among the latrine material. The percentages of root-crop weeds and cereal-crop weeds were similar on both sites. Root-crop weeds dominated over cereal-crop weeds, which may lead to the conclusion of the importance of vegetables in food, and probably the cultivation of some of these crops on the sites. Locally cultivated plants dominated over imported plants on both sites.

Fig. 6: Ecological division of species from site I

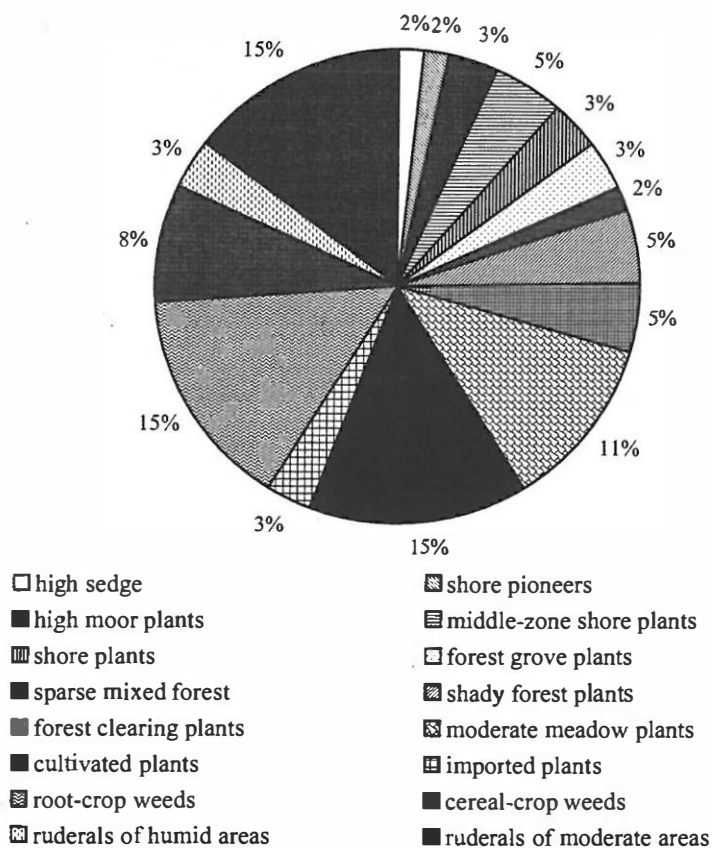
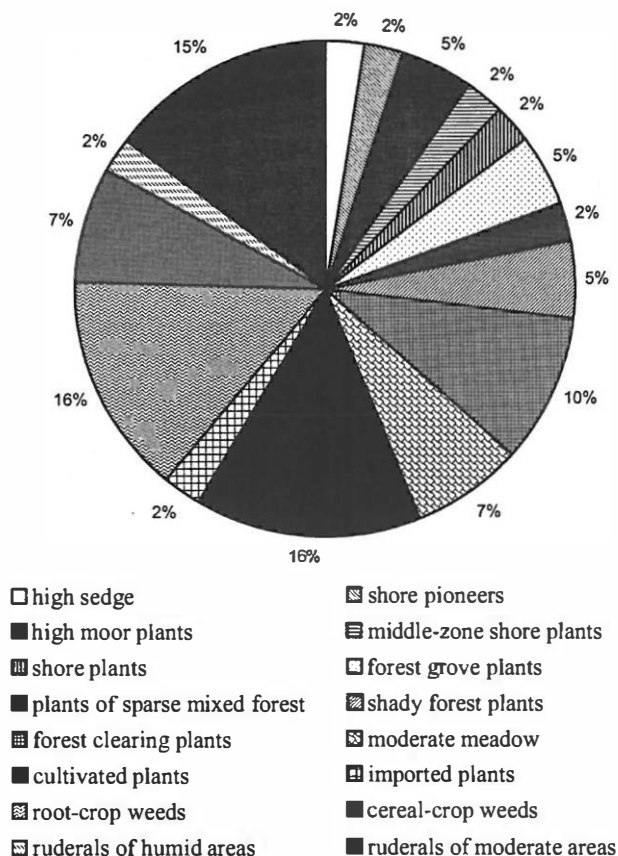


Fig. 7: Ecological division of species from site II

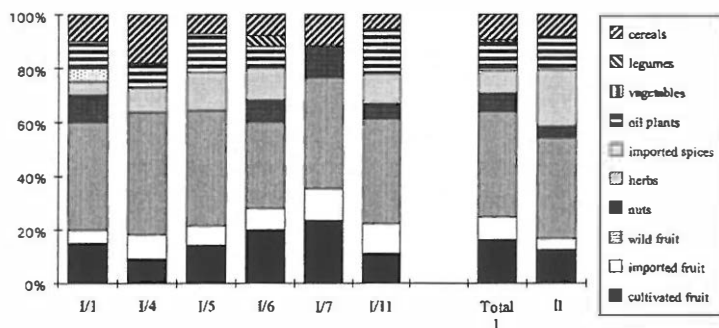


Plant components in food: a comparative study

In order to determine the peculiarities in the consumption of different possible households, the comparison between the constructions of site I and site II concerning plant components in food was carried out (see fig. 8). The disadvantage of the analysis is that it is not very representative, because the number and amount of the samples was relatively small. Nevertheless, the advantage of the analysis is that it demonstrates the occurrence and possibly also the importance of various plant components in food. One of the characteristics for all the constructions was the remarkable prevalence of wild fruit, which was approximately two or three times larger than the proportion of locally cultivated

fruit (apples, plums, cherries). The proportion of the locally cultivated fruit was in turn larger than the proportion of imported fruit (figs and grapes), although in some cases, for example in constructions #4 and #11 of site I, these proportions were equal. The importance of locally cultivated fruit was larger in constructions #6 and #7, site I, due to the number of fruit-stone remains which were discovered separately from the regular samples.

Fig. 8: Groups of edible plants in the wooden constructions



Nuts were present in all of the samples, apart from constructions #4 and #5, site I; in constructions #1, #6, and #7, site I, both walnuts and hazelnuts were found. In most of the cases only herbs occurred. Just in construction #1, site I, locally cultivated herbs and imported spices (pepper) were equally present. The proportion of oil plants formed an equal part with fruit; oil plants were absent in construction #7. No remains of vegetables were found. These, legumes and cereals are the most rarely found plant remains in archaeological samples. Legumes were present only in construction #6. Cereals formed approximately the same proportion as locally cultivated fruit in the constructions.

In a further stage of investigation, a comparison was carried out between non-written and written sources. The only known written sources are the Town Council protocols of Tartu from the sixteenth century which provide pieces of evidence on the trade of a number of foodstuffs, including the regulations of marketing in connection with staples.²² This source was found unsuitable for a comparative numerical analysis, and other possibilities were looked for. Late medieval Livonian towns experienced strong German influence to the extent that a Livonian cook- and household-book from as late as the beginning of the

²² Enn Tarvel, "Tartu hansalinnana XIII sajandist Liivi sõjani." [Tartu as a Town in the Hanseatic League from the 13th c. until the Livonian War], in *Tartu ajalugu* [The history of Tartu], ed. J. Pullat (Tallinn: Kirjastus Eesti Raamat, 1980), 27-60.

nineteenth century,²³ has been claimed to contain recipes similar to the medieval German ones.²⁴ Street names were considered to be relevant for deciding about German origin of the inhabitants of the plots.²⁵ Therefore, two late medieval German cook-books were chosen for a comparison to the archaeological remains of food in late medieval Tartu.²⁶ Because the subjects of interest in this current work were plant components in food, the sources are analyzed in terms of vegetarian food (see also table 3).

As suggested by Green, there are two possibilities for the comparison of archaeological and historical sources. Plant species can be compared, as well as their frequency of occurrence.²⁷ In this study, the comparison is carried out on the basis of the percentages of occurrence of edible plants. For the archaeobotanical finds (ARCH in figures), this means the percentage of occurrence of plants in the constructions; for cook-books (MHG and MLG in figures), the percentage of occurrence in recipes.²⁸ On the one hand this comparison shows what kind of information is recorded in the cook-books, and what is available in the archaeological material. On the other hand, although the information which is recorded in the cook-books indicates the possibilities of consumption, at the same time it also reflects the influences in relation to the existence or non-existence of gardening traditions, trade connections, social stratification, and the eating habits of the authors of the collections. The archaeological information first of all depends on the conditions of preservation of the material, and subsequently on the above-mentioned circumstances regarding the cook-books. In figure 9, the importance of different plant groups in the sources is demonstrated. A more detailed analysis is presented in the sub-sections where each of the plant groups is considered separately.

²³ *Livländisches Koch- und Wirtschaftsbuch für große und kleine Haushaltungen*, 2nd ed. (Riga: Deubner, 1817).

²⁴ Helmut Birkhan, "Some Remarks on Medieval Cooking: The Ambras Recipe-Collection of Cod. Vind. 5486," in *Food in the Middle Ages: A Book of Essays*, ed. Melitta W. Adamson (New York: Garland Publishing, Inc., 1995), 95, 97. He suggests that the Teutonic Knights of the Livonian Order might have transmitted the traditions of German cookery to Livonia.

²⁵ See also Niina Raid, "Tartu vanimad linnamüüri-sisesed tänavad/Die ältesten Tartuer Straßen innerhalb der Stadtmauer," in *Tartu arheoloogias ja vanemast ehitusloost/Zur Archäologie und älteren Baugeschichte Tartus*, Tartu Ülikooli Arheoloogia Kabineti Toimetised, 8, ed. Heiki Valk (Tartu: Tartu Ülikooli Kirjastus, 1995), 129-140.

²⁶ Hans Wiswe, ed., "Ein mittelniederdeutsches Kochbuch des 15. Jahrhunderts," *Braunschweigisches Jahrbuch*, 37 (1956), 19-51 (further MLG); Hans Hajek, *Das Buch von guter spise*, Aus der Würzburg-Münchener Handschrift, Texte des späten Mittelalters 8, eds. W. Stammer and E. A. Philippson (Berlin: Erich Schmidt Verlag, 1958) (further MHG).

²⁷ Frances J. Green, "Archaeological and Documentary Evidence," 99-114.

²⁸ The number of recipes in the cook-books was 101 in the MHG and 103 in the MLG cook-book, the number of constructions was 7. Each of those three values were set equal to 100%, from which the percentage of occurrence was dependent.

Table 3: Plant components in the MHG and MLG cook-books

Abbreviations for the groups

C cereals
F fruit
H herbs
L legumes
N nuts
O oil plants
S spices
V vegetables
W wild fruit

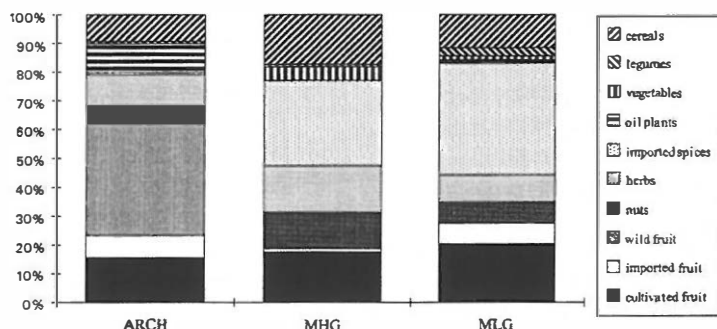
Cx	Plant components	Recipes in MHG cook-book	Total	Recipes in MLG cook-book	Total
F	Apples	5a, 6, 12, 56, 58-61, 67, 70, 75, 76, 95	13	2, 3, 40, 42, 73-74, 99, 101	8
F	Apples (wild)	35	1	11, 14	2
F	Apples (sour)	10, 26, 27, 32a, 43, 51	6		0
F	Apples (goderlingh)		0	2, 3, 42	3
F	Apples (viagecpele)		0	2, 3, 42	3
F	Apples (moeseppelle)		0	42	1
F	Apples (schoene)	69	1		0
F	Quince	12, 68	2	14, 16, 17, 103	4
F	Pears	10, 12, 31, 50, 81, 91	6	3, 40, 43, 95, 103	5
F	Packunghenberen		0	7, 13	2
F	Cherries	1, 7	2	4, 40, 47, 80	4
F	sour cherries	82-85	4		0

Gr. Plant components		Recipes in MHC cook-book	Total	Recipes in MILG cook-book	Total
F	Plums		0 84		1
F	plums (spilinge)	9	1		0
F	Bullaces	9	1 7		1
F	Sloes		0 11		1
F	Figs		0 3, 8, 20, 25, 44-46		7
F	Grapes (and raisins)	32a	1 1, 8, 9, 19, 20, 25, 28-30, 44, 46, 51, 54		13
F	sour grapes	34	1		0
F	Welsche winber	60	1		0
F	Berries		0 13		1
W	blackberries		0 15		1
N	almonds	1, 3, 13, 24, 39, 55-58, 62-64, 71-74, 74a, 75-80, 83	25 1, 3, 6, 8, 25, 38, 45, 48, 52, 56-58, 72, 81, 83, 86, 100		17
N	walnuts	59, 61, 80, 93	4 5, 47, 53, 83		2
H	dill		0 53		1
H	parsley	7, 8, 15, 18, 19, 21, 35, 48, 52	9 20, 33, 44, 46, 64, 71, 91, 93, 94, 96, 103		11
H	caraway	17, 21, 26, 27a, 31, 40, 48	7 31		1
H	cumin		0 31		1
H	nutmeg flower		0 31		1
H	mustard	16, 48	2 10, 38		2
H	sage	7, 14, 15, 17-19, 21, 34, 37, 52	10 51, 64		2
H	mint	21, 41	2		0
H	pennyroyal	21	1		0
H	tansy (T. balsamita)		0 32		1
H	tansy (T. vulgare)	7	1		0
H	agrimony		0 103		1
H	comfrey		0 85		1
H	aquilegia		0 41		1

G	Plant components	Recipes in MHG cook-book	total	Recipes in MLG cook-book	total
H	violets	3, 77, 79	3 54		1
H	roses	4	1 78,79		2
H	hops	14	1		0
S	ginger	2, 4, 15, 18-20, 23, 27a, 28, 29, 49	11 1-6, 12-13, 16-17, 21, 25, 28-29, 45, 47, 49-51, 53-55, 59, 81, 101		0
S	anis	10, 18, 19, 28, 29, 48, 50	7 54		25
S	galingale	2, 27a, 84	3 82		1
S	cloves	2, 27a	2 59		1
S	cardamom		0 59		1
S	cinnamon	15	1 63, 65, 71		3
S	nutmeg		0 59, 82		2
S	nutmeg tree flowers	27a	1 81		1
S	melegueta pepper		0 81		1
S	pepper	4, 5a, 10-12, 15, 17-23, 25-27, 27a, 29, 31, 38, 40, 48-50, 86	25 1-5, 9, 16, 21, 25, 31-34, 36, 42-44, 46, 50-52, 55, 59, 64-67, 78, 80, 91, 94, 97-98, 101		34
S	pepper (geler)		0 103		1
S	pepper (guder)		0 12, 13		2
S	pepper (scharper)		0 91		1
S	pepper (schlichter)		0 7		1
S	zolaery		0 82		1
S	saffron	11, 15, 17, 20, 26-28, 31, 36, 38, 39, 42, 46-48, 80, 94, 95	18 2, 3, 9, 16, 20, 21, 25, 31-34, 36, 42-46, 49, 51, 52, 61, 62, 65, 67, 70-72, 79, 83, 96, 100-101		32
O	opium poppy		0 42		1
O	hemp		0 52, 53		2
L	green beans	31	1		0
L	peas	45	1 3, 8, 20, 25, 44-46		7
L	green peas		0 20		1
C	rice	1, 3, 51, 3, 5, 55-58, 64, 74a, 75-77, 77a, 78, 83	17 2, 6, 9, 10, 12, 24, 31, 40, 53, 72, 81		11
C	millet	47	1		0

G. Plant components		Recipes in MBG cook-book	Total	Recipes in MLC cook-book	Total
C	rye (bread)	23	1		0
C	wheat (flour, bread)	9, 10, 11, 20, 21, 22, 24, 26, 31, 37, 43, 47, 50, 51, 65, 66, 67, 70, 74, 80, 82	21	4, 9, 15, 25, 36, 37, 42, 44, 52, 63, 65, 68, 69, 71, 74, 78, 84-87, 101	21
V	root-parsley		0	6	1
V	garlic	32, 34, 42, 49	4	71	1
V	turnip	35	1	27	1
V	shallot	33, 41	2		0
V	onions	16, 26	2	27	1
V	leek	64	1		0
V	carrot	79	1		0

Fig.9: Groups of edible plants in archaeobotanical (ARCH) and written sources (MHG, MLG)



There are remarkable differences between archaeological and written sources, especially concerning wild fruit, imported spices, oil plants, and vegetables. Wild fruit was recorded only once in the cookbooks, but archaeological evidence illustrates abundant consumption. Spices were the largest part of plant component in cookbooks, in archaeological material they did not play almost any role. Oil plants were present in archaeological material, but were almost missing in cookbooks. A small number of vegetables were recorded in cookbooks, while there was no evidence of them in archaeological material. Subsequently, the information about individual groups of plant components in the archaeological material and in cookbooks will be analysed in more detail.

Cultivated fruit

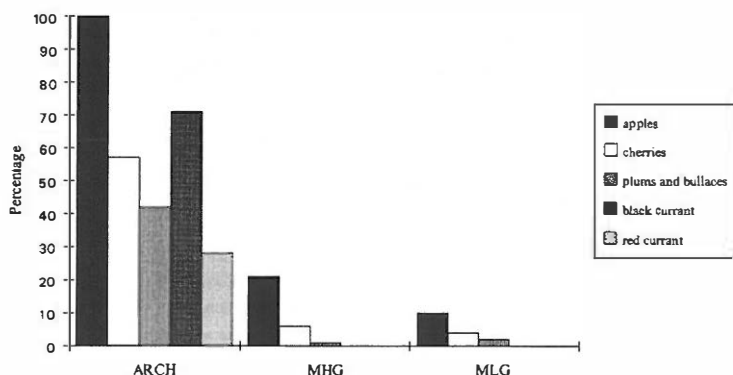
Of the archaeobotanical material from Tartu, fruit was the most frequent plant group found in the material of the wooden constructions. Among the locally cultivated types of fruit, apple dominated. Apple pips and core fragments were present in all the constructions, which leads to the conclusions that apples were one of the most frequently consumed cultivated fruit in late medieval Tartu. As seen in figure 10, medieval German cook-books also confirm the uppermost importance of apples in contemporary food. In recipes, apples are reported to have been included in pies, mashes, stuffing, fritters, and sauces, and for producing vinegar. Characteristic for all of the sources, cherries, plums, and bullaces were of less significance. They were combined in sweet mashes and mixtures, compotes, candies and in stuffing as well. The removal procedure of fruit-stones and apple cores is described in the recipes.²⁹ From the sixteenth

²⁹ MLG recipes 2-3. *Apfelmus*, 4. *Kirschmus*, 7. *Krekenmus*, 80 *Kirschenmus*, 84 *Pflaumenmus*, 42 *Apfelwecken*, and perhaps also 47 *Kirschtrank*; MHG recipes 26 *Diz ist ein güt*

century, there is a record of a large orchard of apple, plum, and cherry trees on an estate near Kudina, north of Tartu.³⁰

Currants were not recorded in the cook-books. There can be several reasons why they were found in the archaeobotanical material from Tartu. One of them is certainly the fact that black currant is native in the moist mixed forests and shore bushes in Estonia. The cultivation of it would not have been difficult. Black currant was also among the archaeological finds from medieval Novgorod (tenth-fifteenth centuries), where the bushes are said to have been cultivated.³¹ According to Bertsch, the oldest known record of *Ribes* species in German sources is from the fifteenth century, reported as *Ribes sunt Johannis-driibel*.³² In the sixteenth century it is claimed to have been grown everywhere in the gardens. The name *Ribes* was used to designate a medical plant by the Arabs. In northerly countries, it designated the berries of currants. The juice of the berries with sugar was advised as a remedy.³³ Medieval cookery also prescribed them for the preparation of sauces with vinegar.³⁴

Fig. 10: Cultivated fruit in archaeobotanical and written sources



fuelle, (51) *Ein güt spise*, and obviously 1 *Ein konkavelite*, 9 *Ein klüge spise von pflumen*, (82) *Ein wissel müs*, (84) *Ein cumpost von wisseln* etc.

³⁰ *Eesti pomoloogia* [Estonian pomology] (Tallinn: Kirjastus Valgus, 1974).

³¹ V. Kirjanov, "Istoriia zemledelija Novgorodskoi zemli X-XV vv." [History of agriculture of the Novgorod area from the tenth to fifteenth century], chap. in *Trudô Novgorodskoi arheologitsheskoi ekspeditsii* [The work of the archaeological excavation in Novgorod], *Materialy i issledovaniia po arheologii SSSR*, vol. 6 (Moscow: n. p., 1959), 306-362.

³² Karl and Franz Bertsch, *Geschichte unserer Kulturpflanzen* (Stuttgart: Wissenschaftliche Verlagsgesellschaft, 1949), 148-150.

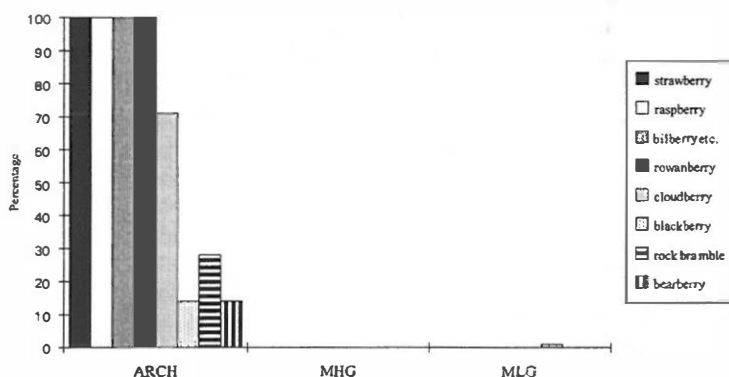
³³ *Ibid.*

³⁴ Scully, *The Art of Cookery in the Middle Ages* (Rochester: Boydell & Brewer, 1997), 53.

Wild fruit

Wild fruit were abundantly present in the archaeological samples (see figure 11), in contrast to the cook-books where the only wild fruit recorded was blackberry.³⁵ As already mentioned, this proves that wild fruit were frequently consumed. The number of strawberry seeds was the highest found among the material, next to the number of bilberry/cowberry/cranberry seeds. Raspberries, rowanberries, cloudberries, blackberries, rock bramble as well as bearberries were consumed in late medieval Tartu.

Fig. 11: Wild fruit in archaeobotanical and written sources



Strawberry is apparently one of the most commonly quoted wild fruit in medieval sources on food at all. Strawberries with sugar have been described as a course of festive meals,³⁶ and purchases of strawberries have been registered in a monastic account book.³⁷ Concerning cultivation, there are records of strawberries grown in the gardens from fourteenth-century France, and from sixteenth century Germany and England.³⁸ The domestication of strawberries has not been evidenced in late medieval Tartu. Wild fruit is mentioned as

³⁵ MLG recipe 15. *Brombeermus*. They were also used for wine preparation in medieval cookery; see Scully, *The Art of Cookery*, 157.

³⁶ Cf. a meal given by the canon Job Rorbach, on June 3, 1500, in Frankfurt; Alwin Schultz, *Deutsches Leben im XIV. und XV. Jahrhundert*, 2. Halbband (Vienna, Prague, and Leipzig: F. Tempsky, 1892), 497.

³⁷ Gerhard Jaritz, "Die Reiner Rechnungsbücher (1300-1477) als Quelle zur klösterlichen Sachkultur des Spätmittelalters," in *Die Funktion der schriftlichen Quelle in der Sachkulturforschung*. Veröffentlichungen des Instituts für mittelalterliche Realienkunde Österreichs, 1 (Vienna: Verlag der Österreichischen Akademie der Wissenschaften, 1976), 193.

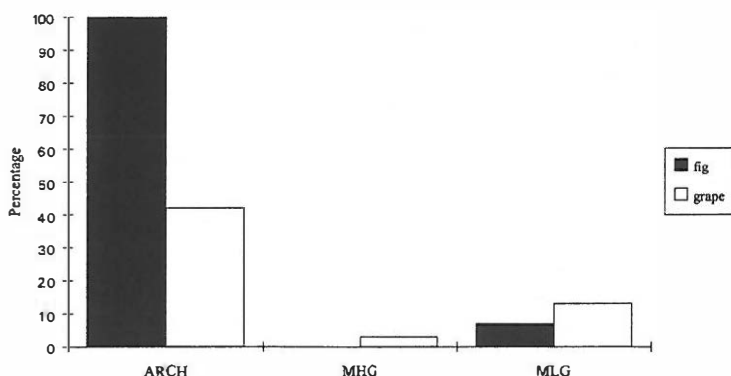
³⁸ Bertsch, *Kulturpflanzen*, 152-55.

requiring due payment in the Norwegian sources. Although they were not accounted as food, laws were issued to prohibit gathering of wild fruit from the land which belonged to another owner.³⁹

Imported fruit

Fig was a common imported fruit in the archaeological samples from late medieval Tartu (see figure 12). A high number of seeds were preserved. Figs are the indicators of southern trade, likewise grapes, although the goods could have had several intermediaries before they reached as far north as Estonia. However, figs are not present in the MHG cook-book, probably because their not crucial role was conditioned by restricted trade connections of the ecclesiastical institution. Also raisins are missing there. In the MLG collection, figs together with raisins were included in recipes for the preparation of stuffing, fasting dishes, in fritter mixtures which probably required a sweetener, while in the MHG collection, sour grapes are recorded for preparing sauces.⁴⁰ Grapes probably reached late medieval Tartu as raisins, in the case that they were not local-

Fig. 12: Imported fruit in archaeobotanical and written sources



ly cultivated.⁴¹ Since in the samples from late medieval Tartu a low number of grape seeds were found, there is the question of whether or not the raisins were

³⁹ Griffin, "Plant Remains," 98-99.

⁴⁰ MLG recipes 8. *Gefüllter frischer Hecht*, 9. *Hechtrogenwurst*, 20. *Großes Ei*, 44. *Speisekuchen von Hechtrogen*, 46. *Gefüllte Eier*. 51; *Gefüllter Aal* (raisins only), 54. *Veilchenlatwerge* (raisins only), 1. *Weinbeermus* (grapes only); MHG recipes (32a) *Wilt du machen einen agraz* (sour grapes), 34. *Ein salse* (sour grapes), (60.) *Von krapfen* (welsche grapes).

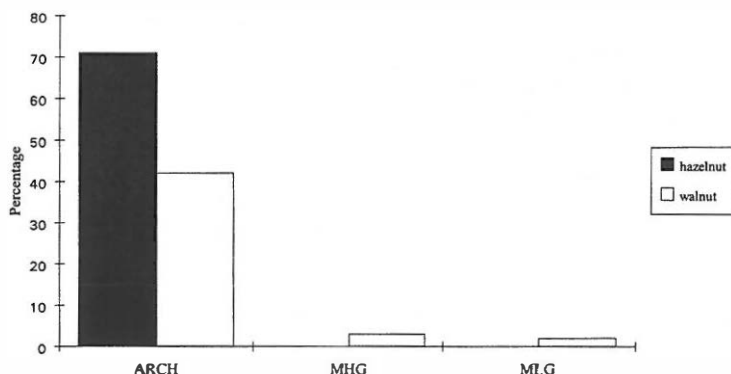
⁴¹ Hermann Fischer, *Mittelalterliche Pflanzenkunde* (Munich: Verlag der Münchener Drucke, 1929), 142. The cultivation has been considered to be developed in some areas, for ex-

destoned before drying. The removal of seeds from raisins is prescribed in a recipe of a French cook-book by Master Chiquart.⁴²

Nuts

More traces of local hazelnuts than imported walnuts were found in the archaeological excavations in Tartu (see figure 13). In two medieval German cook-books only walnuts are recorded in connection with fasting food, the oil and milk of nuts, mashers and condiments.⁴³ In medieval cookery, nuts were also sprinkled on cakes,⁴⁴ and they were steeped in honey or melted sugar to produce candies.⁴⁵

Fig. 13: Nuts in archaeobotanical and written sources



Herbs

In the archaeological material from Tartu, the seeds of several herbs were more abundantly found than in the written sources (see figure 14). Differences appeared also in the importance of individual herbs. Parsley was the most frequently cited herb in the cook-books: chopped parsley leaves used on the one hand, as a colorant and, on the other hand, as savoury in egg and fish

ample, Northern Germany, England, and the Baltic countries, where they are claimed to have grown at the southern walls of the houses.

⁴² "The raisins mentioned above should be carefully seeded, ..."; Scully, *The Art of Cookery*, 224-25.

⁴³ MLG recipes 5. *Walnußmus*, 47. *Kirschtrank*, 53. *"Vlotkese"*; MHG recipes (59., 61.) *Einen krapfen*, (80.) *Wilt du machen ein nuezenmüs*, (93.) *Einen fladen von fleische*.

⁴⁴ *Ibid.*, 204.

⁴⁵ *Ibid.*, 57.

dishes in particular.⁴⁶ In the archaeological material, parsley seeds were found in a modest amount. Parsley seeds, as well as celery seeds uncovered in the archaeological material, but not prescribed in cook-books, could have been related to other purposes than food in late medieval Tartu, for example as remedies. These plants, as well as mint and violet, are listed in a thirteenth-century medical manuscript on herbs from Tallinn.⁴⁷ Mint seeds were present in archaeological material, but obviously mint leaves mentioned in the MHG cook-book only, listed together with parsley, sage and caraway in a meat mixture.⁴⁸ In medieval cookery, herbs were also used to be bound into a bunch and boiled together with meat and pottage.⁴⁹ Violet seeds were present in archaeological material, and obviously violet petals in the two cook-books. In cook-books, it is prescribed as colorant,⁵⁰ but the flowers also had other decorative purposes in medieval cookery.⁵¹ Caraway seeds, present in archaeological material, are frequently recorded in the MHG cook-book in connection with preparation of fish, pig intestines, poultry, and sauces. It appears regularly with pepper and ginger; in the MLG cook-book caraway is recorded only in one recipe.⁵² Caraway seeds were used also as remedies, steeped in honey or sugar.⁵³

Hops, abundantly present in archaeological material, were mentioned in the MHG cook-book in relation to beer/mead production.⁵⁴ Dill was frequent in the archaeological material, but not in the recipe collections. It is recorded once in the MLG cook-book for preparing a special cheese.⁵⁵ Dill seeds, found in the archaeological excavations in Novgorod, were suggested to have originated from pickled cucumbers in the tenth and eleventh centuries.⁵⁶ The same eating

⁴⁶ MLG recipes 44. *Speisekuchen von Hechtrogen*, 46. *Gefüllte Eier*; MHG recipes 7. *Diz sint haselhüner*, 15. *Von pasteden*, 18. *Von frischen elen*, 19. *Diz is ein gut spise von eime lahs*, 35. *Ein agraz (sauce)*, 48. *Ein condimentlin (sauce)*, (52.) *Ein gütuelle (for stuffing?)*.

⁴⁷ Mihkel Tammet, "Some Aspects of Herbal Medical Treatment on the Example of Medieval Reval," *Quotidianum Estonicum: Aspects of Daily Life in Medieval Estonia*, eds. J. Kivimäe and J. Kreem, *Medium Aevum Quotidianum*, Sonderband 5 (1996), 113.

⁴⁸ Recipe 21. *Ein güt spise* (meat mixture).

⁴⁹ Scully, *The Art of Cookery*, 113.

⁵⁰ MHG recipes 3, 77 and 79; MLG recipe 54. *Veilchenlatwerge*.

⁵¹ Fresh violets were scattered over the golden surface of pudding in a festive meal; see Ann Henisch, *Fast and Feast: Food in Medieval Society* (University Park: The Pennsylvania State University Press, 1985), 111 (originally in W. C. Hazlitt, *The Old Cookery Books* (London: Elliot Stock, 1902).

⁵² MLG recipes 31. *Wildenten in Brühe*; MHG recipes 17. *Von gefuelten hechden*, 21: *Ein güt spise*, 26. *Diz ist ein güt fuelle*, (27a.) *Ein güt fuelle*, 31. *Ein spise von bonen etc.*

⁵³ Scully, *The Art of Cookery*, 129.

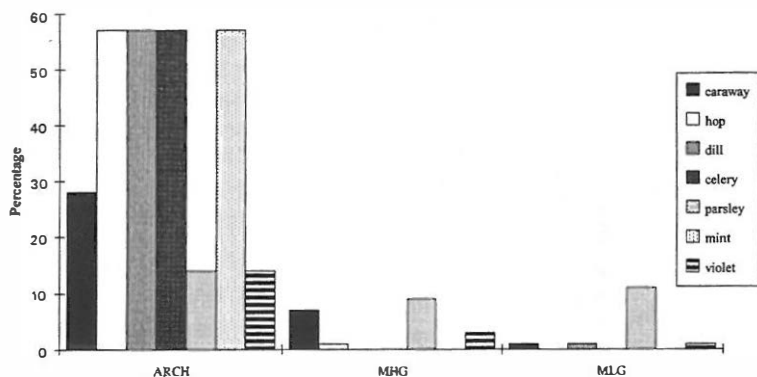
⁵⁴ Recipe 14. *Wilt du güten met machen*.

⁵⁵ Recipe 53. *"Vlotkese"*; it is recorded as *gruneme samen*, a name being identified by Ulrich Willerding, "Paläo-ethnobotanische Befunde über die Lebens- und Umweltverhältnisse im Mittelalter," in *Determinanten der Bevölkerungsentwicklung im Mittelalter*, eds B. Herrmann and R. Sprandel (Weinheim: Acta Humaniora, 1987), 109-25.

⁵⁶ Kirjanov, "Istorija zemledelija," 306-62.

habits could have been developed in medieval Tartu, since Russian merchants, including those from Novgorod, were frequent guests in the town.

Fig. 14: Herbs in archaeobotanical and written sources



Spices

Spices were represented in the archaeological samples by one peppercorn. At the same time, pepper was the most frequently recorded plant component in the recipes of both of the cook-books. Spices usually do not occur in the archaeological material, due to the usual practice of grinding them prior to consumption. This single kernel might have been from kitchen residues, but there certainly were dishes in medieval German cookery in which also whole pepper kernels were used.⁵⁷ In the cook-books, ground pepper is present in sweet dishes as well as in those which, according to today's tastes, are salty; for example in fruit mashes, and in dishes of meat and fish with other herbs and spices incorporated. In the MHG cook-book, pepper frequently appears with ginger, in the MLG cook-book with ginger and cloves. Other spices are not so frequent. In recipes where only "spices" are recorded, probably the same combinations are meant. Pepper was the most frequently used spice in the fourteenth century.⁵⁸ It is suggested that in the fifteenth century meleguetta pepper became more popular,⁵⁹ however, it was recorded only once in the MLG cook-book. There is an entry in the town council protocols of Tartu that, for

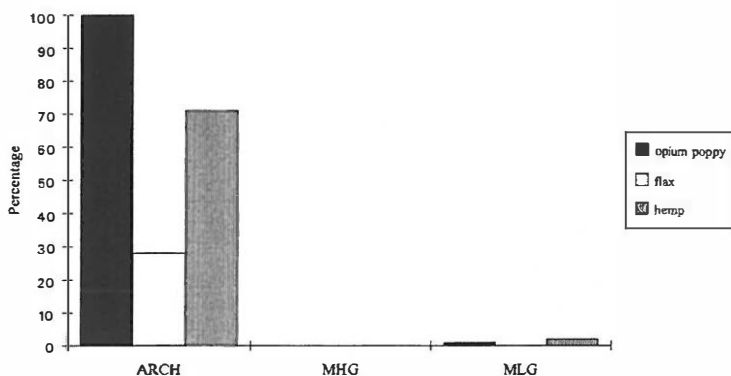
⁵⁷ For example, pepper kernels were mixed into an egg-soup together with saffron and honey in one of the meals of the dinner held in Weißenfels in 1303 for the consecration of the town church: Alwin Schultz, *Das häusliche Leben der europäischen Kulturvölker vom Mittelalter bis zur zweiten Hälfte des XVIII. Jahrhunderts* (reprint Osnabrück: Otto Zeller, 1968), 303.

⁵⁸ Scully, *The Art of Cookery*, 31.

⁵⁹ *Ibid.*, 85.

example, pepper, saffron, cloves, etc. were those goods which the Russians were prohibited to trade in 1528.⁶⁰ This shows that there was probably competition in the spice trade between Russian and Hanseatic merchants, the former presumably offering a lower price.

Fig. 15: Oil plants in archaeobotanical and written sources



Oil plants

In the archaeological material, seeds of oil plants were abundantly represented (see figure 15). Poppy was present in all the constructions. In one sample from site II, a particularly high number of seeds occurred. In contrast, the medieval cook-books do not reflect either the significant use of vegetarian oil or the remarkable usage of oil seeds. They could have been incorporated in dishes for which a particular production existed, and hence they were rarely written down, for example, recipes for making oil, bread, buns and cookies.⁶¹ Poppy oil was prescribed for food preparation in one recipe of the MLG cook-book as an alternative to unsalted butter and clean lard.⁶² However, poppy oil is considered to have been the preferred vegetable cooking oil in northern Germany.⁶³ According to German sources, dishes of hemp seeds were very popular in the Middle Ages.⁶⁴ In the MLG cook-book, they are prescribed for producing hemp-milk.⁶⁵ The evidence of the consumption of hemp-milk has also been found in

⁶⁰ Ibid., 48.

⁶¹ On bread recipes, see Scully, *The Art of Cookery*, 9.

⁶² Recipe 42. *Apfelwecken*. In recipe 44. *Speisekuchen von Hechtrogen*, sweet oil is recommended, which could be interpreted as poppy oil.

⁶³ Scully, *The Art of Cookery*, 218.

⁶⁴ Melitta Weiss Adamson, "Unus theutonicus plus bibit quam duo latini: Food and Drink in Late Medieval Germany," *Medium Aevium Quotidianum*, 33 (1995), 14-17.

⁶⁵ Recipe 52. *Hanfmsus* and 53. "Vlotkese".

Estonian folk tradition.⁶⁶ Hemp seeds were one of the goods traded on the town market of Tartu.⁶⁷ Flax seeds could have been used in remedies or in bread.

Legumes

Of legumes, only peas were found in the wooden constructions, although they were present among the carbonised stored findings from the archaeological excavation of site I. In the MHG cook-book, peas were mentioned once, in the MLG cook-book more frequently. The usage of pea mash for food was common in the Middle Ages. As seen in the recipes, various methods were used in order to mash the seeds to produce porridge.⁶⁸ The mash was frequently consumed during the fasting periods. From mashed peas show-dishes were prepared.⁶⁹ Whole peas were incorporated in jellies⁷⁰ and probably pea sprigs or other green parts alternatively used with parsley.⁷¹

Cereals

The archaeobotanical investigation of latrine samples revealed several cereals, but in small numbers (see figure 16). For a few reasons they could not all be identified (see before). Wheat was identified in one case, but it is possible that other similar grain skins were of the same species. Therefore, they are indicated as wheat in figure 16. Rye was not identified among the archaeobotanical material. It is indicated in the figure, because the seeds of corn flower, which is a typical weed in rye crops, were found. The remains of oat, millet, and carbonised barley were found in the archaeological material. Carbonised barley was also present among the store findings from the excavation on site I.

⁶⁶ Alis Moora, *Eesti talurahva vanem toit* [History of food of Estonian peasants], vol. 1 (Tallinn: Valgus, 1980). She writes that in the 16th century, hemp seeds were used for making hemp-milk and oil cakes. For hemp-milk, hemp seeds were broken into pieces, and soaked in water, yielding a milk-like solution which was used in food preparation.

⁶⁷ The town council declared that foreign merchants were prohibited to buy honey, butter, eggs, hemp and hemp seeds in bulk from the boats of the Russians, and from non-Germans in front of the town gate; Enn Tarvel, "Tartu hansalinnana XIII sajandist Liivi sõjani" [Tartu as a Town in the Hanseatic League from the 13th c. until the Livonian War], in *Tartu ajalugu* [The history of Tartu], ed. J. Pullat (Tallinn: Kirjastus Eesti Raamat, 1980), 47.

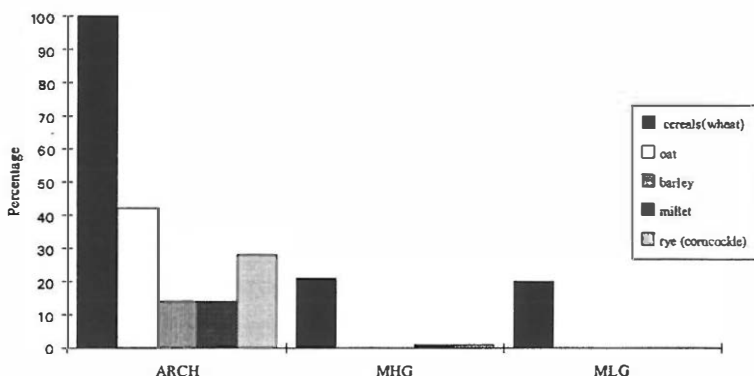
⁶⁸ MHG recipe 45. *Ein gût gerihltin*, MLG recipe 35. *Erbsekochen*, 36. *Auf dem Spieß gebratene Erbsen*.

⁶⁹ MLG recipes 38. *Gerichte von gestoßenen Erbsen* and 39. *Burg von gestoßenen Erbsen*.

⁷⁰ MLG recipe 37. *Erbsen in Gallert*.

⁷¹ MLG recipe 20. *Großes Ei*.

Fig. 16: Cereals in archaeobotanical and written sources



In medieval German cook-books, cereal grains are rarely mentioned. Instead, wheat bread, breadcrumbs and wheat flour for preparing dough or used as a thickener, are recorded in the recipes.⁷² In the MHG cook-book, rye bread⁷³ is mentioned, and millet porridge⁷⁴ is reported in connection with the preparation of a dish. Regarding written sources from elsewhere, porridges of wheat, oats, rice, and millet in milk and egg yolks, eaten with sugar, or barley, cooked with figs and honey, are considered as the typical dishes for the sick.⁷⁵ Cereals were commonly used for staple foods and drinks for all classes, for example bread, gruels, porridges, and beer. For producing bread, cereals were usually ground, but there could be a bread sort, where complete grains were mixed into the dough; complete grains among archaeobotanical material can be also the traces of whole grain porridges.

In the surviving sixteenth-century town council protocols of Tartu entries on trade in cereals dominate. This trade was mainly carried out with Russians. On March 20, 1553, an embargo was issued to prohibit wheat purchased from Russians or peasants from being exported from the town.⁷⁶ On April 7, 1551, the town council reported to the bishop that the Russians were looking for rye and

⁷² MHG recipes 10. *Ein spise von birn*, 20. *Diz sagt von eime stoc vische*, 21. *Ein gût spise*, 26. *Diz ist ein gût fuelle*, 31. *Ein spise von bonen*, 43. *Ein clûge spise*, (51.) *Ein gût spise*, (67.) *Aber ein col rys*, (70.) *Ein mandelmûs*, (80.) *Wilt du machen ein muezenmûs*, (82.) *Ein wissel mûs*; MLG recipes 4. *Kirschmus*, 9. *Hechtrogenwurst*, 15. *Brombeermus*, 25. *Gefüllte Krebse*, 42. *Apfelwecken*, 44. *Speisekuchen von Hechtrogen*, 52. *Hanfimus*, 74. *Gefüllte Fladen*, 84. *Pflaumenmus*, 101. *Erbsenmehlbuter*.

⁷³ MHG recipe 23.

⁷⁴ Recipe 47. *Ein geriht*.

⁷⁵ Scully, *The Art of Cookery*, 187, 188. This concerns the eating habits of upper classes.

⁷⁶ Tarvel, "Tartu," 45.

that they had bought barley from the town and the bishopric.⁷⁷ On February 21, 1554, the Great Guild complained that some of the citizens were employing young journeymen and servants to buy rye from the Russians before it reached the town.⁷⁸ Tarvel, the interpreter of the passages in the town council protocols, suggests that the trade in grain was closely related to the Russian hinterland. In the years of famine, the Russians bought grain from the town, while in the years of surplus they sold it in great amounts to the town.⁷⁹ Documentary sources also refer to the scarce export of rye from Livonia to the West. Neighbouring countries such as Prussia, Sweden, and Russia (Novgorod) were the destinations of small and occasional quantities of grain.⁸⁰ Also peasants are referred to as being involved in the trade, which may point to the local cultivation of wheat.⁸¹

Vegetables and miscellaneous

In the archaeobotanical material, no traces of "ordinary" vegetables were found. Thus, the only sources about plausible vegetables in Old Tartu remain the records in the Town Council Protocols from the sixteenth century. There is an entry, for example, that Russians were allowed to sell onions, horse-radish, garlic, cabbage, and several seeds on their boats.⁸² Occasionally, wild and in present sense ruderal plants could have served as vegetables for the inhabitants of the plots, for example wild turnip, and fat-hen. Dock and sorrel could also be collected for alternative dishes.⁸³ Turnips were used to be prepared with the herbal part of the plant; they were chopped and stewed or used in soups (*rüebekrut*) in some cases.⁸⁴ This was food for mainly poor people. The best explanation of occurrence of corn cockle and perhaps some other weed plants in archaeological material is that they were eaten with dishes made of grain, for example, with several porridges. The seeds of sheep's sorrel and fragments of cornflower seeds, found in rather large number, could have been incorporated in coarse bread made of rye. Many of the plants which were found in latrine samples could have been related to purposes other than food, for example meadow sweet and common henbane in medicine. It is interesting that the seeds

⁷⁷ Ibid.

⁷⁸ Ibid.

⁷⁹ Ibid., 46.

⁸⁰ M. M. Postan and Edward Miller, eds., *The Cambridge Economic History of Europe*, vol. 2, *Trade and Industry in the Middle Ages*, 2nd ed. (Cambridge: Cambridge University Press, 1987), 592, 593.

⁸¹ Tarvel, "Tartu," 45.

⁸² Ibid., 48.

⁸³ Werner Rösener, *Peasants in the Middle Ages* (Cambridge: Polity Press, 1992), 36.

⁸⁴ Moriz Heyne, *Deutsches Nahrungswesen. Fünf Bücher Deutscher Haushaltertümer von den ältesten geschichtlichen Zeiten bis zum 16. Jahrhundert*, vol. 2 (Leipzig: Verlag von S. Hirzel, 1901), 325.

of wild flowers were found in the material, for example a number of oxeye daisy seeds from sample #1a, site I, which could not have been occasional (see table 1).

Conclusion

In this article, an attempt was made to reconstruct the consumption of plant components in food in late medieval Tartu with the help of archaeological data, comparing them with two late medieval German cook-books. These cook-books were chosen for the comparison due to the necessity of a contemporary background, and because there was deficiency of local written sources. One of the advantages of the cook-books is that it was possible to present the information in the same numerical level as it appeared in the archaeological material, by summarising the data in graphs and tables. Another advantage was that, provided that the recipes represent late medieval German cooking traditions and eating habits, they provided illustrative supplement to the archaeological material from the plots of obviously German inhabitants.

One disadvantage of such research is that the cook-books were from an ecclesiastical background, while the inhabitants of the plots were probably representatives of the middle classes in the town. In addition, these two German cook-books originated from regions distant from Livonia. However, since similar compositions of plant remains have been found from many late medieval towns in Europe, the comparison was carried out, and the regularities and irregularities were examined in the context of both of the sources.

The largest dissimilarities in the comparison appeared in groups of wild fruit, spices, oil plants, and vegetables. The archaeological material did not provide much information on spices and vegetables, excluding wild vegetables. The written sources did not provide much information about wild fruit and oil plants. Apparently, these are general features of the sources, because, for example, wild fruit is the most frequently presented plant group in all these types of archaeological material.

Concerning the social stratification of the inhabitants of the plots, an evaluation could be completed on the basis of the data referred to in Weiss Adamson's article on Ryffs' writings.⁸⁵ Most of the edible plants (see table 2) were foodstuff for all classes, with the exemption of oat and millet as food for the lower classes, and imported figs, raisins, and pepper which were probably consumed mainly by middle and upper classes. In conclusion, the inhabitants of the plots were of middle class, as it was already deduced from the names of the streets. The plant remains did not reveal characteristics of upper class food. With the exception of a few imported foodstuffs, consumption was closely related to local natural resources.

⁸⁵ Weiss Adamson, *Unus theutonicus*.

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*From the Latrine, through the Woods, and into the Lake:
Ecological Samples from Medieval East-Central Europe*

An Introduction

Recycling is nowadays a decisive issue in ecology. This holds true for historical ecology in East-Central Europe as well, albeit in a very different sense. Whereas reusing old material is doubtlessly valuable in environmental protection, the same is rather questionable, if the old material comprises historical sources. The reason to put together and present the following four essays was to help, as far as the authors could, recycling be back where it truly belongs.

Historical ecology is a well-established discipline in Western Europe. In East-Central Europe, much progress has been made recently, and now many scholarly publications appear on the subject. In other words, the *methodology* is understood and applied. However, it is only in exceptional cases, such as the climatology research in Brno, Czech Republic, or the excavations of the medieval royal garden at Visegrád, Hungary that the methods are applied on sources, be them written or archaeological that are freshly gathered for the topic. Historical ecology is an essentially *quantitative* field of research. Before the writing process commences, a large amount of data must be collected. Furthermore, the type of data we use is atypical for former research. A chance mention of heavy rains in a charter, or pieces of seeds in a latrine did not use to be considered significant. This may well be true if they stand alone; but *all* occurrences of heavy rains for a hundred years, or *all* plant remains in a latrine carry otherwise unreachable information. The task, then, is twofold: we have to collect as much data as we can, and we have to look for the type of data that has not yet been searched for.

Many learned articles on the historical ecology of East-Central Europe fail to perform this task. They take what was published before and examine it from a different angle, which, although an inevitable step, does not suffice alone.

The connection between the otherwise rather diverse essays presented here is that they all try to analyse sources hitherto unexplored. We hope that we live up to the requirement of introducing essentially new data to the common knowledge. Whether our analyses may also stand the test of time is for the reader to decide.

Péter Szabó (Budapest)