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The common and the rare
a review of Early Modern Dutch plant food consumption based on archaeobotanical urban cesspit data

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Introduction
- Consumed food items can be disposed of during or after food preparation, as kitchen by-products, or after consumption, as human faecal matter.
- Both kinds of material contain subfossil plant remains which are generally interpreted as, respectively, indirect and direct evidence for past food consumption.
- In order to interpret and reconstruct what is common and what is rare, cesspit samples from Dutch urban centres were analysed in a diachronic local study.
- The data was derived from the Relational Archaeobotanical Database for Advanced Research (RADAR, version 2012).

Fig. 1
The location of the Dutch urban settlements with excavation data used, plotted on a modern-day map of the Netherlands

Material, Methods & Results
- The data provided detailed diachronic information about plant consumption in 34 different urban settlements within the Netherlands (Fig. 1).
- These 34 settlements provided 62 sites that had cesspits in use in sub-period 1500-1600 (*n* = 38), 1600-1700 (*n* = 54) and 1700-1850 (*n* = 38).
- A total of 94 taxa of macro-remains and micro-remains of edible plants were present in the cesspits under study.
- This list of taxa roughly breaks down into four groups: fruit trees and fruit-producing shrubs (*n* = 34), vegetables (*n* = 25), herbs and spices (*n* = 27) and (pseudo-)cereals (*n* = 8).

Common finds
- The plant taxa that are present in > 50% of the sites in each of these three sub-periods show relatively few changes in ranking between the sub-periods for macro-remains (table 1) and micro-remains (table 2).
- Potential ovule production, clustering of fruits in food units, and plant usage were analysed to assess if these plant taxa were overrepresented (table 1).
- An increase in potential seed production was shown not to correspond with an increase in the percent ubiquity of subfossil plant taxa found in sites, although percentagewise the frequency of their presence was higher.
- Only a limited number of plant taxa represented by seeds and fruits are also represented by pollen.
- Many of the species represented solely by pollen finds are edible plants of which the leaves, flowers or flower buds were consumed.

Plant taxa	1500–1600	1600–1700	1700–1850	KBP	CR	GW	Category	Food unit
Cerealia	83	73	71		+		1	S
Corylus avellana	72	58	71	+			1	S
Fagopyrum esculentum	83	73	71	+			1	S
Humulus lupulus	56	38	36	+		+	1	S
Juglans regia	61	50	64	+			1	S
Oryza sativa	44	54	57	+			1	S
Panicum miliaceum	67	54	50	+			1	S
Piper nigrum	33	38	57		+		1	S
Prunus avium/cerasus	78	73	86	+			1	S
Prunus domestica	67	77	86	+			1	S
Secale cereale	78	62	71		+		1	S
Triticum aestivum	56	15	29		+		1	S
Coriandrum sativum	56	62	57	+	+		2	S
Foeniculum vulgare	67	65	50	+	+		2	S
Sambucus nigra	39	54	57	+	+		2	S
Vitis vinifera	89	92	93	+	+		2	S
Brassica napus/rapa	33	42	57		+		3	S
Brassica nigra	83	77	79		+	+	3	S
Linum usitatissimum	56	46	36		+		3	S
Malus domestica/Pyrus communis	89	88	93	+	+		3	S
Mespilus germanica	61	62	50	+	+		3	S
Vicia faba	44	38	50		+		3	S
R. nigrum/rubrum/uva-crispa	72	69	86	+	+		4	S
V. myrtillus/uliginosum/vitis-idaea	72	58	50	+	+		4	S
Ficus carica	100	85	100		+		5	C
Fragaria moschata/vesca	67	77	79	+	+		5	M
Morus nigra	67	69	64		+		5	M
Rubus fruticosus	89	73	64	+	+		5	C
Rubus idaeus	44	77	79	+	+		5	M

Table 1: Ubiquity > 50 (%) of plant macro-remains found in the cesspits under study. Also noted are potential origin: kitchen by-products (KBP), consumption refuse (CR); secondary fill e.g., garden waste (GW).
The taxa are ordered alphabetically within categories of potential ovule numbers.
Category 1: number of potential ovules n = 1, 2: n = 2–5, 3: n = 6–10, 4: n = 11–50, 5: n > 50
Food units are categorized as: S single fruit, M multiple fruit, C compound fruit.

Plant taxa	1500–1600	1600–1700	1700–1850
Anethum graveolens	6	4	
Anthriscus cerefolium	33	31	29
Apium graveolens	6	4	
Beta vulgaris	22		7
Borago officinalis	6	8	14
Capparis spinosa	11	8	14
Carthamus tinctorius	17	8	
Carum carvi/Cuminum cyminum		4	
Castanea sativa	6	4	
Cerealia	56	35	36
Coriandrum sativum	6		7
Fagopyrum esculentum	17	15	21
Foeniculum vulgare	6		14
Humulus lupulus	17		21
Juglans	11	4	14
Mespilus germanica			7
Olea europaea			7
Petroselinum crispum	11	4	
Pimpinella anisum	6	12	21
Pisum sativum	17	8	21
Portulaca oleracea			7
Prunus		4	7
R. nigrum/rubrum/uva-crispa	6		
Sambucus nigra	6	12	7
Secale cereale	28	8	7
Sorbus			7
Spinacia oleracea	6	12	29
Syzygium aromaticum	28	31	36
V. myrtillus/ uliginosum/vitis-idaea	22	8	14
Vicia faba	28	19	29
Vitis vinifera	6		

Table 2: Ubiquity (%) of plant micro-remains (pollen) found in the cesspits under study, in alphabetical order.

Rare finds
- The 12 plant species were represented by singular finds (table 3). They are not interpreted as 'rare', for one or more of three reasons.
- First, some are present in sub-periods omitted from the selection because of overlaps in dating.
- Second, their absence from the archaeobotanical datasets may have been caused by post-depositional processes, such as grinding or pounding.
- Third, their absence may relate to the lesser preservation qualities of their vegetative plant parts, such as leaves and roots.

Taxon	Plant name	Native species	Plant part	Possible preparation methods
Fagus sylvatica	Beech	Yes	Cupule	De-seeding, roasting
Coffea arabica	Coffee	No	Seed	Roasting, grinding
Berberis vulgaris	Common barberry	Yes	Seed	–
Salicornia europaea	Common glasswort	Yes	Seed	–
Lepidium sativum	Garden cress	Yes	Seed	–
Atriplex hortensis	Garden orache	Yes	Fruit	Threshing
Physalis alkekengi	Chinese or Japanese Lantern	Yes	Fruit	–
Melissa officinalis	Lemon balm	Yes	Fruit	–
Lens culinaris	Lentil	Yes	Seed	Boiling, pulverizing/mashing
Lactuca sativa	Lettuce	Yes	Fruit	–
Rosmarinus officinale	Rosemary	Yes	Fruit	–
Sinapis alba	White mustard	Yes	Seed	Grinding

Table 3: The 12 species represented by singular finds, including plant part and possible preparation methods.
A '-' indicates that no preparation would have been needed to render the food edible.

Conclusion
- This review shows that there is a large potential for improving the dataset to reconstruct past food consumption practices by combining the analysis of macro- and micro-remains.
- Further attention needs to be paid to the detailed registration of plant parts in general and potential preparation marks in particular to reconstruct diet.
- Post-depositional processes influencing the chances of recording a taxon during archaeobotanical analysis have to be studied in greater detail and deserve further attention in future research.
- A more accurate picture of Early Modern Dutch food consumption will be obtained by supplementing bio-archaeological results with data from primary historical sources pertaining to food consumption, such as cookbooks and herbaria.

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