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# Priorities in Urban Archaeobotany: some examples from Denmark

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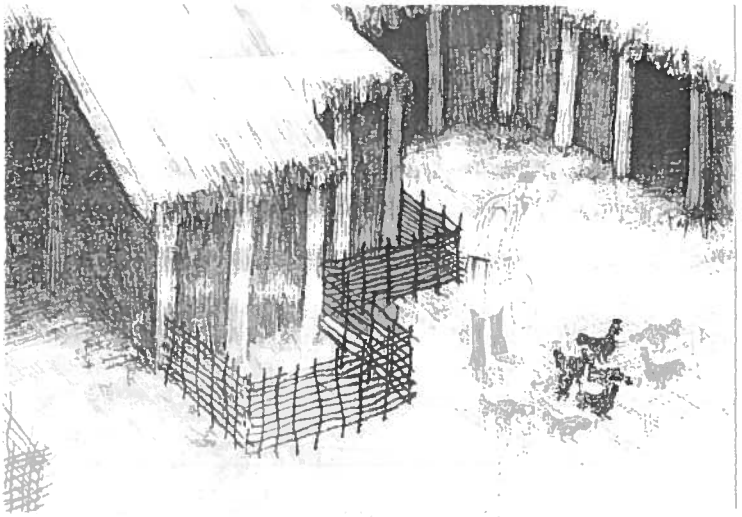

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# Priorities in urban archaeobotany: some examples from Denmark

by David Robinson

This paper is based on a lecture given to the Town Archaeology Meeting in Ribe in May 1992. It has been updated in the light of subsequent research and discussions held at meetings of the Nordic Archaeobotanical Group at Lejre, Denmark in 1994 and at Bökeberg, Sweden in 1995. It is intended that this version of the paper will appear in the Proceedings of the Bökeberg meeting published by the Department of Quaternary Geology, University of Lund

***Abstract:***

*High quality archaeobotanical analysis is demanding both in time and expertise, and it therefore important that the subjects chosen for research are those which yield new and precise information. This paper examines those contexts and deposits most commonly encountered during excavations of urban sites and attempts to categorise them according to the information they potentially can produce. These categories are then used as a basis for an evaluation of archaeobotanical research carried out at urban sites in Denmark over the past 25 years. In the light of the evaluation suggestions and recommendations are made with regard to future research strategy.*

*Keywords: archaeobotany, urban archaeology, Denmark*

## Introduction

Plant resources, both from cultivated plants and the natural vegetation, were a vital ingredient in the development of early urban sites. If we can ascertain which of these resources were available and how they were exploited, then we can gain a valuable insight into the internal workings of such settlements. Pollen and plant macrofossil analysis are the two main techniques available to us for studying the utilisation of plant resources in the past, and it is often in combination that they produce the best results.

Research work of this quality is demanding, both in time and expertise, and it is therefore important that subjects for study are chosen with care. This paper examines priorities in the archaeobotanical investigation of urban archaeological sites. The emphasis is on plant macrofossil analysis, but many of the points made are also relevant to pollen studies.

## Taphonomy

Plant macrofossil analysis involves the identification and quantification of sub-fossil plant remains - seeds, fruits, leaves, flowers and other remains visible to the naked eye. When these remains are preserved in connection with archaeological features and deposits, they are normally referred to as archaeobotanical remains. They are preserved in a variety of ways (Robinson and Mikkelsen 1994). Early urban sites are often very rich in well-preserved uncarbonised organic remains, but carbonised and mineralised remains, as well as impressions, are also encountered. Early towns are commonly situated in low-lying areas by rivers, lakes or the sea where the water table is high and organic material is readily preserved by waterlogging, often resulting in overwhelming

quantities of uncarbonised organic material. There is also inherent in the process of urbanisation a change in the amount and the treatment of organic waste material. We no longer see virtually complete recycling of organic waste via composting and the manuring of fields as is the case with pre-urban agrarian settlements. In urban sites, relatively large numbers of people, many of whom are involved in non-agrarian activities, are concentrated into a relatively small area. They produce more waste than can be conveniently recycled or otherwise dealt with and this leads to rapid accumulation in and around the settlement. Under the right circumstances this material contains a wealth of information about the contemporary environment and activities in and around the settlement, and exotic finds may reveal evidence of trading contacts both far and near.
Effective extraction of this information is dependant on a well-planned programme of archaeobotanical analyses.

**Plant macrofossil analyses from Danish urban sites**
As in many other aspects of environmental archaeology, Danish scientists were pioneers in using botanical analyses to investigate urban archaeological deposits. Around the turn of the century a group of natural scientists assisted the teacher and amateur archaeologist Rosenkjær in his investigations of the organic layers exposed during building work in Copenhagen (Rosenkjær 1906). It was Rostrup (Rostrup in Rosenkjær 1906) who carried out most of the botanical work and he produced some very impressive species lists. Most of the analyses were from culture layers and "fill" and unfortunately the dating of much of the material is problematical. Two decades later Jessen and Lind (1922-23) attempted to rationalise the dating of the material Rostrup analysed and added some analyses of their own. It is still difficult to make comparisons between the various sites and also to relate the data to later work, I have therefore chosen to exclude these early analyses from the summary presented in table 1.

Modern archaeobotanical research on Danish urban deposits started rather more than 20 years ago with the work by Lange in Ribe (Bencard and Lange 1972). It then continued in Svendborg and other provincial towns with analyses by Jensen (1979, 1986, 1988, 1991a, 1991b) and Jørgensen (1980, 1986). Figure 1 shows towns from which material has been analysed, or where archaeobotanical analyses are in progress, as of October 1995. The numbers refer to the site numbers used in table 1. Table 1 summarises information about the sites (dating, site history, context) and the nature of the material which has been analysed (midden, well fill, latrine etc.). The results of the individual analyses will not be presented or commented upon here; the reader is referred to the original publications or reports quoted in the tables.
A total of 277 samples from 40 sites are listed. Together they span the period from the 8th century up to and beyond the end of the medieval period.
The various monasteries have been included as "honorary" urban sites. The material from the Gedesby shipwreck is included because it is very similar to that which we find in urban sites, and it illustrates the information potential of good material.

**Assessment**
How can we assess this material by considering various categories of deposits

which are potentially available to us from urban sites, their interpretation and the potential value of the information they produce. This will bring to light a sample representativity and the value of the information it produces. We can then look at the material which has already been analysed in the light of this and plan for the future.
Deposits encountered at urban sites can be placed in one of three categories which I have chosen to call category 1, category 2 and category 3 deposits. Examples of each of these are given below along with an estimate of their potential information value. This information value refers not to the potential raw botanical information (i.e. state of preservation, seed concentration, species present etc.) but to the potential archaeobotanical information - i.e. the way in which the botanical information can be interpreted to give precise and new information about the context in question and about particular aspects of the life and environment of the settlement.
The dating of a deposit also plays an important role in any assessment. A reliable precise date increases the information potential, whereas an unreliable or broad date decreases the information value of the sample.

**Category 1 deposits** are deposits with a high information value because precise data are readily extractable. Examples include
in situ human faeces in cess pits, animal dung in stables or byres, concentrations of stored grain and other crop products and the contents of single activity pits can provide precise and new information because we can be fairly confident of the origin and history of this material. Human faeces contains the remains of what has been eaten with the possible addition of material used as "toilet paper". Similarly, animal dung contains remains of what the animal has grazed or been fed on with the possible addition of material strewn on the stable or byre floor. Concentrations of stored grain or other cultivated plants, particularly those preserved by carbonisation in a catastrophic fire, usually represent a stage in the harvesting and processing procedure which normally can be readily recognised. A refuse pit from a single activity such as tanning, brewing or dyeing contains material solely or primarily resulting from that process and can readily be interpreted.

**Category 2 deposits** are deposits which are normally in situ but of mixed origin, arising from numerous potential sources and their history is more difficult to deduce. Their information value is moderate.
Human faeces, animal dung etc.(i.e. normally classed as category 1 deposits) which are obviously contaminated/mixed with other material, for example in mixed activity refuse pits are good examples of category 2 deposits. Another example is floor layers; apart from plant material used to cover and perhaps sweeten the floor, the latter could for example contain domestic refuse, hearth rakings, craft waste, material used as bedding and so on. It can be difficult to ascertain the origin(s) of the material we are analysing. Category 2 deposits can give valuable information but they often present us with problems of interpretation.

**Category 3 deposits** are those which are of mixed origin, not obviously in situ and therefore probably redeposited. Their analysis often produces very little unequivocal information, perhaps no more than an indication of presence or

absence of a particular species. Interpretation of the results is very difficult because we have no way of deducing the origins and history and the potential sources of the deposit and the potential sources of the material are so numerous. Wells and moats are good examples; they contain a mixture of remains from plants growing in the vicinity plus a range of other material, refuse etc. which has found its way by various means into the water. This is often material representing many differing activities which may well have been redeposited several times and thus can represent a considerable period of time. There tends also to be over-representation of wetland and ruderal species, either because they are growing in situ or because they dominate the refuse. The latter is a consequence of the use of large quantities wetland plants for many different functions such as roofing, flooring etc. The situation is even more difficult in midden deposits, culture layers and nondescript "fills". The material is of mixed origin both in space and time and rather than producing new information, we find ourselves using existing knowledge, for example from written sources or earlier investigations, to explain that which may be represented in our samples. Unfortunately it is usually category 3 deposits which are the most abundant at urban sites and superficially they are the most attractive to would-be sample takers, with their rich content of well-preserved organic remains.

If we now return to the material which has been analysed to date from Danish urban sites, we can examine which categories are represented. A total of 277 samples been analysed from 40 sites. Figure 2 shows the proportions of these samples from category 1, category 2 and category 3 deposits. Samples from category 1 deposits (faeces, dung and carbonised grain etc.) make up only a relatively small percentage of the total. Category 2 deposits are rather better represented, but the overwhelming majority of samples come from category 3 deposits. It is clear therefore that most of our archaeobotanical information from early urban sites comes from category 2 and category 3 deposits, with all their inherent problems of representativity and interpretation.
This sounds like a very damming judgement. One must however remember that these category 3 deposits were usually the only deposits available for study at the sites in question. Furthermore, a considerable number of samples has been analysed in attempts to solve archaeological rather than archaeobotanical problems. These have often been from category 3 deposits which, although the may contain little archaeobotanical information, can give answers to pertinent archaeological questions. It cannot be denied however that there are also cases where research planning has been inadequate.

**Research planning**
How can we improve this situation? Obviously we cannot change the deposits which are available at sites, but we can change our approach to one which is more problem-orientated. The problems we choose to solve can either be of an archaeological or a purely archaeobotanical nature.

1. Archaeobotanical problems: through selecting our samples carefully, with a clear emphasis on category 1 deposits, we can investigate archaeobotanical questions such as:
- which cultivated plants were utilised?
- were they grown locally or imported?

- what strategies were employed in the cultivation, harvesting and processing of cereals and other crops?
- what were animals fed on or where did they graze?
- what plant-based industries and crafts were there in the town?

Examples of this can be seen in the analyses from Lillelunds Have in Næstved (Robinson unpub b) where the contents of latrine barrels from the early Middle Ages and the Renaissance were analysed in an attempt to compare and contrast the diet of the occupants in the two periods. The aim was similar with the analyses of a 16th century latrine/refuse barrel from Brogade in Svendborg (Robinson and Harild unpub e) and a late medieval faecal layer at Provstevænget in Roskilde (Robinson and Harild unpub b). At Valdemar Slot on Tåsinge (17th century) (Robinson and Harild unpub c) and Ahlgade, Holbæk (13th century) (Boldsen and Robinson 1991, in press) samples were taken from a stone-lined drain to solve both an archaeological problem (was it a sewer and if so was it flushed with fresh water?) and an archaeobotanical problem (can the contents of the sewer say anything about the diet of the inhabitants?).

More general problems can be answered by co-ordinating analyses, such as those outlined above, over a range of sites, each of which provides a piece or pieces in the jigsaw puzzle.

- development of the urban economy.
- development of trade in luxury and basic plant resources.
- diet of various social classes.
- exploitation of natural or managed natural resources woodland, grassland heath and marsh.
- the medicinal use of plants
- cross-referencing and comparison with contemporary written sources.

Answers to these questions cannot however be expected in the immediate future. Many more reliable routine analyses are needed

2. Archaeological problems: we can also use archaeobotanical techniques (including careful description in the field) to attempt to solve questions posed by the archaeologist. Questions such as:
- is this deposit natural or man-made?
- is this material animal dung, human faeces or peat?
- did a vegetation layer develop here before the subsequent layer was deposited?
- is this material <u>in situ</u> or has it been redeposited?

The Copenhagen sites of Lille Kirkestræde (Moltsen unpub) and Kompagniestræde (Boldsen 1994) are good examples of the above situation. The most pertinent questions concerning the early development of Copenhagen, such as the position and nature of the coastline at various times and the rate and nature of the subsequent land reclamation, town expansion and harbour construction. Analyses of number of sample series extending from natural beach layers, up through reed-swamp deposits to refuse and consolidation layers (which are very much category 3 deposits) are beginning to provide answers to these questions. A similar situation, albeit in a freshwater environment was met

at the medieval Boller Slot near Horsens (Robinson and Harild unpub h).

The research plan and, in particular, the sampling strategy at a site depends very much on which of the above questions we are attempting to answer. It is very important that archaeobotanical analyses have been planned prior to the excavation and that these plans are revised as necessary during the course of the excavation. Post-excavation planning is a poor substitute because the deposits which then prove to be crucial to our investigation were almost certainly not sampled!

**Conclusion**

Over the last 20 years we have amassed a considerable body of archaeobotanical data from early urban sites in Denmark. However we can now see that investigations generally have been rather random in their aims and that the vast majority of the data we have accumulated comes from category 3 deposits i.e. material of mixed origin not in situ. Analyses of these deposits can in some cases be justified from an archaeological point of view but when the analyses are for archaeobotanical purposes the results are very difficult to interpret and the data lack precision. The way to improve this situation is by adopting a more problem-orientated approach and by devising an archaeological/archaeobotanical research plan, which outlines the problems one wishes to solve prior to the excavation. This research plan can then be adjusted as necessary in the course of the excavation. Archaeological problems can be addressed as they arise. Precise archaeobotanical information is furnished by the analysis of unmixed well-defined, well-dated in situ (i.e. category 1) deposits and it is the analysis of these which should form the core of the research plan.

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Robinson, D.E. and Harild, J.A. (unpub d) Skarregård, Mors.

Robinson, D.E. and Harild, J.A. (unpub e) Brogade, Svendborg.

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Figure legends

Figure 1: Towns with early urban sites from which material has been analysed, or work is in progress, as of October 1995. The numbers refer to the site numbers used in table 1.

Figure 2: Archaeobotanical research in Denmark: The proportions of samples from category 1, category 2 and category 3 deposits analysed during the past 25 years.

Table 1: Summary information about the sites (dating, site history context), the nature of the material which has been analysed (midden, well fill, latrine etc.) and the archaeobotanical information category.

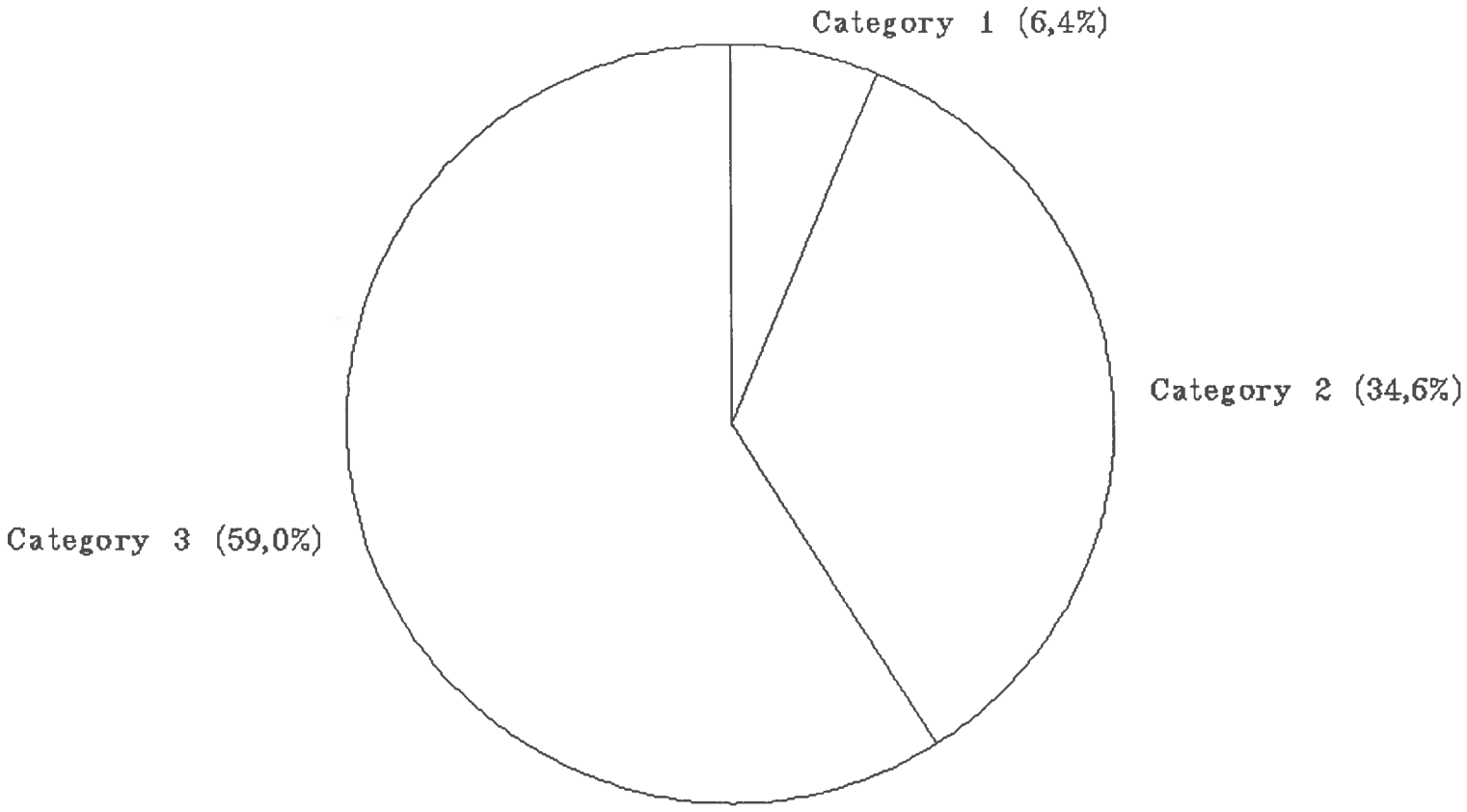


Figure 2: Archaeobotanical research at urban sites in Denmark: The proportions of samples from category 1, category 2 and category 3 deposits analysed during the past 25 years.

Table 1

| Site | 1. Ribe Kunstmuseet | 2. Ribe Dommerhaven | 3. Ribe Tvedgade | 4. Ribe Posthus | | 5. Ribe Sønderportsgade | 6. Viborg St. Sct. Peterstræde | | 7. Viborg Søndersø | | | 8. Århus Søndervold | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Source | Jensen 1986, 1988, 1991a, 1991b | Jensen 1986, 1988, 1991a, 1991b | Jensen 1986, 1988, 1991a, 1991b | Robinson & Boldsen 1993 | | Bencard & Lange 1972, Jensen 1986, 1988, 1991b | Jensen 1986, 1988, 1991b | | Robinson et al 1992 | | | Fredskild 1971 | |
| Site history | market place | market place | market place | market place | | urban settlement | farm/ urban settlement | | urban settlement | | | urban settlement | |
| Context | refuse layers | refuse layers | refuse layers | refuse layers | work-shops | refuse layers | plough-soil | refuse layers/ byre | refuse layers | latrine layer | well fill | fortifi-cations | pit-house floors |
| Layer/sample description | mixed refuse/ dung | mixed refuse/ dung | mixed refuse/ dung | mixed refuse/ dung | sand/ ash/ work-shop waste | building debris/ charcoal/ mixed refuse | soil with organic remains | mixed refuse/ dung | mixed refuse | human faeces | gyttja/ refuse | gyttja/ peat/ refuse | carbon -ised grain/ seeds etc. |
| Dating | 8th century | 8th century | 8th century | 8th-10th century | | c. 1100 - c. 1580 | late Viking - c. 1200 | | 11th century | | | 11th century | |
| Number of samples | 5 | 1 | 3 | 5 | 21 | 14 | 1 | 7 | 14 | 4 | 1 | 3 | 12 |
| Category | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 1 | 3 | 3 | 2 |

Table 1 (cont.)

| Site | 9. Kolding Borch's Gaard | 10. Svendborg Foldagers Gaard | 11. Svendborg Korsgade 4 | | 12. Svendborg Krøyers Have | 13. Svendborg Franciscan Monastery | | 14. Svendborg Møllergade 6 | | | | 15. Svendborg Brogade |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Source | Jensen 1986, 1988, 1991b | Jensen 1979, 1988, 1991b | Jensen 1979, 1988, 1991b | | Jensen 1979, 1988, 1991b | Jensen 1979, 1988, 1991b | | Jørgensen 1980, 1986 | | | | Robinson & Harild unpub. e |
| Site history | urban settlement | urban settle-ment | urban settlement | | urban settlement | monastery site | | urban settlement | | | | urban settlement |
| Context | refuse layers | refuse layers | refuse layers | floor levels | moat fill | natural deposits | refuse layers | refuse layers | barrel fill | byre | hearth | barrel fill |
| Layer/ sample description | mixed refuse | mixed refuse | mixed refuse | mixed refuse | clay/ gyttja/ refuse | peat | mixed refuse | mixed refuse | human faeces | dung | carb. grain/ seeds | mixed refuse/ dung |
| Dating | 13th century - c. 1500 | 1100 - 1600 | 1150- c. 1250 | 1300 - c. 1400 | c. 1200 - c. 1550 | EMA | | EMA - LMA | LMA | | | 16th century |
| Number of samples | 2 | 8 | 3 | 2 | 8 | 2 | 3 | 17 | 1 | 2 | 1 | 5 |
| Category | 3 | 3 | 3 | 2 | 3 | 2 | 3 | 3 | 1 | 2 | 2 | 2 |

Table 1 (cont.)

| Site | 16. Gedesby | 17. Holbæk Ahlgade 15-17 | | | 18. Copenhagen Mikkel Bryggersgade | 19. Copenhagen Nytorv | 20. Copenhagen Lille Kirkestræde | | | | | 21. Copenhagen Kompagnistræde 28 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Source | Robinson & Aaby 1994, Robinson et al in press | Boldsen & Robinson 1991, in press | | | Robinson et al 1991 | Robinson unpub. a | Moltsen unpub. | | | | | Boldsen 1994 | | |
| Site history | shipwreck | urban settlement | | | urban settlement | urban settlement | coastal deposits/ urban settlement | | | | | coastal deposits/ urban settlement | | |
| Context | organic layer in hold | pit fill | fill in drain | stored grain | refuse layers | refuse layers | nat. salt-marsh | anthrop. coastal | coastal/ refuse | floor level | refuse layer | nat. coastal layer | anthrop. coastal layer | refuse layer |
| Layer/ sample description | dung | mixed refuse | mixed refuse | carb. grain etc. | mixed refuse | mixed refuse | veg. layer | veg. layer | veg. layer/ refuse | refuse | mixed refuse | sand/ veg. layer | sand/ veg. layer/ refuse | mixed refuse |
| Dating | 13th century | 14th century | 13th century | c. 1300 | EMA | EMA - LMA | pre-medieval - medieval | | | | | pre-medieval - medieval | | |
| Number of samples | 3 | 1 | 1 | 1 | 4 | 12 | 1 | 4 | 5 | 2 | 1 | 3 | 4 | 2 |
| Category | 1 | 2 | 2 | 1 | 3 | 3 | 1 | 2 | 2 | 2 | 3 | 1 | 2 | 3 |

Table 1 (cont.)

| Site | 22. Roskilde Algade | 23. Roskilde Sct. Pederstræde | 24. Roskilde Provstevænget | | | 25. Næstved Lillelunds Have | 26. Næstved Kompagni-stræde | 27. Tåsinge Valdemar Slot | 28. Nordmors Skarregård | 29. Odense Black Friars Monastery | | 30. Øm Monastery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Source | Robinson & Harild unpub. a | Robinson & Harild unpub. a | Robinson & Harild unpub. b | | | Robinson unpub. b | Robinson & Harild unpub. f | Robinson & Harild unpub. c | Robinson & Harild unpub. d | Jensen 1986, 1988, 1991b | | Jensen 1986, 1988, 1991b |
| Site history | urban settlement | urban settlement | urban settlement | | | urban settlement | urban settlement | castle | Farm | Monastery | | Moanastery |
| Context | road/ refuse layer | pit fill | pit fill | refuse layer | well fill | barrel fill | barrel fill | fill in stone drain | hearth deposits | refuse tip | | refuse pit |
| Layer/ sample description | mixed refuse | mixed refuse | mixed refuse | human fæces/ refuse | gyttja/ refuse | human faeces | dung/ refuse | faeces/ refuse/ freshwater deposits | carbonised grain/ seeds | building debris | mixed refuse | building debris/ refuse |
| Dating | medieval | medieval | late medieval | | | EMA - renaiss. | 17th - 18th century | 17th century | EMA | pre-medieval | 16th century | 1412 - 1450 |
| Number of samples | 4 | 1 | 1 | 1 | 1 | 3 | 2 | 5 | 1 | 4 | 4 | 1 |
| Category | 3 | 3 | 3 | 2 | 3 | 1 | 2 | 2 | 2 | 3 | 3 | 3 |

Table 1 (cont.)

| Site | 31. Aalborg Greyfriars Monastery | | 32. Aalborg Bispensgade | 33. Horsens Borgergade | | | | | 34. Horsens Nørregade | |
|---|---|---|---|---|---|---|---|---|---|---|
| Source | Robinson & Harild unpub. b | | Robinson unpub. c | Robinson et al unpub. | | | | | Robinson et al unpub. | |
| Site history | pre-monastic urban settlement | | urban settlement | urban settlement/ road | | | | | urban settlement | |
| Context | pit fill | pit/ hearth | well construction | pit house floor | plough soil | road | refuse layers | pit fill | refuse layers | ash/ sand layers |
| Layer/sample description | human faeces/ refuse | burnt peat/ carb. grain/ seeds etc. | heather branches | carb. remains | carb. remains | mixed refuse | mixed refuse | mixed refuse | mixed refuse | carb. remains |
| Dating | premedieval - EMA | | 17th - 18th century | Viking | pre-medieval | EMA | c. 1300 | 14th century | 1250 - 1350 | 15th century |
| Number of samples | 1 | 2 | 1 | 1 | 2 | 3 | 1 | 3 | 10 | 5 |
| Category | 2 | 2 | 1 | 2 | 3 | 3 | 3 | 2 | 3 | 3 |

Table 1 (cont.)

| Site | 35. Horsens Søndergade | | 36. Horsens Kirketorvet | | | 37. Horsens Rådhusgade | 38. Horsens Boller Slot | 39. Søkskøbing Hotel du Nord | 40. Amager Tårnby Torv | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Source | Robinson et al unpub. | | Robinson et al unpub. | | | Robinson et al unpub | Robinson & Harild unpub. h | Robinson 1991 | Robinson & Harild unpub. g | | | | |
| Site history | urban settlement | | fortified settlement/ market-square | | | urban settlement | castle | urban settlement | village/ urban settlement | | | | |
| Context | pit fill | refuse layer | defensive ditch | hearth | refuse layer | house floor | nat. layer/ refuse | stored grain | well fill | ditch fill | pit fill | refuse layer | floor levels |
| Layer/ sample description | mixed refuse/ dung | mixed refuse | human faeces/ dung | carb. grain/ seeds etc. | mixed refuse | refuse | gyttja/ refuse | Carb. grain/ seeds etc | gyttja/ sand/ refuse | carb. remains | | mixed refuse | carb. remains |
| Dating | 13th century | | 14th century | c.1400 | 14th centur y | medieval | 15th century | 17th century | 13th - 17th century | | | | |
| Number of samples | 4 | 2 | 7 | 2 | 1 | 1 | 2 | 1 | 3 | 6 | 3 | 1 | 4 |
| Category | 2 | 3 | 2 | 2 | 3 | 2 | 2 | 1 | 3 | 3 | 3 | 3 | 2 |