Archaeobotanical investigations at Danish urban sites: Planning and priorities

By David Earle Robinson

1. Introduction

The theme of this conference is topography and many papers deal with the location and structure of early urban sites in the landscape. In this contribution I would like to address another important element in landscape archaeological studies – the vegetation. Specifically, I would like to examine the most effective ways in which we can investigate the special relationship between plant resources in the landscape in the past and the human populations which created, managed or exploited them.

Plant resources, both in the form of cultivated plants and the natural vegetation, were a vital component in the development of early urban sites. If we can ascertain which of these resources were available, and the ways in which they were exploited, we can gain valuable insights into the internal workings of such settlements (see fig. 1).

There are two major techniques available to us in this respect, pollen analysis and plant macrofossil analysis, and it is often in combination that they produce the best results. Both techniques are, however, very demanding, both in time and expertise, and it is therefore important that subjects for study are chosen with care. Using existing plant macrofossil from Danish urban sites as a base, this paper examines the archaeobotanical investigation of urban archaeological sites and makes some suggestions with regard to planning and priorities. The emphasis is, of course, on plant macrofossil analysis, but the general points are also of relevance for pollen studies.

2. Plant macrofossil analysis

Plant macrofossil analysis involves the identification and quantification of »large« sub-fossil plant remains, i.e. seeds, fruits, leaves, flowers and other remains visible to the naked eye. When these remains are preserved in natural sediments in lakes and bogs we refer to their study as palaeobotanical or palaeoecological investigations; in an archaeological context the term is archaeobotany.

Archaeobotanical remains are preserved in a variety of ways, but most commonly by charring or waterlogging.[1] The latter are often present in astounding quantities at early urban sites, but carbonised and mineralised remains, as well as impressions, are also encountered.

Early towns were commonly situated in low-lying areas by rivers, lakes or the sea where the water table was high, providing ideal condition for the preservation of uncharred 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 was the case with pre-urban agrarian settle-

ments. At the first urban sites, relatively large numbers of people, many of whom were involved in non-agrarian activities, were concentrated into a relatively small area. More organic waste was produced than could be conveniently recycled and there were few or no formal means of disposal. This lead to rapid accumulation in and around the settlement, and, where conditions were favourable, thick deposits were formed. By virtue of the waste material of which they comprise contain, these deposits contain a wealth of information about the contemporary environment, activities in and around the settlement and contacts both near and far. Effective extraction of this often very complex information is dependant on a well-planned programme of archaeobotanical analyses.

3. Existing analyses from Danish urban sites

As in many other aspects of environmental archaeology, Danish scientists were pioneers with regard to archaeobotanical studies of deposits at urban archaeological sites. Around the turn of the century a group of natural scientists assisted the teacher and amateur archaeologist H.N.Rosenkjær in his investigations of the organic layers exposed during building work in Copenhagen.[2] It was Rostrup[3] 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 by modern standards the dating of much of the material is problematical. Two decades later Jessen and Lind[4] attempted to improve the precision of the dating and added some analyses of their own. It is, however, 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 of Danish archaeobotanical analyses from urban sites presented in table 1 (see below).

Modern archaeobotanical research on Danish urban deposits started about 30 years ago with the work by Johan Lange in Ribe.[5] It then continued in Svendborg and other provincial towns with analyses by Hans Arne Jensen,[6] Grethe Jørgensen[7] and the present author and co-workers.[8] Figure 2 shows towns from which archaeobotanical material has been analysed, or where archaeobotanical analyses were in progress, as of October 1995.[9] The numbers refer to the site numbers used in table 1. Table 1 summarises information about 277 samples from 40 sites (dating, site history, context) and the nature of the material which has been analysed (midden, well fill, latrine etc.). The sites span the period from the 8th century up to and beyond the end of the medieval period. Monasteries have been included as »honorary« urban sites and 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.

It is not possible here to refer to the results of the individual analyses in detail; the reader is referred to the original publications or reports quoted in the table.

5. Assessment

Planning a research strategy for the future requires a close assessment of the existing data in terms of its usability and relevance. I have chosen to do this by considering the various types of deposit potentially available from urban sites (floor layers, pits, latrines etc.) and the potential value of the information they

can provide. For ease of discussion I have divided these deposit types into three categories – 1, 2 and 3. Descriptions of each of these categories, along with examples of the deposit types they contain and an estimate of their potential information value, are given below. The information value refers not to the potential raw botanical information contained in the material, i.e. the concentration of well-preserved seeds or the number of species represented, 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 (e.g. the points listed in fig. 1)

EXAMPLES OF THE MAIN QUESTIONS WHICH CAN BE ADDRESSED BY PLANT MACROFOSSIL ANALYSIS

A. ARCHAEOBOTANICAL QUESTIONS

1. HOW WERE PLANT RESOURCES USED IN PREHISTORIC AND EARLY HISTORIC TIMES?

(i) HOW WERE RESOURCES FROM NATURAL AND »MANAGED« HABITATS/ RESOURCE AREAS USED (e.g. woodland, heath, saltmarsh, bog etc.) FOR FOOD, ANIMAL FODDER, BUILDING MATERIALS, CRAFTS AND INDUSTRIES, MEDICINES AND RITUALS

(ii) WHICH PLANTS WERE CULTIVATED AND HOW WERE THEY CULTIVATED, PROCESSED, STORED AND USED?

2. ARE THERE TEMPORAL, GEOGRAPHIC OR SOCIAL DIFFERENCES IN THIS USE?

B. ARCHAEOBOTANICAL/ ARCHAEOLOGICAL QUESTIONS

DETERMINATION OF ACTIVITY/ FUNCTION AREAS
TRADE OR OTHER SOCIAL CONTACTS

C. ARCHAEOLOGICAL QUESTIONS

FORMATION AND COMPOSTION OF ARCHAEOLOGICAL DEPOSITS

Fig. 1: Examples of the main questions which can be addressed by plant macrofossil analyses.

Category 1 deposits have the highest information value. These are primary deposits from single activities with little or no mixing. Precise data are readily extractable because we can be reasonably certain of the origin and sources of the material and the formation processes involved. Examples include *in situ* human faeces in cess pits, pure animal dung, concentrations of stored grain and other crop products and the contents of single activity pits.

Human faeces and animal dung contain the remains of what has been eaten by human and animals respectively, with the possible addition of material used as »toilet paper« in the case of the former.

Concentrations of stored grain or other food plants, particularly those preserved by carbonisation in a catastrophic fire, usually represent a stage in the processing procedure which normally can be readily recognised.

Single activity refuse pits such as those linked with, for example, tanning, brewing or dyeing, contain material solely or primarily resulting from that process and thus can readily be interpreted.

Category 2 deposits have a medium information level. They normally lie *in situ* but are perhaps of mixed origin, containing material from two or more

sources. As there are several potential sources their formation history is more difficult to deduce and their information value is therefore more modest.

Wells and moats are good examples of category 2 deposits. The deposits they contain were formed *in situ* but contain plant remains from a variety of sources; from plants growing in the vicinity and from a range of materials and activities in the immediate vicinity.

Floor layers also fall into category 2; apart from plant material used to cover and perhaps sweeten the floor, they can contain a wide variety of domestic refuse, hearth rakings, craft waste, material used as bedding etc.

Similarly, human faeces and animal dung, which are normally classed as category 1 deposits can, if obviously contaminated/mixed with other non-faecal material (refuse, fodder etc., also be assigned to category 2. Category 2 deposits can give valuable information but often present problems of interpretation as it can be difficult to ascertain the exact origin(s) of the material they contain.

Category 3 deposits have a low information value. These are deposits which do not obviously lie *in situ,* and are therefore probably redeposited, or those which contain material from a wide variety of material from many sources. Typical examples are middens, culture layers and mixed pit fills. These often contain material representing many differing activities which may well have been redeposited several times and thus can represent a considerable period of time. Category 3 deposits are of mixed origin both in space and time and we find ourselves using existing knowledge, for example from written sources or earlier investigations, to explain that which *may* be represented in our samples. Their analysis often produces very little unequivocal or new 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 precise origins and formation history of the material.

The categories described above are not the only criteria to be considered in an assessment. The dating of a deposit also plays an important role in any assessment; an unreliable or broad date decreases the information value of any deposit regardless of the quality of the data it produces. In some cases a reliable precise date may increase the information potential of poor data.

If we now return to the material which is to be assessed we can examine which categories are represented. 277 samples have been analysed from 40 urban archaeological sites in Denmark (table). 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 with all their inherent problems of representativity and interpretation.

This sounds like a very damming judgement but this situation reflects the fact that it is usually category 3 deposits which are the most abundant or the only deposits encountered at many urban sites. At the same time these are superficially the most attractive to would-be sample takers, because of their obviously rich content of well-preserved organic remains. Furthermore, a considerable number of sam-

ples has been analysed in attempts to solve *archaeological* rather than archaeobotanical problems (see fig. 1). Some of these have been from category 3 deposits which, although they 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.

4. 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 focuses more clearly on the problems at hand. As shown on fig 1, the problems we choose to solve can either be of an archaeological or a archaeobotanical nature or something in between.

At the level of the single site we can approach archaeobotanical problems through selecting our samples carefully, with a clear emphasis on category 1 deposits. Typical questions which can be investigated are:

- 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?
- which plant raw materials were used in buildings?

At a regional level, more general questions 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. We can, for example, investigate:

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

We can also use archaeobotanical techniques 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 *in situ* or has it been redeposited?

In these cases the category of the deposit is less important as the questions are directed at the composition and formation of the deposit itself.

Combined archaeobotanical/archaeological problems are also to be envisaged. One which immediately springs to mind concerns the investigation of building function and changes in this function through time.

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 these questions are considered and the archaeobotanical analyses are planned prior to the excavation. These plans should then be revised regularly, ideally in the light of analyses carried out by the archaeobotanist as the excavation progresses. Post-excavation planning is a poor substitute because the deposits which then prove to be crucial to our investigation were almost certainly not sampled!

5. Conclusion

Over the last 30 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 vague in their aims and that the vast majority of the data we have accumulated comes from category 3 deposits i.e. secondary or tertiary material of mixed origin. Analyses of these deposits can in some cases be justified with reference to well-defined archaeological problems, 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 *prior* to the excavation, which outlines the problems one wishes to solve. This research plan can then be adjusted as necessary in the course of the excavation in the light of analyses carried out in parallel with 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.

Notes

1. Robinson and Mikkelsen 1994.
2. Rosenkjær 1906.
3. Rostrup in Rosenkjær 1906.
4. Jessen and Lind 1922-23.
5. Bencard and Lange 1972.
6. Jensen 1979, 1986, 1988, 1991a, 1991b.
7. Jørgensen 1980, 1986.
8. Annine Moltsen, Ida Boldsen and Jan Andreas Harild (se references).
9. Most recent revision of this article. Many new analyses have been carried out at the National Museum in the intervening period (see note 8).
   An earlier version of this article was made available as NNU Rapport no. 6 (1996) (National Museum).

References

Bencard, M. & J. Lange: Botaniske resultater af en udgravning i Ribe. *Mark og Montre.* Ribe, 1972, pp. 27-37

Boldsen, I.: Plantemakrofossilanalyse fra det tidligste København: Kompagnistræde 28/Radhustræde 6. *NNU Rapporter* 1994 nr. 11. The National Museum, Copenhagen

Boldsen, I. & D.E. Robinson: Botaniske analyser på prøver fra udgravning af det middelalderlige Holbæk. *NNU Rapporter* 1991 nr. 3. The National Museum, Copenhagen

Boldsen, I. & D.E. Robinson: Arkæobotaniske analyser af materiale fra Ahlgade 15-17, Holbæk. Asmussen, E. (red.) *Ahlgade 15-17, Holbæk: En arkæologisk og historisk undersøgelse fra 1200 til nutiden.* (Aarbøger for Nordisk Oldkyndighed og Historie 1994-1995), (1997), pp. 215-224.

Fredskild, B.: Makroskopiske planterester fra det ældste Århus. Andersen, H.H,, Crabb, P.J., Madsen, H.J. Århus Søndervold: en byarkæologisk undersøgelse. (Jysk Arkæologisk Selskabs Skrifter IX). Copenhagen 1971, pp. 307-318.

Jensen, H.A.: Seeds and other diaspores in medieval layers from Svendborg. *The archaeology of Svendborg 2* 1979, pp. 1-102

Jensen, H.A.: Seeds and other diaspores in soil samples from Danish Town and Monastery Excavations, dated 700-1536 A.D. *Biologiske Skrifter* 26, Det Kongelige Danske Videnskabernes Selskab, Copenhagen 1986, pp. 1-107.

Jensen, H.A.: Studies of content of seeds and macrofossils in samples from Danish fields and archaeological excavations. DSR Forlag, Copenhagen 1988, pp. 1-49.

Jensen, H.A.: Seeds and other macrofossils in the 8th century deposits. Bencard, M. & Jørgensen, L.B. *Ribe Excavations 1970-76* 3, Sydjysk Universitetsforlag, Esbjerg 1991a, pp. 17-36.

Jensen, H.A.: Macrofossils recovered from Danish town and monastery excavations, date AD 700 – 1536. Renfrew, J. *New Light on Early Farming.* Edinburgh 1991b, pp. 307-313.

Jessen, K. & J. Lind: *Det danske markukrudts historie* (Kongelige Danske Videnskaberne Selskab 8. Række VIII). Copenhagen 1922-23.

Jørgensen, G.: Om kostvaner i det middelalderlige Svendborg. *Naturens Verden 1980,* pp. 203-209.

Jørgensen, G.: Medieval plant remains from Møllegade 6. *The archaeology of Svendborg* 4, 1986, pp. 45-84.

Robinson, D.E. Analyse af forkullet korn og frø fra en 1600-tallet brandtomt ved Hotel du Nord, Sakskøbing. *NNU Rapporter* 1991 nr. 10. The National Museum, Copenhagen.

Robinson, D.E. & B. Aaby: Botanical analyses from the Gedesby Ship – a medieval shipwreck from Falster, Denmark. *Vegetation History and Archaeobotany* 3, 1994, pp. 167-182.

Robinson, D.E. & I. Boldsen: Botaniske analyser af prøver fra udgravningen ved Ribe Posthus. *NNU Rapporter* 1993 no. 32. The National Museum, Copenhagen

Robinson, D.E. & I. Boldsen: Arkæobotaniske analyser. In: J. Hjermind, M. Iversen & H.K. Kristensen (eds.) *Viborg Søndersø 1000-13000: Byarkæologiske undersøgelser 1981 og 1984-85.* Århus 1998, pp. 309-323.

Robinson, D.E. & H.A. Harild: Arkæobotaniske analyser af jordprøver fra Algade og Sct Pedersgade, Roskilde. *NNU Rapport* 1996(a) no. 8. Copenhagen: National Museum.

Robinson, D.E. & H.A. Harild: Arkæobotaniske analyser af jordprøver fra Provstevænget, Roskilde. *NNU Rapport* 1996(b) nr. 9. Copenhagen: National Museum.

Robinson, D.E. & J.A. Harild: Arkæobotaniske analyser af prøver af fylden fra en formodet kloak ved Valdemar Slot, Taasinge. *NNU Rapport* 1996(c) no. 11. Copenhagen: National Museum.

Robinson, D.E. & J.A. Harild: Arkæobotaniske analyser af jordprøver fra Kompagnistræde, Næstved. *NNU Rapport* 1997(a) nr. 6. Copenhagen: National Museum.

Robinson, D.E. & J.A. Harild: Arkæobotaniske analyser af jordprøver fra Tårnby Torv, Amager. *NNU Rapport* 1997(b) nr. 25. Copenhagen: National Museum.

Robinson, D.E. & P.H. Mikkelsen: Arkæobotaniske undersøgelser af forhistoriske bopladser. *Arkæologiske udgravninger i Danmark 1993.* Det Arkæologiske Nævn, Copenhagen1994, pp. 7-19.

Robinson, D.E., B. Aaby & S. Wales: Botanical and chemical analyses of organic material from the Gedesby Ship – a medieval shipwreck from Falster, Denmark. I. Vuorela Proceedings of PACT Symposium Tvärminne, Finland, October 1992. PACT 47 II.4. 1996, pp. 75-90.

Robinson, D.E., H.K. Kristensen & I. Boldsen: Botanical analyses from Viborg Søndersø: a waterlogged urban site from the Viking period. *Acta Archaeologica 62* 1992, pp. 59-87.

Robinson, D.E., I. Boldsen, R. Nicholsen, T. Schiøtte & D. Ejbye-Jakobsen: Naturvidenskabelige-analyser af prøver fra udgravningen ved Mikkel Bryggers Gade 11, København (KBM 250). *NNU Rapporter* 1991 no16. The National Museum, Copenhagen

Rosenkjær, H.N.: *Fra det underjordiske København.* Copenhagen 1906

Unpublished archaeobotanical analyses carried out at the National Museum, Copenhagen

Moltsen, A (unpub) Lille Kirkestræde, København (NNU j.nr. A7282).

Robinson, D.E. (unpub a) Botaniske analyser ved Nytorv, København (NNU j.nr. A7166).

Robinson, D.E. (unpub b) Lillelunds Have, Næstved (NNU j.nr. A7510).

Robinson, D.E. (unpub c) Bispensgade, Aalborg (NNU j.nr. A8046).

Robinson, D.E. (unpub d) Algade/Møllegade, Aalborg (NNU j.nr. A7993).

Robinson, D.E. and Harild, J.A. (unpub a) Skarregård, Mors (NNU j.nr. A7078).

Robinson, D.E. and Harild, J.A. (unpub b) Brogade, Svendborg (NNU j.nr. A7438).

Robinson, D.E. and Harild, J.A. (unpub c) Boller Slot, Horsens (NNU j.nr. A7488).

Robinson, D.E., Moltsen, A. and Harild, J.A. (unpub) Horsens, Borgergade, Nørregade, Søndergade, Kirketorvet, Rådhusgade (NNU j.nr. A7186).

Table. 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. ▶

Site	1. Ribe Kunstmuseet	2. Ribe Dommer-haven	3. Ribe Tvedgade	4. Ribe Posthus		5. Ribe Sønder-portsgade	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 Robinson & Boldsen 1998			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 centrury	8th centrury	8th centrury	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

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. b
Site history	urban settlement	urban settlement	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 centrury - 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

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 1996	Boldsen & Robinson 1997			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	anthrop. coastal	coastal/ refuse	floor level	refuse layer	nat. coastal	anthrop. coastal	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 centrury	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

Site	22. Roskilde Algade	23. Roskilde Sct. Peder-stræde	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 & Harrild 1996a	Robinson & Harrild 1996a	Robinson & Harild 1996b			Robinson unpub b	Robinson & Harrild 1997a	Robinson & Harrild 1996c	Robinson & Harrild unpub. a	Jensen 1986, 1988, 1991b		Jensen 1986, 1988, 1991b
Site history	urban settlement	urban settlement	urban settlement			urban settlement	urban settlement	castle	farm	monastery		monastery
Context	road refuse	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	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

Site	31. Aalborg Algade/Møllegade		32. Aalborg Bispensgade	33. Horsens Borgergade					34. Horsens Nørregade	
Source	Robinson unpub. d		Robinson unpub. c	Robinson et al unpub.					Robinson et al unpub.	
Site history	pre-monastic urban		urban	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

Site	35. Horsens Søndergade		36. Horsens Kirketovet			37. Horsens Rådhusgade	38. Horsens Boller Slot	39. Sakskøbing Hotel du Nord	40. Amager Tårnby Torv				
Source	Robinson et al unpub.		Robinson et al unpub.			Robinson et al unpub	Robinson & Harild unpub. c	Robinson 1991	Robinson & Harild 1997b				
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		barb. remains
Dating	13th century		14th century	c. 1400	14th century	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