Journal of Archaeological Science 40 (2013) 526–543

Contents lists available at SciVerse ScienceDirect

Journal of Archaeological Science

journal homepage: http://www.elsevier.com/locate/jas

Defining an indicator package to allow identification of 'cesspits' in the archaeological record

David N. Smith*

Institute of Archaeology and Antiquity, The University of Birmingham, Edgbaston, Birmingham B15 2TT, UK

ARTICLE INFO

Article history:
Received 30 March 2012
Received in revised form
14 June 2012
Accepted 16 June 2012

Keywords:
Cesspits
Insect remains
Plant macrofossils
Indicator packages

ABSTRACT

This paper summarises the insect, plant macrofossil and other environmental evidence from a large number of deposits, thought to be cesspits, at a range of archaeological sites. A potential 'indicator package' (*sensu* Kenward and Hall, 1997), consisting of a range of biological materials and archaeological artefacts, is outlined which should allow a more accurate identification of cesspits in the archaeological record enhancing further studies of the rich evidence often preserved in them.

1. Introduction

Cess/rubbish pits are probably one of most common features encountered on medieval archaeological sites (usually 9th–15th century in Britain) (Greig, 1982a; Sabine, 1934). The contents of these features, technically best described as *ordure*, are commonly called 'cess' by most field archaeologists (although strictly speaking 'cess' is an ancient land tax) and the term 'cess' will be maintained throughout this paper.

Cess/rubbish pits are a type of archaeological feature which is routinely ignored both during excavation and publication. This is in part due to their perceived 'mundane nature' and their 'obvious function'. However, previous studies have clearly shown that they contain a wealth of information on past diet, waste disposal, health and hygiene, and settlement history (e.g. Greig, 1982a, 1994; Hall, 2000; Moffett, 1992). One persistent problem is how the archaeologist defines a cesspit from any other pit or archaeological feature, particularly on deeply stratified urban sites? Moreover, how can we effectively identify the presence of cess in the archaeological record within features where it should not normally be present?

One answer to these questions is to propose an 'indicator package' for both cesspits and cess in the archaeological record. Defining indicator packages for the identification of specific archaeological materials or contexts has become *de rigueur* (i.e. Kenward and Hall, 1997; Hall and Kenward, 2003; Moffett and Smith, 1997; Smith et al., 1999, 2005). The aim is to take individual 'indicators' for a specific archaeological behaviour, derived either from the archaeological record itself or the biological record, and combine these to form a larger diagnostic 'package'. The development of these larger indicator packages has been shown to be a very strong interpretative tool allowing a number of archaeological materials and features to be firmly identified (Kenward and Hall, 1997; Hall and Kenward, 2003). Much of the strength of this interpretive tool comes from the fact that the 'package' is primarily based on information derived from the existing archaeological record rather than any reliance on modern behaviour.

This paper will attempt to establish an indicator package for cess and cesspits in the archaeological record.

2. Methods and data

A survey of 49 cesspit features from eleven archaeological sites was undertaken for this proposed indicator package for cesspits. The locations of these sites are plotted in Fig. 1. The features discussed date from the late 11th century AD to the late 16th century AD, with the majority dating between the 12th and 15th centuries. In terms of the biological contents of the cesspits, this consists of a survey of 56 individual fills.

The construction and nature of fills of the cesspits from these sites are outlined in Table 1. A detailed discussion of the archaeology of these features, and its implications for archaeological

* Tel.: +44 121 414 6542.
E-mail address: d.n.smith@bham.ac.uk.

0305-4403/$ – see front matter © 2012 Elsevier Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.jas.2012.06.014

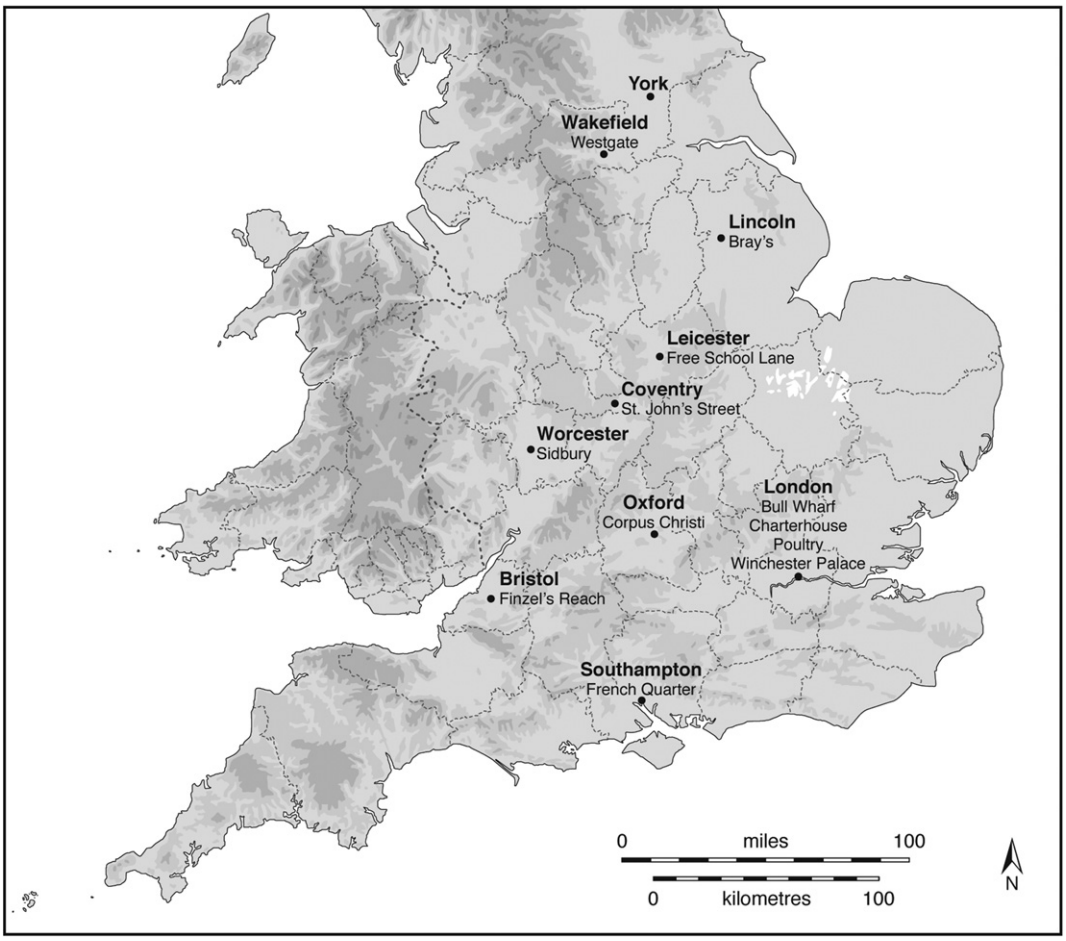

Fig. 1. Location of sites mentioned in text.

recording and interpretation will be presented in a companion paper to this.

The nature of the animal bone, fish bone and parasite ova recovered (where available) is also listed in Table 1. One problem that was encountered in this survey was that the larger mammal bone often is reported as part of the general phase assemblage for the archaeological site rather than on a context or feature basis. It is likely that large animal bone probably was recorded at the context level during zooarchaeological analysis, but without access to this detailed data it is difficult to relate specific examples or 'associated bone groups' to individual features or pits (*sensu* Hill, 1995). This has been a major limitation for the present survey and has effectively excluded this important source of information from this review and any proposed indicator package. However, the insect and plant macrofossil remains are reported by individual context and have received more detailed attention below.

2.1. Insect remains

Insect remains recovered from cesspits can be preserved in two ways. The majority of the remains are preserved by waterlogging and are recovered from whole earth samples using paraffin flotation (Kenward et al., 1980). However, at Free School Lane, Leicester (Smith, 2008) and at the French Quarter, Southampton (Smith, 2009) mineralised remains were present and were only recovered from the plant macrofossil fractions and residues.

The insect faunas from these features have been analysed in two ways:

1) A detrended correspondence analysis (hereafter DCA) using the CANOCO 4.5 programme (ter Braak and Smilauer, 2002) was carried out on a total of 131 insect faunas from a wide range of Roman to Late medieval features in order to clarify whether insects faunas from cesspit type deposits were distinct from any other insects faunas encountered from a wide range of other feature types. The full data set consists of 17,476 individuals from 394 taxa. This data set includes both adult beetles (Coleoptera) and the puparia of the flies (Diptera). An initial run of the DCA across the whole data set indicated that standard reciprocal averaging gave an undue importance to both rare individuals and individual taxa where sample counts were low. This is a common problem encountered with reciprocal averaging (Gauch, 1982) and, as a result, it was decided to restrict the data by removing faunas where less than 50 individuals were recovered and removing taxa which accounted for less than 10% of the total fauna (in essence this meant the removal of faunas that would not normally be considered as interpretable and taxa that occurred less than 13 times in the whole data set). This reduced the data set to 16,115 individuals of 123 taxa from 96 faunas. The option to 'down weight' species occurring infrequently was selected for the DCA.
2) Rank orders of insect taxa have been calculated for all 49 cesspit features from 11 archaeological sites and including four of the London sites used in the DCA discussed above. The first step in this analysis was combining the individual scores for each taxon from all 'cesspit' deposits from an individual site to give a combined value for that site. One disadvantage of