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Playing with fire? Charred grain as a proxy for cereal surpluses in early medieval England

By Mark McKerracher[1]

Introduction

There can be little doubt that the arable yields of England, generally speaking, increased substantially between the 5th and 13th centuries AD. This view is supported by mounting circumstantial evidence. In the 5th and 6th centuries, the English countryside seems to have been devoid of granaries, barns, mills and crop-drying ovens. Arable soils were light, likewise the ploughs, and corn surpluses so meagre as to drive grain weevils to extinction (Faith 2009; Hamerow 2012, 144–55; Smith and Kenward 2012, 249–50). By the 13th century, watermills, windmills, great barns, heavy ploughs, open fields and a resurgent weevil population all bear witness to a significant arable upturn. Above all else, there were more mouths to feed: following a post-Roman decline, England's population is thought to have soared to unprecedented heights by the 13th century (Williamson 2013, 13–16).

Such is the circumstantial evidence for arable growth in early medieval England, circumstantial because it does not include the vital component, to whose production and processing all the fields, ploughs, barns, mills, farmers, bakers and brewers were devoted: grain. While the literature on medieval field systems has grown as extensive as its subject (e.g. Hall 2014), research on the old English cereal grain is correspondingly diminutive. Yet the growth in developer-led archaeology over recent decades, coupled with the increasingly systematic recovery and analysis of environmental remains, has produced a rich and largely untapped dataset of botanical evidence which can shed important new light on the 'cerealisation' of medieval England (van der Veen *et al*. 2013).

Exploiting such material – chiefly charred grain and its accompanying arable weed seeds – I have previously undertaken an archaeobotanical study of the 5th to 9th centuries, focusing on East Anglia and the Thames valley. On this basis, I have argued that cereal surpluses began to grow in the 7th and especially 8th centuries, through the application of refined crop husbandry strategies (McKerracher 2016). Extending such an archaeobotanical approach across the whole of England, and taking in the 9th to 13th centuries too, would pay dividends. Hence it forms part of a major, interdisciplinary research proposal, currently being prepared by a team led by Professor Helena Hamerow (University of Oxford), to address the 'cerealisation' of England from a pioneering bioarchaeological angle. Meanwhile a short pilot study, designed to assess the volume and distribution of botanical material available for the larger project, has already begun to reveal intriguing patterns which, I argue here, bear direct witness to the growth of crop husbandry in early medieval England.

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Methods

Over approximately four weeks, I undertook a rapid assessment of charred plant remains identified in archaeological deposits dating from the 8th to 13th centuries across England. Both published sources and unpublished 'grey' literature (excavation archive reports) were consulted. For each excavated site, I recorded the number of soil samples containing charred plant remains and, where possible, the total quantity of charred plant items within each sample (excluding fragments). Following initial collection, the data were 'sanity checked' to ensure internal consistency and to avoid duplication. Despite these checks, the rapid nature of the assessment means that the dataset should be considered roughly indicative rather than authoritative. The necessarily uncritical approach to dating and quantification render these data unsuited to detailed analysis, and I have therefore confined myself to broad pattern-spotting.

Data have been sought from every English county and, when data collection ceased because of time constraints, significant new data were becoming harder to locate and tended simply to strengthen existing patterns. I therefore believe that the overall patterns presented here are likely to be genuinely representative of the entire national dataset, an impression reinforced by the broad agreement between my distributional patterns and those recorded in another, independent assessment of medieval archaeobotany (van der Veen *et al*. 2013, 154–7).

The charred material and its significance

While I have not differentiated between different kinds of charred plant items – by species, say, or anatomical part – most samples were dominated (often heavily) by cereal grains and the seeds of attendant arable weeds. Samples were divided chronologically into four overlapping sub-periods and a fifth, poorly-dated generic group, based on available dating schemes:

- 8th–9th centuries (Mid Saxon)
- 9th–11th centuries (Late Saxon)
- 11th–12th centuries (Saxo-Norman)
- 12th–13th centuries (High Medieval)
- 8th–13th centuries (Generic Medieval)

The samples were also categorised by the quantities of charred plant items recorded therein: those containing 300 or more items have been classed as 'abundant'. This threshold for abundance is entirely arbitrary, but rigorous enough that it excludes the majority of

recorded samples. 'Abundant' may therefore be glossed as 'unusually rich in charred plant remains for England in this period'. I have highlighted these richer samples because I believe they may serve as a proxy – if a fairly crude one – for surplus cereal production, by the simple argument that increasing the volume and/or frequency of crop processing activities will increase the accidental charring of substantial batches of plant material. Charred grain is almost always the result of accidental conflagrations carbonizing a harvest in the routine course of cereal production; it may catch fire in storage, or whilst being dried or malted over a fire. Thus van der Veen and Jones, though not specifying quantities, essentially make the same inference with regard to the Iron Age in southern Britain: more grain is charred when more grain is handled, therefore 'large, accidentally charred grain-rich samples' are taken to reflect 'a considerable degree of surplus production' (van der Veen and Jones 2006, 223).

In this way, by contrasting the distribution of unusually rich samples with the distribution of *all* samples containing any charred plant remains, I aim to highlight where and when cereal surpluses increased in medieval England. In the regional analyses, I utilize the sub-provinces devised by Roberts and Wrathmell in their study of rural settlement patterns, and made freely available as the *Atlas of Rural Settlement in England GIS* (Roberts & Wrathmell 2000; Lowerre *et al*. 2011). It is adopted here as a convenient, if not uncontested, framework for differentiating distinctive landscape zones in rural England.

Methodologically, it would be preferable to take account of each sample's original soil volume, because a low-volume sampling strategy would be biased against archaeobotanical abundance. A sample of 0.5 litres is theoretically less likely than one of 5 litres to contain 300 charred plant items. However, even if there is a hidden bias in the dataset due to variable sample volumes, there is no obvious reason why this should have resulted in the striking regional and chronological patterns described below. A greater number of excavations, and/or a tendency towards larger soil samples, cannot conjure rich concentrations of charred plant remains from a locale if these were never deposited there in antiquity.

Results

In total, the dataset contains 3,759 samples from 274 sites. Fig. 1 shows that the samples exhibit no clear chronological pattern across the four sub-periods. Fig. 2 illustrates their geographical distribution, and highlights a marked concentration of samples in central, eastern and south-eastern England, with a particularly strong emphasis on East Anglia. This pattern may plausibly reflect regional concentrations of excavation activity, and perhaps also variable preservation conditions.

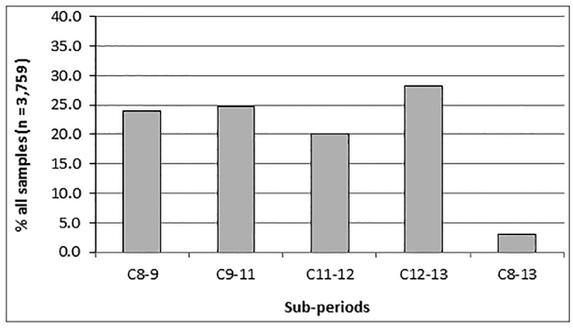

Figure 1 Chronological distribution of samples with charred plant remains.

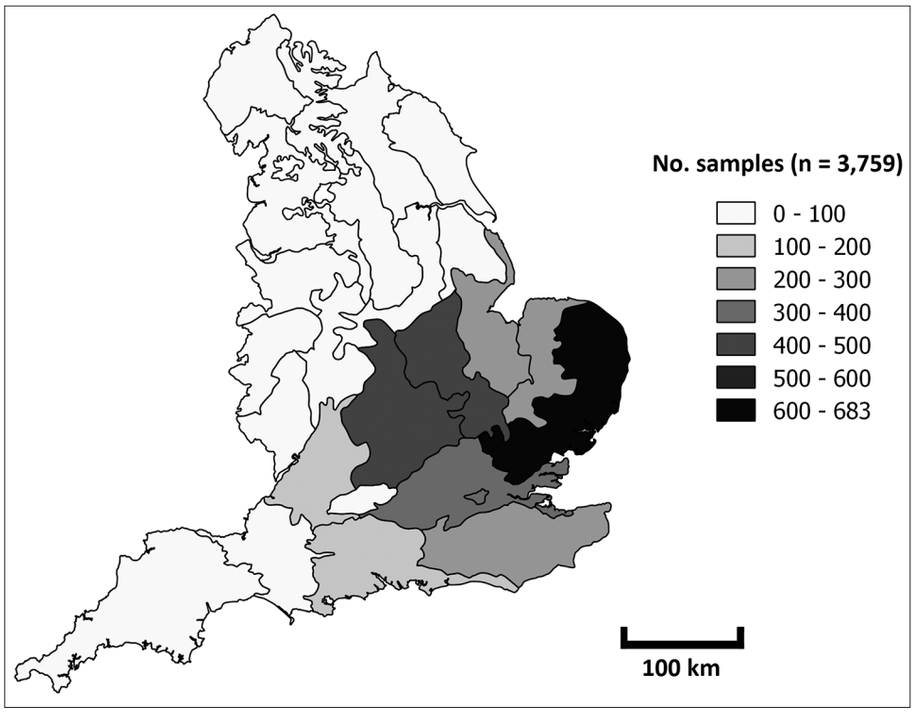

Figure 2 Geographical distribution of samples with charred plant remains, mapped against rural settlement sub-provinces (Lowerre et al. 2011).

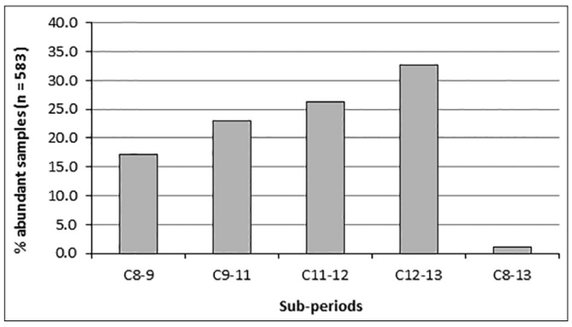

Figure 3 Chronological distribution of samples with ≥300 charred plant remains.

How does the distribution of 'abundant' samples compare to these baseline data? There are 583 such samples overall. Their chronological distribution (Fig. 3) shows a clear pattern: the frequency of abundant samples increases steadily in each successive period, a trend which cannot be explained by a general chronological increase in *all* samples, since the overall distribution of samples does not conform closely to this pattern (Fig. 1). Fig. 4 illustrates how the 'abundant' samples also buck the regional trend: they are most frequent not in East Anglia, where samples in general are most concentrated, but in the Inner and East Midlands – the heartland of classic 'champion' country, where open fields and nucleated villages prevailed most of all (Roberts & Wrathmell 2000, 49–50; Williamson *et al*. 2013, 1–3). This regional concentration is not due simply to one or two exceptionally prolific sites: 55 abundant samples derive from West Cotton (Northants) but the remainder are spread more widely across several Midland sites, indicating a regional rather than a merely local phenomenon.

Conclusions

As I have stressed above, the results of this pilot study are provisional, unrefined, and perhaps precarious. But they have confirmed, first and foremost, that there is indeed a rich archaeobotanical dataset which can be brought to bear on the medieval cerealisation debate. The 'abundant' samples are particularly ripe for detailed statistical analysis. Second, this pilot study has argued that arable growth – as represented by charred plant remains – occurred throughout the 8th to 13th centuries, implying an extended period or successive waves of cerealisation over at least 500 years, rather than a short, sharp leap in arable growth at one particular point. The third and final outcome of this study is the glimmer of a hypothesis, to spark further debate: were the champion heartlands of Midland England the hub of early medieval arable growth? Alternatively, might the distinctive social behaviours of the medieval Midlands offer an alternative explanation for their regional concentration of abundant charred plant remains? With further analysis, charred plant remains may yet light new paths through the familiar territory of the open fields.

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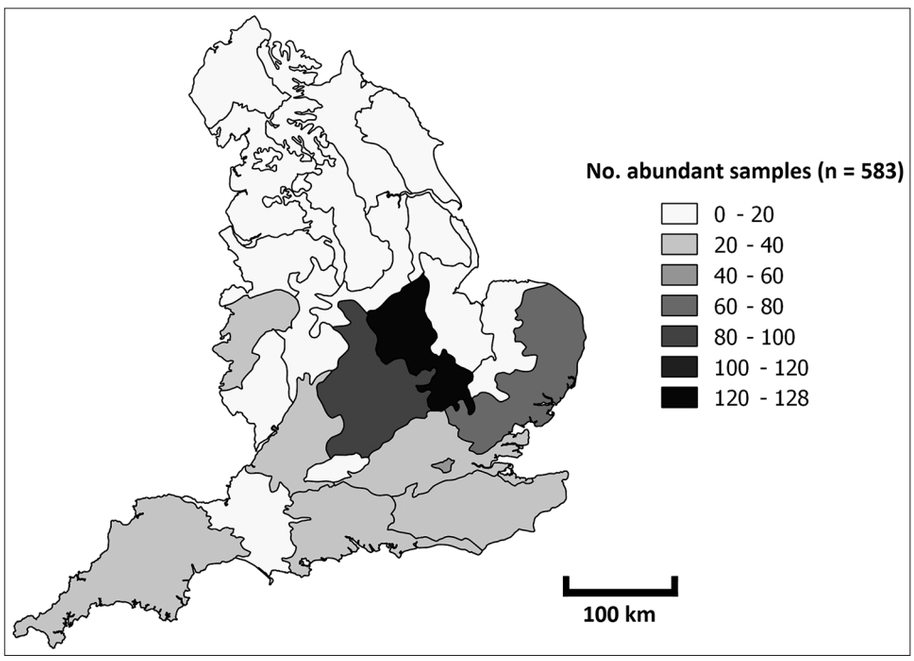

Figure 4 Geographical distribution of samples with ≥300 charred plant remains, mapped against rural settlement sub-provinces (Lowerre et al. 2011).

Oxford. I am also grateful to Prof. John Blair (University of Oxford) for generously giving me access to his grey literature offprint collection; to Dr Gabor Thomas (University of Reading) for providing original data from the Bishopstone excavations; and to Dr Fay Worley (Historic England) for supplying an Ancient Monuments Laboratory archive report on data from Rocester.

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