APPENDIX 1 - POLLEN

1.1 Assessment of the Pollen

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Introduction

1.1.1 Machine trenching at the East of Station Road site revealed a palaeochannel containing layers of organic material, minerogenic sediments and a branch from an oak tree (Figure 5). Environmental samples were taken from this profile including 3 monoliths for pollen analysis. This pollen assessment was carried out to ascertain if sub-fossil pollen and spores are present in the sediments and the potential of the profiles for reconstruction of local vegetation environment and land use in the Iron Age and Romano-British period. Pollen analysis has been carried out on two of the three monolith profiles. Pollen has been successfully recovered and preliminary pollen diagrams constructed. Assessment data are presented here.

Methodology

1.1.2 The open sections were sampled using plastic monoliths. Sub-samples were taken at an interval of 80 mm and 160 mm in the laboratory at the same time as the sediments were described. Samples of 2 ml volume were prepared using standard procedures for the extraction of sub-fossil pollen and spores outlined in Moore and Webb (1978) and Moore *et al.* (1991). Fuller details are given at the end of this Appendix. Absolute pollen frequencies were calculated using an added exotic/spike (Stockmarr 1971, *Lycopodium* tablets) to the known volumes of sample. Pollen counts of generally 100-150 grains per level (the pollen sum) were made where possible plus pollen of all extant marsh taxa and spores of ferns. Data obtained are presented in standard pollen diagram form (Figures 6 and 7) with percentages calculated as follows:

- Sum = % total dry land pollen (tdlp)
- Marsh/aquatic = % tdlp+sum of marsh/aquatics
- Spores = % tdlp+sum of spores
- Misc = % tdlp+sum of misc. taxa.

1.1.3 Taxonomy in general follows that of Moore and Webb (1978) modified according to Bennett *et al.* (1994) for pollen types and Stace (1992) for plant descriptions.

Quantification

Column 1

1.1.4 This is the upper of the two profiles examined and spans contexts 1723, 1724 and 1725. Pollen column 2 from context 1725 (not examined here) is represented within this column.

The Stratigraphy

Depth mm

- 0-280 - Buff coloured clay with brown mottling. 10YR 6/4 and 10YR 5/6 to 10YR 5/8.
- 280-510 - Homogeneous, fine silt-clay. Buff coloured 10YR 5/2.

- 510-580 - Transition with occasional black organic inclusions.
- 580-670 - Black organic/humic material.
- 670-860 - Grey/Brown silt. 10YR 4/2 - 10YR 4/6
- 860-910 - Black, organic/peat. Fibrous/fragmentary.
- 910-1000 - Sandy silt. yellowish 10YR 5/6 or 10YR 5/8.

The Pollen Data

1.1.5 Three local pollen assemblage zones are recognised in the 880 mm of this profile. These are characterised as follows.

1.1.6 **Zone 1: 880 mm - 840 mm.** ***Alnus***. Absolute pollen frequencies in this basal level/zone are 62,047 grains/ml. Although only a single sample, this zone is delimited by markedly higher values of *Alnus* than in subsequent zones (76%). This corresponds with organic/peat material contrasting with largely minerogenic sediments in overlying levels. Other trees include small numbers of *Quercus* (8%), *Fraxinus* and *Corylus* type (5%). There are few herbs with Poaceae (9%) being most important.

1.1.7 **Zone 2: 840 mm - 320 mm.** ***Quercus-Alnus-Corylus*** **type-Poaceae**. Absolute pollen frequencies values range from 32,000 to 97,000 grains/ml. This zone is characterised by *Quercus* (28%), *Alnus* (av. 5%) and *Corylus* type (20%). There are also *Betula, Pinus, Fraxinus* and *Fagus* all of which occur sporadically. *Corylus* type is the dominant shrub (15%). There is an expansion of herbs from zone 1 with Poaceae dominant (to 35%). Cereal type is present. Spores comprise *Pteridium aquilinum* (28%), *Dryopteris* type and *Polypodium*.

1.1.8 **Zone 3: 320 mm - 80 mm**. Absolute pollen frequencies values decline to 19,482 grains/ml. This zone is characterised by a reduction in numbers and diversity of tree pollen. *Alnus* (15%) and *Corylus* type (20%) remain the most important tree and shrubs. Herbs expand. Poaceae expands to 40%. Cereal pollen has highest values (5%). Spores of ferns remain consistent with *Pteridium aquilinum* (declining to 10%). *Sphagnum* is present.

Vegetation Interpretation

1.1.9 **Woodland**: The lowest organic unit lying between 910 mm and 860 mm contains substantial pollen values of *Alnus* (alder) zone 1. It is thus likely that this peat formed under alder woodland (carr) which was growing in the wetter valley bottom or palaeochannel. Subsequently, values are reduced but remain in sufficient quantity to suggest that this community remained within the region. Of the other tree pollen, *Quercus* (oak) is the most important type with *Corylus* (hazel). These were probably the main elements of local and regional woodland vegetation growing in a range of habitats. *Tilia* (lime/linden), *Fraxinus* (ash) and *Fagus* (beech) are all present in zones 1 and 2. These are all poorly represented in pollen assemblages (Andersen 1970,1973) and as such these occurrences may imply some local growth. In zone 3 there is a reduction in tree pollen although *Corylus* remains. This may be a 'real' decline in woodland or may be due to changing taphonomy as evidenced by changes in the stratigraphy.

1.1.10 This column (1) lies higher in the stratigraphy/section than column 3, the latter extending down into the underlying bedrock. Column 3 shows a predominately herbaceous environment which therefore suggests that the alder (and other woodland) discussed above may be woodland recolonisation.

1.1.11 **Herbs**: The relatively small values of trees and shrubs and the importance of herbs dominated by Poaceae but with evidence of cereals and associated weeds (eg *Persicaria* and *Fallopia*) are strong evidence of the local arable and pastoral agriculture. The presence of bracken (*Pteridium aquilinum*) suggests waste/abandoned ground or rough pasture.

1.1.12 **Marsh/Wetland**: There is limited representation of wetland types which may have formed the autochthonous marsh community. *Alnus* noted above present in the basal wood peat is the exception. Subsequently, Cyperaceae (sedges) and occasional *Typha/Sparganium* (reed-mace and bur reed) are the only indicators.

Column 3

1.1.13 This is the lower of the two pollen monoliths examined and as such predates column 1. The profile spans contexts 1726, 1727, 1730 and 1731.

The Stratigraphy

Depth mm

- 0-140 - Grey silt 10YR 4/1
- 140-400 - Orange/grey fine sand/silt with organic specks.
- 400-620 - Coarser sand containing molluscs 10YR 4/4 or 10YR 4/6
- 620-660 - Stone horizon.
- 660-750 - Grey silt 10YR 5/1 to 10YR 4/1.

The Pollen Data

1.1.14 The 0.56 m of Section 3 examined for pollen has been divided into 2 local pollen assemblage zones. These are characterised from the bottom of the diagram at 560 mm as follows.

1.1.15 **Zone 1: 560 mm - 360 mm. Poaceae-cereal type-*Plantago lanceolata***. Absolute pollen frequencies range from 13,000 grains/ml at the base to 32,600 grains/ml. This zone has been defined tentatively by the higher values of cereal type and *Plantago lanceolata* pollen (to 6% and 20% respectively). Overall, tree and shrub pollen is sparse (10% and 5% respectively) with only small numbers of *Quercus* (4%) and *Alnus* (9%) present consistently. Herbs are dominant with Poaceae most important (to 67%). *Plantago lanceolata* and cereal, as noted, have higher values. There is also a moderately diverse range of other herb types including Brassicaceae, Chenopodiaceae, *Polygonaceae* and Asteraceae types. Marsh/wetland types include Cyperaceae (<5%) and *Typha angustifolia/Sparganium* type (to 20%). Spores are relatively important with *Pteridium aquilinum* (20%) and *Dryopteris* type (monolete) (11%) at base of the profile.

1.1.16 **Zone 2: 360 mm - 0 mm. Poaceae-Lactucoideae-*Pteridium aquilinum***. Absolute pollen frequency values range from 61,000 to 15,000 grains/ml. This zone is delimited by some reduction of cereal type and *Plantago lanceolata* from zone 1 and an expansion of *Pteridium aquilinum*. Tree and shrub pollen values remain small with a possible decrease in *Quercus*. Herbs remain dominated by Poaceae (to 60%) with *Plantago lanceolata* (peaks to 10%) and Lactucoideae (12%). There is an increase in Apiaceae types and Asteraceae types (*Anthemis* type, *Bidens* type, Aster type, *Centaurea nigra* type.). *Pteridium aquilinum* is the principal spore peaking to 30%.

Vegetation Interpretation

1.1.17 Compared with Column 1, there are substantially fewer trees and shrubs with *Quercus* at levels suggesting regional long distant input or sporadic local growth. It should also be noted that the dominance of grasses here, if growing on/very near the sample site, may have had a statistical depressing effect on elements such as the arboreal pollen coming from further afield. Herbs are dominant with a strong representation of grasses (Poaceae) and other pasture types (eg *Plantago lanceolata*). Arable types are also present including cereal type and weeds which were possibly associated with disturbed ground and cultivation.

Comparative Material and Potential for Further Work

1.1.18 This study has demonstrated that pollen is preserved in the peat and minerogenic sediments filling this valley bottom. Thus, there is the potential for reconstructing further the local vegetation and environment of the site and adjacent interfluves on which prehistoric and later woodland clearance and agriculture activity took place.

1.1.19 Some indication of dating has been given by the presence of pottery in the colluvial sediments overlying these valley fills. Although pollen is not a dating medium, there are certain indications that the sediments analysed are in fact of very late prehistoric age. This argument is based on the rather small values of trees and shrubs which had presumably been cleared at an earlier date. Most importantly, there is very little pollen of *Tilia* (lime/lindens). It is now accepted that *Tilia* formed the dominant or at least co-dominant tree over much of Southern and Eastern England prior to its clearance - the often seen 'lime decline' in pollen diagrams. Whilst this latter phenomenon was diachronous, there is also a wealth of information demonstrating that lime woodland was cleared during the middle and late Bronze Age. This would fit well with the suggested date of this valley sediment sequence as indicated by the archaeology/artefacts.

1.1.20 The pollen profiles thus have the potential for reconstructing in more detail the local landscape/environment of the Iron Age-Roman period for which there is the evidence of fields, field boundaries, pits and gullies etc. This addresses Landscape Zone Priority 1 and Fieldwork Event Aims 2, 4 and 5 for the sites, which are set out in section 2 of the main document, above.

1.1.21 This assessment has demonstrated that pollen is preserved and it is suggested from the character of the pollen assemblages that the sequences may be contemporary with the field system at East of Station Road. Consequently, further and more detailed analysis of these profiles offers the potential for studying local environment and land use history related to the archaeology. It should also be considered that there are few pollen data from this region of the country compared with the north where there are substantially more pollen preserving environments. Furthermore, there is also a paucity of pollen data as a whole which can be related accurately to the late prehistoric and early historic period. The following are suggested.

- Adopt a closer pollen sampling interval of 40 mm.
- Adopt a standard pollen sum of 400 or more grains per level where preservation makes this possible.
- Radiocarbon dating of the profiles would be desirable to confirm that the sequence is contemporary with the local archaeology.

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