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Peter Murphy BSc MPhil

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Summary

This report replaces an earlier report (no. 3793). It has been revised to take account of the final phasing of the site and also incorporates revised interpretations of some of the assemblages. Samples were collected from a few Beaker Pits and Bronze Age cremations, but most samples came from mid-late Iron Age contexts (Phase I), early Roman features (Phases II - III) and a few late Roman features (Phase IV).

Crop plants identified in the Iron Age and Roman samples are Triticum Spelta, Triticum dicoccum, Hordeum vulgare and Avena sp. The larger assemblages consist mainly of grain and are thought to represent predominantly prime products. The distribution of cereal remains within one Phase I pit are consistent with an interpretation of this feature as a storage pit. Postholes of a Phase II roundhouse produced assemblages of barley with some remains ogf grassland plants - possibly charred animal fodder. Another pit-fill produced assemblages interpreted as semi-cleaned wheat spikelets mixed with semi-cleaned barley grains. Smaller assemblages comprising a 'background scatter' across the site also consist largely of grain. It is suggested that sample composition indicates that Fison Way was a cereal consumer site.

Remains of heathland plants, including Calluna vulgaris, occur from Phase I onwards, but were not prsent in Beaker and Bronze Age samples. This is consistent with recent pollen analysis at Hockham Mere indicating a spread of heathland from about 300 BC. An Iron Age expansion of settlement onto marginal sandy soils seems to be indicated.

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Fison Way, Thetford. Carbonised plant remains

Introduction

The fills of the archaeological features at this site consisted predominantly of freely-draining acid sands and gravels derived from glacial outwash gravels and blown sand deposits. In parts of the site there were deposits of sandy clay loam, resulting in impeded drainage. Preservation conditions for biological remains were extremely poor: the carbonised plant remains are the only significant source of information about the environment and agrarian economy of the site. Even these are not generally well-preserved. Nevertheless the botanical remains recovered have provided information on vegetation in the vicinity and on crop production and processing.

Methods

Eighty-eight bulk samples were collected from Iron Age and Roman features, together with eight smaller samples from Bronze Age cremations and two bulk samples from a Beaker pit. Processing on site, using a simple water flotation tank (Williams 1973) was initially planned. However a proportion of the samples had a high clay content, which made disaggregation difficult and seriously reduced the efficiency of recovery. To ensure consistent recovery rates between samples on-site flotation was abandoned, and the samples were processed in the laboratory, where near-complete extraction of carbonised plant remains could be achieved. For practical reasons sample size had to be reduced: 10kg. samples were normally processed. After disaggregating the dried soil samples in hot water the flots were separated by flotation and repeated wash-over, using a 500 micron collecting mesh.

The flots were dried and sorted under a binocular microscope at low power. Almost all samples included some uncharred contaminants, notably fine fibrous roots and seeds of arable weeds. Most of these were easily separated from the carbonised seeds and discounted, though weathered uncarbonised seeds of Chenopodiaceae were often difficult to distinguish from carbonised specimens, particularly where they were fragmented (see note in Table 2). Carbonised fruits, seeds and fragments of spikelets, rachis and straw were extracted and identified by comparison with modern reference material. Small charcoal fragments were ubiquitous, but only certain categories of charcoal were extracted for identification. Fragments larger than 6mm. from the Beaker and Bronze Age contexts and from charcoal-rich deposits of Iron Age and Roman date were identified. In addition fragments from other samples which

appeared, on external characteristics, to be of the family Ericaceae were picked out for high-power examination of fractured sections. Plant remains identified are listed in Tables 1-2. (microfiche.)

Floristic composition of the assemblages

1) Remains of crop plants

No carbonised remains of crops were present in the Beaker and Bronze Age samples. Samples from Iron Age and Roman contexts produced remains of spelt, (Triticum spelta L), emmer (Triticum dicoccum Schübl) and six-row hulled barley (Hordeum vulgare L. emend Lam.), with traces of wild or cultivated oats (Avena sp).

The wheats are represented by grains, rachis internodes, spikelet forks, glume bases and 'spikelet bases' (forks lacking internodes and with only the extreme basal part of the glumes surviving). From characteristics of size and morphology defined by Helbaek (1952) and Hillman (forthcoming) all the well-preserved wheat spikelet fragments are identified as spelt and emmer, though specifically identifiable fragments are rare. The wheat grains are almost all in a very poor state of preservation and have therefore not been specifically identified, but elongate forms of spelt/emmer-type predominate. No remains of free-threshing wheats were identified.

Most grains of barley are similarly poorly-preserved, distorted and with porous surfaces, though well-preserved grains were recovered from 2663, 2665 and 3025 (Plate 1). Most of these have angular cross-sections, sometimes with traces of lemma and palea adhering. No intact lemma bases have survived. Asymmetrical lateral grains are present in these samples, though due to distortion overall ratios of twisted to straight grains cannot be determined. However six-row hulled barley is certainly present. Barley rachis fragments were recovered from only four samples: single internodes and fragments from 3641, 5442 and 6071, and a node with two partial internodes from 2750. The specimen from 3641 is 2.9mm. in length, approximately 1.0mm. across the basal node, and shows faint traces of marginal pubescence.

The remains of oats (Avena sp) comprise only naked grains and awn fragments. In the absence of floret bases it cannot be determined whether a weed species or a cultivated oat is represented. Charred cereal culm nodes and other culm fragments occur sporadically.

2) Remains of wild plants

Plants from several distinct habitats are represented in the samples by fruits, seeds, fruitstones, nutshells and charcoal.

a) Weeds

In the Iron Age and Roman samples fruits and seeds of weeds are frequent, though rarely abundant. Taxa identified include Raphanus raphanistrum, Silene cf. alba, Stellaria media-type, Spergula arvensis, Atriplex sp, Chenopodium album, Malva sp, Medicago/Trifolium sp, Vicia/Lathyrus sp, Vicia cf. tetrasperma, Polygonum aviculare, P. lapathifolium, P. lapathifolium/persicaria, P. convolvulus, Rumex sp, R. acetosella, Urtica dioica, Plantago lanceolata, Galium aparine, Centaurea sp, Bromus mollis/secalinus and other Gramineae.

Raphanus raphanistrum, Spergula arvensis and Rumex acetosella are prevalent on acid soils and these three plants presumably formed part of the weed flora of cereal crops grown on sandy and gravelly soils either in the vicinity of the site or on the river terraces. Terrace and upland soils in this area are generally acid, coarse-textured, stony and excessively well-drained (Corbett 1973). The frequencies of leguminous weed seeds are generally low: seeds and cotyledons of Vicia/Lathyrus sp. were recovered from only seven samples, usually in small numbers apart from in 505 (Phase I(?), which produced eleven cotyledons and a seed of V. cf. tetrasperma. Jones (1978) has argued that a rise in the frequency of vetch seeds in samples from successive phases of an Iron Age settlement at Abingdon, Oxfordshire indicates progressive nitrogen depletion of the arable land. No such trend is apparent at Fison Way. It seems that soil nitrogen levels were maintained either by manuring or by a system of long fallows. The presence of the autumn-germinating weed species Galium aparine implies that at least some of the cereals were autumn-sown.

b) Wetland and grassland plants

Rare fruits and seeds of Ranunculus acris/repens/bulbosus, Prunella vulgaris, Carex sp. and Eleocharis palustris were recovered. These are all typically grassland plants; buttercups, sedges and spike-rush are associated with damp soils. Jones (1978, 105) considers that the association of carbonised remains of such plants with cereals indicates that cultivation extended onto poorly-drained land but it is also possible that some seeds of grassland plants

reached the site with hay and became mixed with cereals at some stage after harvesting. Soils in Breckland generally are very well-drained, but damp or wet soils occur at the margins of the river floodplains and also in the vicinity of the site where a discontinuous impervious sandy clay loam horizon has resulted in locally impeded drainage (MacPhail 1979).

c) Heathland plants (Plate 2)

Many of the samples from Iron Age and Roman contexts included fragments of ericaceous charcoal, most of which were too small for close identification. Carbonised capsules of Calluna vulgaris were present in contexts 648 and 2750 (Phase I) and four contexts of phases III and IV produced very large deposits of Calluna charcoal with capsules, seeds, leaves and young shoots (3303, 3304, 6326, 6852). These deposits are very similar in composition to a layer consisting largely of carbonised Calluna remains from the base of the turf-stack at Gallows Hill (5744 THD). This layer was just above a buried soil , an immature soil formed on blown sand (MacPhail 1979), and was dated to 1600 ± 70b.p. or 350a.d. (HAR-2905). It is thought to represent remains of heath vegetation cleared by burning before construction work began at this site. The dense deposits of Calluna charcoal in pits at Fison Way could represent remains of heather collected locally for use as litter, flooring, bedding or thatch and subsequently burnt either intentionally as refuse or accidentally, though the presence of Calluna charcoal in the phase III hearth 6852 seems to indicate some use of heather as fuel.

Calluna is the dominant ericaceous plant on dry Breckland heaths today. One other heath plant represented by carbonised remains in the Fison Way samples is Carex cf. arenaria. Carex nutlets matching this species came from 499, 2750 and 3019, though possible deformation during charring means that this identification must remain tentative. Carex arenaria (sand-sedge) occurs widely in the Breckland, most conspicuously nowadays as extensive pure communities developing on blown sand in areas where rabbits were formerly abundant. (Petch and Swann 1968, 243; Corbett 1973, 28). No remains of heath plants were recovered from Beaker or Bronze Age contexts.

d) Trees and shrubs

Non-ericaceous charcoal fragments were identified only from the Beaker and Bronze Age contexts and from a single charcoal-rich deposit (5871: Phase II) which seemed to have been burnt in situ.

Most of the charcoal from the Beaker and Bronze Age contexts consists of very small fragments with deformed cell structure. Amongst the fragments larger than 6mm. only oak (Quercus sp) was identified. The sample from context 6565 includes oak charcoal with very narrow rings, showing little growth of 'late wood'. This could indicate growth in shaded conditions.

5871 included large fragments from branches of ash (Fraxinus sp) about 35mm. in diameter with small fragments of oak charcoal (Quercus sp) from mature wood, ericaceous charcoal (probably Calluna) and unidentified diffuse porous charcoal. Charred fragments of hazel nut shells (Corylus avellana) were extracted from eight Iron Age - Roman samples, a single fruitstone of haw (Crataegus monogyna) came from 2663 and carbonised seeds of elder (Sambucus nigra) were present in five samples.

Sample composition and taphonomy

The samples of cereals and weed seeds from the site fall into two main categories: small samples consisting of a 'background scatter' derived probably from a variety of sources, and larger samples which appear to have been produced by a single activity or event. Interpretation of most larger samples in terms of specific crop processing activities is possible, but the background scatter of grains, chaff and weed seeds is less easily interpreted.

1. Pit 131

This feature was of the type usually described as a grain storage pit. Samples were taken in order to establish whether the distribution of charred cereal remains within its fill could be interpreted in the light of experimental results reported by Reynolds (1974, 1981), and also, if possible, to determine the crop stored. A central column sample and a further sample from the edge of the pit at its base were collected. A full list of charred plant remains identified is given in Table 2 and the results are summarised in Table 3.

The upper fills of this pit produced only low concentrations of poorly-preserved cereal grains, most of which were unidentifiable, together with rare wheat spikelet fragments. At the base of the pit, however, cereal remains were more abundant, particularly towards the edge of the pit base where they were associated with clay fragments. The sample from the edge

included some grains which had become fused together, and were extremely badly distorted.

Layer	Depth (cm)	Cereal grains/ kg of soil	Spikelet fragments/ kg of soil
256	0-20	0.2	0
256	20-40	1.2	0
256	40-55	0.8	0
257	55-75	0.8	0.2
259	75-90	0.6	0.2
259	90-105	0.2	0
259	105-110	6.0	0
259	(at edge of pit base)	12.4	0

Table 3: Summary of concentration of cereal remains in fill of pit 131

Reynolds (1974, 127-8) notes that viable grain stored in a pit of this type forms a 'skin' of germinated grain lining the pit wall. It seems possible that the fused grains from the edge of pit 131 may be the charred remnants of such a skin produced during a firing of the pit to dry it out and destroy micro-organisms prior to re-use. Reynolds has demonstrated experimentally that firing does result in the charring of residual cereal grains and the concentration of charred cereals at the base of pit 131 certainly would be consistent with such a firing. So far as the type of crop stored is concerned, the high proportion of indeterminate grains inevitably leads to some uncertainty, but of the grains identified in layers below 90cm depth, 15 were of barley and 3 of wheat. This might indicate successive use for both wheat and barley storage.

2. Contexts 2663, 2665 and 3025 (Plate I)

These contexts were the fills of post-holes which formed the secondary doorway inserted into the back wall of building II (PhaseIII). They produced very similar seed assemblages and this, together with their proximity to one another, leaves little doubt that the assemblages had a common source. Each of the three samples produced assemblages consisting mainly of six-row hulled barley grains associated with unidentified, poorly-preserved, cereal grains, wheat grains, some grass or cereal culm nodes, seeds of arable weeds, grassland and heath plants with a few seeds and fruitstones of wild fruits. (Table 4.)

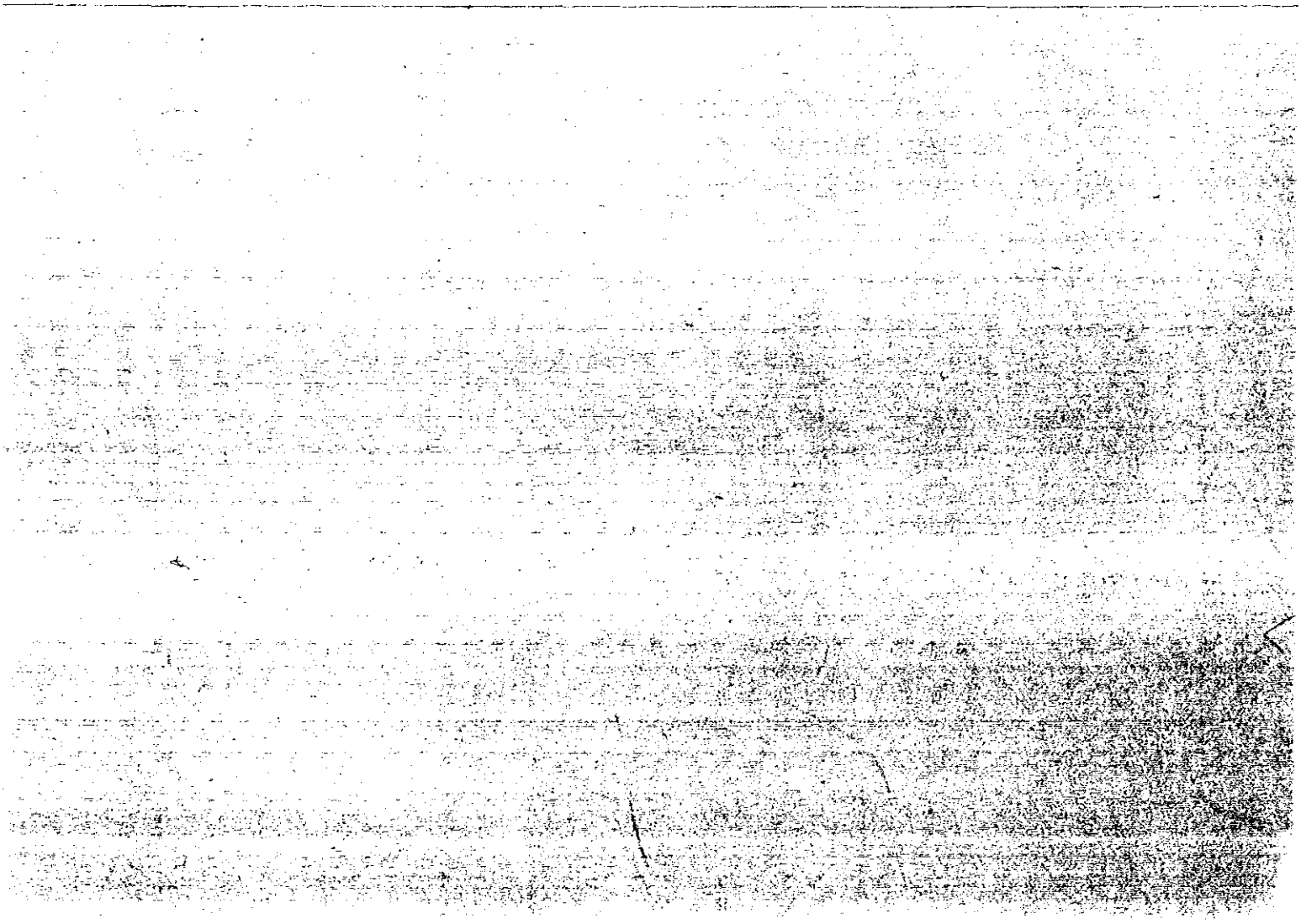
The predominance of barley grains, and the absence of light cereal chaff, implies that the assemblages consist largely of semi-clean grain prepared for bulk storage (Hillman 1984, 10). However the grass/cereal culm nodes and seeds of grassland taxa (Prunella vulgaris, Plantago lanceolata, Carex spp. Gramineae) could indicate some admixture of hay and/or straw with the barley. In this respect the assemblages from these features are broadly comparable to carbonised assemblages of grassland plant seeds, grass culm fragments and barley from Roman contexts at Culver Street, Colchester which were associated with herbivore coprolites and are interpreted as burnt stable or byre sweepings including spoilt fodder. (Murphy, forthcoming.) In the Culver Street assemblages, however, barley grains make up no more than about 15% of the total seed count, the remainder being largely of seeds from grassland taxa. Nevertheless high phosphate levels from these postholes of building II do suggest the possibility that stock were kept in the vicinity of these features. The seed assemblages thus could be interpreted as the carbonised residue left from an accidental fire in a fodder store associated with a byre or stable.

These samples also produced charred remains of wild fruits, which are otherwise rare at the site. Only five samples from the site (including these three) produced seeds of elderberry (Sambucus nigra), and 2663 contained the only fruitstone of haw (Crataegus monogyna). One possible interpretation is that these wild fruits were stored, either dried or preserved by some other means, in the same building as the barley and that mixing occurred after carbonisation.

Feature		Pit 506		Building II		
Context no.		2748	2750	2663	2665	3025
Cereal indet	ca.	59	64	80	52	49
Cereal indet	ca.fr.	+	+	+	+	+
Cereal/grass	cn.	1	-	2	1	8
Hordeum sp	ca.	7	13	-	-	-
Hordeum sp	ri.	-	1fr	-	-	-
Hordeum vulgare L	ca.	-	-	131	85	94
Triticum sp	ca.	32	19	6	3	14
Triticum sp	ri.	6	-	-	-	-
Triticum sp	spb.	27	2	-	-	-
Triticum sp	gb.	42	1	-	-	-
Triticum spelta L	gb.	2cf	-	-	-	-
Triticum dicoccum Schübl	spf.	11	4	-	-	-
Triticum dicoccum Schübl	gb.	21	5	-	-	-
Avena sp	ca.	-	-	1	1cf	1
Avena sp	afr.	+	-	-	-	-
Raphanus raphanistrum L		1fr	-	-	1	-
Atriplex sp		-	-	+	+	-
Chenopodium album L		+	+	+	+	+
Vicia/Lathyrus sp	co.	-	-	-	1	-
Crataegus monogyna Jacq.		-	-	1	-	-
Polygonum aviculare agg		1	-	1	-	1
Polygonum lapathifolium/persicaria		22	4	-	-	-
Polygonum convolvulus L		5	4	1	-	-
Rumex acetosella agg		3	-	-	-	-
Rumex sp		3	2	4	2	1
Polygonaceae indet		1	1	1	-	1
Calluna vulgaris (L) Hull	cap.	-	2	-	-	-
Ericaceae	ch.	+	+	-	-	+
Prunella vulgaris L		-	-	-	-	1
Plantago lanceolata L		-	-	3	-	-
Galium aparine L		-	-	3	-	1
Sambucus nigra L		-	-	1	2	3
Centaurea sp	fr.	1	-	-	-	-
Carex arenaria-type		-	2	-	-	-
Carex sp		2	-	1	1	-
Bromus mollis/secalinus		4	6	-	-	-
Gramineae indet		1	1	4	5	5
Indeterminate		5	-	7	6	3
Sample wt (kg)		10	10	10	10	10

Table 4 : Carbonised plant remains from pit 506 (Phase I?) and building II (phaseIII)

Taxa are represented by fruits or seeds unless otherwise indicated.
Abbreviations: afr - awn fragments; ca - caryopses; cap - capsules; ch - charcoal; cn - culm nodes; fr - fragments; gb - glume bases; ri - rachis internodes; spb - spikelet bases; spf - spikelet forks.



3. Contexts 2748 and 2750 (Table 4)

These contexts were the top two layers of pit 506, probably of phase I. Both samples produced barley and wheat grains with wheat chaff (mainly of emmer) and seeds of arable weeds. In 2748 the wheat grain: glume base ratio approximates to the 1:1 ratio expected in two-grained spikelets (assuming that the unidentified cereal grains are of wheat and barley in the same ratio as for those identified, and excluding spikelet bases from the calculation). This sample therefore seems to consist of a mixture of semi-cleaned wheat spikelets with semi-cleaned barley grains.

In summary, then, these larger assemblages from Fison Way are all thought to consist of prime products with some impurities: there are no large samples consisting of crop processing waste. Interpreting the majority of samples from the site individually in terms of activities and processes is, however, very difficult for the assemblages are generally very small and each assemblage is likely to include material from more than one source. The general predominance of grains over spikelet and rachis fragments is, however, worth noting.

Jones (1984) has emphasised that Iron Age agrarian economies involved elements of specialisation and of inter-dependence between sites. To appreciate fully the significance of the cereal assemblages from Fison Way comparison with contemporary sites in the area is therefore necessary. Large assemblages of Iron Age and Roman cereals have been obtained from four other sites in the Breckland: West Stow, Suffolk (WSW 030 and WSW), Brandon, Suffolk (BRD 018), and Fengate Farm, Weeting, Norfolk (WWB 5636) (Murphy 1983, 1985 and forthcoming). These sites are all located on terraces of the Rivers Lark and Little Ouse and are thought to represent farming settlements. The range of crops present is very consistent. Spelt and six-row hulled barley are the main cereals at all these sites, and traces of emmer, free-threshing wheat, rye and wild or cultivated oats occur sporadically. The composition of assemblages from almost all contexts at these sites is also similar. With the exception of an assemblage from an oven at Fengate Farm, samples from these sites consist predominantly of weed seeds and cereal chaff with relatively small amounts of grain. They represent fine sievings from cereal processing (Hillman 1984, 12 and Table 1), usually with some admixture of material from other stages in crop processing. In the Iron Age and Roman assemblages from West Stow and Brandon weed seeds are the predominant component, but in the Roman assemblages from Fengate Farm wheat glume bases and rachis internodes are more common. These variations may be related to different methods of harvesting. However, the points of relevance here are that all these assemblages consist largely of waste from crop processing and, with the one exception noted above, there are no deposits of prime grain.

The assemblages from these sites on the river terraces are thus very different in composition from the Fison Way assemblages, which, as we have seen, consist of a few fairly large deposits of prime products and a 'background scatter' mainly of grains with some chaff and weed seeds. Such variations between sites may be explained in terms of the status and functions of sites and their environmental contexts (Hillman 1984; Jones 1984, 118-122). Both the location and size of the Fison Way site suggest that it is likely to have been a consumer of agricultural products rather than a farming settlement. It lies on very poor sandy soils which, from at least the Iron Age, appear to have been covered by heath vegetation and were prone to wind erosion (see below). The site is about 1km. from the river. Evidently the site's location was influenced more by considerations of status and defence than by agricultural requirements. Sites on the terraces, by contrast, were conveniently situated to exploit valley-floor pasture, and stock supported

on these productive grasslands could have provided manure to maintain the productivity of arable fields on the gravel soils of the terraces and the calcareous soils of the valley slopes (Murphy 1983). It therefore seems probable that the Fison Way site was supplied with cereals by subsidiary settlements on the terraces. Moreover the composition of the cereal assemblages implies that most crop cleaning took place at the river terrace sites, which, it is argued, were the sites of production, and that the Fison Way site was receiving semi-cleaned grain and spikelets. In this respect the results obtained contrast with those from the hillfort of Danebury, Hampshire, which Jones (ibid) suggests acted as a central location for the processing, storage and redistribution of unprocessed crops brought in from a large territory. There is no reason to suppose, from the available evidence, that the cereals arriving at the Fison Way site represented more than the site's subsistence requirements.

Environment

The site at Fison Way is about 11km. to the south-south-west of Hockham Mere, an infilled lake basin at which several palynological studies have been made (Godwin 1944, Godwin and Tallantire 1951, Sims 1978, Bennett 1983). Changes in pollen frequencies registered in the Mere sediments must relate in part to vegetational changes on the extensive area of high-level glacial gravels, lying between the site and the Mere (Corbett 1973, 65). Pollen results from Hockham Mere are thus of direct relevance to the environmental history of the site.

The most recent study by Bennett (ibid) indicates that substantial forest clearance did not begin in this area until c. 550b.c., though there were earlier temporary clearances on a small scale. The spread of heath vegetation, following clearance, began at about 300b.c., and pollen of cereals does not become prominent until c. 50b.c. It is against this background that the carbonised plant remains must

be interpreted.

Beaker and Bronze Age contexts at Fison Way produced only sparse assemblages of carbonised plant remains. All the charcoal identified was of oak (Quercus sp), some of which had very narrow rings and may come from trees grown in shaded conditions, perhaps in woodland. No remains of heathland plants were present. A single caryopsis of Bromus sp, a common cereal weed, from 5823 suggests that there may have been some cereal cultivation, but no carbonised remains of cereals were recovered. These rather poor results could fit with Bennett's suggestion that before c. 550b.c. clearances for agriculture were small and temporary. Evidence from other sites suggests that pre-Iron Age clearances and farming were predominantly on the more agriculturally-productive calcareous soils in the Breckland rather than the mainly acid sandy and gravelly soils of the area between Hockham Mere and Thetford (Murphy 1984).

Bennett's pollen results from Hockham Mere suggest that permanent large-scale woodland clearances, associated with cereal farming and followed by soil deterioration and the spread of heathland relate to an Iron Age expansion onto the more marginal sandy and gravelly soils - areas of land which today are extensively planted with conifers (Corbett 1973, 53). The carbonised plant remains from Fison Way are consistent with Bennett's results. Samples from contexts of all Iron Age and Roman phases produced carbonised remains of Ericaceae, and some large deposits of charred remains of Calluna vulgaris came from late Roman contexts. These clearly indicate the proximity of heathland from at least as early as the 1st century B.C. Trees and shrubs identified from charcoal and from carbonised nutshells fruitstones and seeds are Fraxinus sp. (ash), Quercus sp. (oak), Corylus avellana (hazel), Crataegus monogyna (hawthorn) and Sambucus nigra (elder). Ash is the only tree whose pollen concentrations do not decline after c. 550b.c. at Hockham Mere and Bennett (ibid, 482) suggests that it persisted by invading cleared ground. Generally ash is more common on damp calcareous soils, being fairly drought-sensitive (Wardle 1961) and the ash charcoal from Fison Way is perhaps most likely to have come from valley floor woods rather than from trees growing on the dry acidic soils around the site. The remains of hazel, hawthorn and elder presumably represent fruits and nuts collected from areas of scrub.

Evidence for the effects of clearance on soils comes from two sources. Firstly radiocarbon dates on humus in the B_h horizon of several Breckland podzols indicate that podzolisation was well advanced in some areas by c. 850b.c. (Perrin et al 1964). Secondly a soil buried beneath the late Roman turf-stack at Gallows Hill was immature and had formed on blown sand (MacPhail 1979).

Podzolisation and wind erosion would have occurred after clearance permitting the expansion of heath vegetation except where soils were continuously manured and marled for cultivation.

The information available on habitat change in this area is summarised in Table 5

Years bc/ad	Pollen data (Hockham Mere)	Palaeosols	Carbonised plant remains
500 ad	Tree and shrub pollen reduced to 60% by c. 350ad	Buried soil at THD 5744. Immature soil formed on blown sand.	Large deposits of carbonised Calluna vulgaris remains at THD 5744 and THD 5853.
0	Pollen of cereals becomes prominent after c. 50bc. Sharp increase in Calluna pollen from c. 300bc		Cereal cultivation (mainly Triticum spelta and Hordeum vulgare) from 1st cent. B.C. Carbonised remains of Calluna present. Tree and shrub taxa: Fraxinus, Quercus, Corylus, Crataegus, Sambucus.
500 bc	Decline in pollen concentrations of all tree taxa except Fraxinus excelsior and rise in herb pollen values from c. 550bc.		
1000 bc		Podzolisation well advanced in some areas by c. 850bc.	
1500 bc	? Small temporary local clearances, before c. 550bc.		Beaker and Bronze Age contexts contain oak (Quercus) charcoal, some slow-grown. No ericaceous charcoal. Rare cereal weed remains (including Bromus).
2000 bc			

Table 5 : Summary of palaeoecological data.

Sources Bennett (1983), MacPhail (1979), Perrin et al (1964), this report.

References

Bennett, K.D. (1983) Devensian Late Glacial and Flandrian vegetational history at Hockham Mere, Norfolk, England. I. Pollen percentages and concentrations. New Phytologist. 95, 457-487.

Corbett, W.M. (1973) Breckland Forest Soils. Soil Survey. Special Survey No. 7. Harpenden.

Godwin, H. (1944) Age and origin of the Breckland heaths of East Anglia. Nature 154, 6-7.

Godwin, H. and Tallantire, P.A. (1951) Studies of the postglacial history of British Vegetation. XII. Hockham Mere, Norfolk. Journal of Ecology 39, 285-307.

Helbaek, H. (1952) Early Crops in Southern England. Proc. Prehist. Soc. 18, 194-233.

Hillman, G. (1984) Interpretation of archaeological plant remains: The application of ethnographic models from Turkey in Van Zeist, W. and Casparie, W.A. (eds) Plants and Ancient Man. Studies in palaeoethnobotany pp.1-42. A.A. Balkema, Rotterdam.

Hillman, G. (forthcoming) Criteria for distinguishing chaff remains of the glume wheats. J. Archaeol. Sci.

Hubbard, R.N.L. (1975) Assessing the botanical component of human palaeo-economies Bulletin of the Institute of Archaeology 12, 197-205.

Jones, M. (1978) The Plant Remains, in Parrington, M. (ed.) The excavation of an Iron Age settlement, Bronze Age ring-ditch and Roman features at Ashville Trading Estate, Abingdon, Oxfordshire 1974-6. CBA Res. Rpt. No. 28. London.

Jones, M. (1984) Regional patterns in crop production, in Cunliffe, B. and Miles, D. (eds.) Aspects of the Iron Age in central Southern Britain. University of Oxford: Committee for Archaeology Monograph 2, pp.120-125.

Murphy, P. (1983) Iron Age to Late Saxon Land Use in the Breckland, in Jones, M. (ed.) Integrating the Subsistence Economy. BAR International Series 181, 177-209.

Murphy, P. (1984) Prehistoric Environments and Economies, in Barringer, J.C. (ed.) Aspects of East Anglian Prehistory pp. 13-30 Geo Books, Norwich.

Murphy, P. (1985) 'The cereals and crop weeds' in West, S. (1985) 'West Stow. The Anglo-Saxon Village Vol. 1.' East Anglian Archaeology Report No. 24, 100-108. Suffolk County Planning Dept, Bury St Edmunds.

MacPhail, R.I. (1979) Soil report on turf stack and buried soil at Gallows Hill, Thetford, Norfolk. Ancient Monuments Laboratory Report Series.

Petch, C.P. and Swann, E.L. (1968) Flora of Norfolk. Norwich.

Reynolds, P.J. (1974) Experimental Iron Age Storage Pits: An Interim Report. Proc. Prehist. Soc. 40, 118-131.

Reynolds, P.J. (1981) Deadstock and Livestock, in Mercer, R. (ed.) Farming Practice in British Prehistory. Edinburgh University Press.

Sims, R.E. (1978) Man and vegetation in Norfolk, in Limbrey, S. and Evans, J.G. (eds.) The effect of man on the landscape: the Lowland Zone. C.B.A. Res. Rpt. No. 21.

Williams, D. (1973) Flotation at Siraf Antiquity 47, 288-292.

Wardle, P. (1961) Biological Flora of the British Isles: Fraxinus excelsior L. Journal of Ecology 49, 739.

Context No.	5814	5816	5817	5818	5819	5820	5823	5824	6565	6566
Quercus sp. charcoal	–	++	–	–	–	–	–	–	++	–
Indeterminate charcoal	–	–	–	–	–	–	–	–	+	–
Bromus sp. caryopsis	–	–	–	–	–	–	1	–	–	–
Indet. stem fragments	–	–	–	–	–	+	+	–	–	–
bud	–	–	–	–	–	–	+	–	–	–
seeds	–	–	1	–	–	–	3	2	–	–
Sample wt. (kg)	0.8	2	1.4	1.2	1.8	4.7	7.8	–	10	1

Table 1 Charred plant remains from Beaker and Bronze Age samples.

Table 2 : Carbonised plant remains from site phases I-IV [microfiche]

Taxa are represented by fruits or seeds unless otherwise indicated.
Abbreviations: afr - awn fragments; bri - brittle-rachis internodes; ca - caryopses; cap - capsules; co - cotyledons; cn - culm nodes; fr - fragments; gb - glume bases; ns - nutshell; ri - rachis internodes; spb - spikelet bases; spf - spikelet forks; st - stem.

Seeds of Atriplex and Chenopodium have not been counted since some difficulty was experienced in separating carbonised seeds from modern intrusive seeds.

Phase I (a)

Context no.	Gully 132 153	Pit 131 256 0-20 cm	Pit 131 256 20-40 cm.	Pit 131 256 40-55 cm	Pit 131 257 55-75 cm	Pit 131 259 75-90 cm	Pit 131 259 90-105 cm	Pit 131 259 105-110 cm	Pit 131 259 (pit edge)	Pit 346 (347)	Pit 392 393
Cereal indet. ca.	-	1	6	3	4	3	-	23	31	3	14
Cereal indet. ca fr.	-	+	+	+	+	+	+	+	+	+	+
Cereal indet. cn.	-	-	-	-	-	-	-	-	1fr	-	-
Hordeum sp. ca	-	-	-	1	-	-	1	7	7	-	22
Hordeum sp. ri	-	-	-	-	-	-	-	-	-	-	-
Hordeum vulgare. ca	-	-	-	-	-	-	-	-	-	-	-
Triticum sp. ca	-	-	-	-	-	-	-	-	3	-	4
Triticum sp. bri	-	-	-	-	-	-	-	-	-	-	-
Triticum sp. spb	-	-	-	-	1	-	-	-	-	-	2
Triticum sp. gb	-	-	-	-	-	-	-	-	-	-	1
Triticum spelta spf	-	-	-	-	-	-	-	-	-	-	-
Triticum spelta gb	-	-	-	-	-	1	-	-	-	-	2
Triticum dicoccum spf	-	-	-	-	-	-	-	-	-	-	-
Triticum dicoccum gb	-	-	-	-	-	-	-	-	-	-	-
Avena sp. ca	-	-	-	-	-	-	-	-	-	-	-
Avena sp. a fr.	-	-	-	+	-	-	-	+	+	-	-
Ranunculus acris/repens-type	-	-	-	-	-	-	-	-	-	-	-
Raphanus raphanistrum	-	-	-	-	-	-	-	-	-	-	-
Cruciferae indet.	-	-	-	-	-	-	-	-	-	-	-
Silene cf alba	-	-	-	-	-	-	-	-	-	-	2
Stellaria media-type	-	-	-	-	-	-	-	-	-	-	1
Stellaria graminea	-	-	-	-	-	-	-	-	-	-	-
Spergula arvensis	-	-	-	-	-	-	-	-	-	-	-
Atriplex patula/hastata	-	-	-	-	-	-	-	-	-	-	-
Chenopodium album	-	-	-	-	[illegible]	+	-	+	+	-	+
Chenopodium sp.	-	-	-	-	+	-	-	-	-	-	-
Chenopodiaceae indet.	-	-	-	-	-	-	-	-	-	1	-
Malva sp.	-	-	-	-	-	-	-	-	-	-	-
Medicago/Trifolium -type	-	-	-	-	-	-	-	-	-	-	3
Vicia sp. s.	-	-	-	-	*1	-	-	-	-	-	-
Vicia sp. co	-	-	-	-	-	-	-	-	-	-	-
Vicia cf tetrasperma	-	-	-	-	-	-	-	-	-	-	-
Leguminosae indet.	-	-	-	-	-	-	-	-	-	-	-
Crataegus monogyna	-	-	-	-	-	-	-	-	-	-	-
Polygonum aviculare agg	-	-	-	-	-	-	-	-	-	-	-
Polygonum lapathifolium	-	-	-	-	-	-	-	-	-	-	-
Polygonum lapathifolium/persicaria	-	-	-	-	-	-	-	1	1	-	4
Polygonum convolvulus	-	-	-	-	-	-	1	2	8	1fr	6
Rumex acetosella	-	-	-	-	-	-	-	-	-	-	-
Rumex sp.	-	1	-	-	-	-	-	-	-	-	4
Polygonaceae indet	-	-	-	-	-	-	-	-	-	-	5
Urtica dioica	-	-	-	-	-	-	-	-	-	-	-
Corylus avellana ns fr	-	-	-	-	-	-	-	-	-	-	+
Calluna vulgaris cap	-	-	-	-	-	-	-	-	-	-	-
lvs	-	-	-	-	-	-	-	-	-	-	-
Ericaceae charcoal	-	-	-	-	-	-	-	-	-	+	-
Prunella vulgaris	-	-	-	-	-	-	-	-	-	-	-
Plantago lanceolata	-	-	-	-	-	-	-	1	-	-	2
Galium aparine	-	-	-	-	-	-	-	-	-	-	-
Sambucus nigra	-	-	-	-	-	-	-	-	-	-	-
Centaurea sp. fr	-	-	-	-	-	-	-	-	-	-	-
Carex arenaria-type	-	-	-	-	-	-	-	-	-	-	-
Carex sp.	-	-	-	-	-	-	-	-	-	-	-
Eleocharis palustris agg	-	-	-	-	-	-	-	-	-	-	-
Bromus mollis/secalinus	-	-	2	-	*1	-	2	8	6	2	23
Gramineae indet.	-	-	-	-	-	-	-	-	-	-	1
Indet st fr	-	-	-	-	-	-	-	-	-	-	-
Indeterminate.	-	1	3	1	2	1	1	5	-	-	6
Sample wt (kg).	4·4	5	5	5	5	5	5	5	3·3	10	10

Phase I (b)

Context no.	Pit 587 588	Grave 646 647	Grave 646 648	Grave 735 736	Pit 1796 1654	Pit 1804 1805	Pit 392 2413	Pit 2640 2649	Pit 2640 2746	Ditch 510 2755	Ditch 510 2756	Ditch 510 2757
Cereal indet. ca.	2	–	3	–	6	–	21	–	1	–	–	2
Cereal indet. ca fr.	+	–	+	+	+	–	+	+	+	+	+	–
Cereal indet. cn.	–	–	–	–	–	–	–	–	–	–	–	–
Hordeum sp. ca	1	–	–	–	4	–	14	–	2	2	–	–
Hordeum sp. ri	–	–	–	–	–	–	–	–	–	–	–	–
Hordeum vulgare. ca	–	–	–	–	–	–	–	–	–	–	–	–
Triticum sp. ca	–	–	–	1	–	2	7	–	–	–	–	–
Triticum sp. bri	–	–	–	–	1	–	–	–	–	–	–	–
Triticum sp. spb	–	–	1	–	–	–	–	–	–	–	–	–
Triticum sp. gb	–	–	–	–	–	–	–	–	–	–	–	–
Triticum spelta spf	–	–	–	–	1	–	–	–	–	–	–	–
Triticum spelta gb	–	–	–	–	–	1	–	–	–	1	–	–
Triticum dicoccum spf	–	–	–	–	–	–	–	–	–	–	–	–
Triticum dicoccum gb	–	–	–	–	–	–	–	–	–	–	–	–
Avena sp. ca	–	–	–	–	–	–	–	–	–	–	–	–
Avena sp. a fr.	–	–	–	–	–	–	–	–	–	–	–	–
Ranunculus acris/repens-type	–	–	–	–	–	–	–	–	–	–	–	1
Raphanus raphanistrum	–	–	–	–	–	–	–	–	–	–	–	–
Cruciferae indet.	–	–	–	–	–	–	1	–	–	–	–	–
Silene cf alba	–	–	–	–	–	–	–	–	–	–	–	–
Stellaria media-type	–	–	–	–	–	–	–	–	–	–	–	–
Stellaria graminea	–	–	–	–	–	–	–	–	–	–	–	–
Spergula arvensis	–	–	–	–	–	–	–	–	–	–	–	–
Atriplex patula/hastata	–	–	–	–	+	–	–	–	–	–	–	–
Chenopodium album	–	–	–	–	+	–	+	–	+	–	+	–
Chenopodium sp.	–	–	–	–	–	–	–	–	–	–	–	–
Chenopodiaceae indet.	–	+	+	–	–	–	–	–	–	+	–	–
Malva sp.	–	–	–	–	–	–	–	–	–	–	–	–
Medicago/Trifolium -type	–	–	–	–	–	–	–	–	–	–	–	–
Vicia sp. s.	–	–	–	–	–	–	–	–	–	–	–	–
Vicia sp. co	–	–	–	–	–	–	–	–	–	–	1	–
Vicia cf tetrasperma	–	–	–	–	–	–	–	–	–	–	–	–
Leguminosae indet.	–	–	–	–	–	–	–	–	–	–	–	–
Crataegus monogyna	–	–	–	–	–	–	–	–	–	–	–	–
Polygonum aviculare agg	–	–	1	–	–	–	–	–	–	–	1	–
Polygonum lapathifolium	1	–	–	–	–	–	–	–	–	–	–	–
Polygonum lapathifolium/persicaria	–	–	–	–	–	–	5	–	–	–	–	–
Polygonum convolvulus	–	–	1	–	–	–	4	–	–	–	–	–
Rumex acetosella	–	–	1	–	–	1	–	–	–	–	–	1
Rumex sp.	–	–	1	–	–	–	6	–	–	–	–	–
Polygonaceae indet	–	–	31	–	–	–	–	–	–	–	–	–
Urtica dioica	–	–	–	–	–	–	–	–	–	–	–	–
Corylus avellana ns fr	–	–	+	–	+	–	+	–	–	–	–	–
Calluna vulgaris cap	–	–	1	–	–	–	–	–	–	–	–	–
Calluna vulgaris lvs	–	–	–	–	–	–	–	–	–	–	–	–
Ericaceae charcoal	+	+	+	+	–	–	+	+	+	+	–	–
Prunella vulgaris	–	–	–	–	–	–	–	–	–	–	–	–
Plantago lanceolata	1	–	–	1	–	–	1	–	–	–	2	–
Galium aparine	–	–	–	–	–	–	–	–	–	–	–	–
Sambucus nigra	–	–	–	–	–	–	–	–	–	–	–	–
Centaurea sp. fr	–	–	–	–	–	–	–	–	–	–	–	–
Carex arenaria-type	–	–	–	–	–	–	–	–	–	–	–	–
Carex sp.	–	–	–	–	–	–	–	–	–	–	–	–
Eleocharis palustris agg	–	–	–	–	–	–	–	–	–	–	–	–
Bromus mollis/secalinus	–	1	–	3	3	1	15	–	–	–	–	1
Gramineae indet.	–	–	–	–	–	–	1	–	–	–	–	1
Indet st fr	–	–	–	–	–	–	–	–	–	–	–	–
Indeterminate.	–	–	11	–	–	–	–	–	–	1	1	–
Sample wt (kg).	10	7	7.5	10	10	10	10	10	10	10	5	

Phase I (c)

Context no.	Gully 522 2854	Pit 587 3019	Grave 646 3187	Grave 646 3239	Grave 646 3240	Grave 646 3241	Gully 1565 3641
Cereal indet. ca.	–	7	–	1	–	–	16
Cereal indet. ca fr.	+	+	+	–	+	–	+
Cereal indet. cn.	–	–	–	1	–	–	–
Hordeum sp. ca	–	1	–	–	–	–	4
Hordeum sp. ri	–	–	–	–	–	–	1
Hordeum vulgare. ca	–	–	–	–	–	–	–
Triticum sp. ca	–	2	–	–	–	–	8
Triticum sp. bri	–	–	–	–	–	–	–
Triticum sp. spb	–	–	–	–	–	–	–
Triticum sp. gb	–	–	–	–	2	–	1
Triticum spelta spf	–	–	–	–	–	–	–
Triticum spelta gb	–	–	–	–	1	–	–
Triticum dicoccum spf	–	–	–	–	–	–	–
Triticum dicoccum gb	–	–	–	–	–	–	1
Avena sp. ca	–	–	–	–	–	–	–
Avena sp. a fr.	–	–	–	–	–	–	+
Ranunculus acris/repens-type	–	–	–	–	–	–	–
Raphanus raphanistrum	–	2	–	–	–	–	–
Cruciferae indet.	–	–	–	–	–	–	–
Silene cf alba	–	–	–	–	–	–	–
Stellaria media-type	–	–	–	–	–	–	–
Stellaria graminea	–	–	–	–	–	1	–
Spergula arvensis	–	–	–	–	–	–	–
Atriplex patula/hastata	–	–	–	–	–	–	–
Chenopodium album	–	+	–	–	–	–	+
Chenopodium sp.	–	–	–	–	–	–	–
Chenopodiaceae indet.	–	–	–	–	–	–	–
Malva sp.	–	–	–	–	–	–	–
Medicago/Trifolium -type	–	–	–	–	–	–	–
Vicia sp. s.	–	–	–	–	–	–	–
Vicia sp. co	–	–	–	–	–	–	–
Vicia cf tetrasperma	–	–	–	–	–	–	–
Leguminosae indet.	–	–	–	–	–	–	–
Crataegus monogyna	–	–	–	–	–	–	–
Polygonum aviculare agg	–	–	–	–	–	–	–
Polygonum lapathifolium	–	–	–	–	–	–	–
Polygonum lapathifolium/persicaria	–	–	–	–	–	–	–
Polygonum convolvulus	–	1	–	–	–	–	1
Rumex acetosella	–	–	–	–	–	–	–
Rumex sp.	–	1	–	–	–	–	4
Polygonaceae indet	–	–	–	–	–	–	–
Urtica dioica	–	–	–	–	–	–	–
Corylus avellana ns fr	–	–	–	–	–	–	–
Calluna vulgaris cap	–	–	–	–	–	–	–
Calluna vulgaris lvs	–	–	–	–	–	–	–
Ericaceae charcoal	–	+	+	+	–	+	+
Prunella vulgaris	–	–	–	–	–	–	–
Plantago lanceolata	–	–	–	–	–	–	–
Galium aparine	–	–	–	–	–	–	–
Sambucus nigra	–	–	–	–	–	–	–
Centaurea sp. fr	–	–	–	–	–	–	–
Carex arenaria-type	–	1	–	–	–	–	–
Carex sp.	–	–	–	–	–	–	–
Eleocharis palustris agg	–	1	–	–	–	–	–
Bromus mollis/secalinus	–	–	–	–	–	–	–
Gramineae indet.	–	1	–	–	–	–	–
Indet st fr	–	–	–	–	–	–	–
Indeterminate.	–	–	–	–	–	–	2
Sample wt (kg).	10	10	10	3	10	10	10

Uniphased (I?) a

Context no.	Heath 498 499	Heath 504 505	Pit 512 513	Heath 534 535	Pit 670 671	Pit 796 797	Heath 798 799	Heath 961 962			Pit 2079 2080
Cereal indet. ca.	–	–	5	4	–	–	–	–			3
Cereal indet. ca fr.	–	–	+	+	–	+	+	–			+
Cereal indet. cn.	–	–	3	–	–	–	–	–			–
Hordeum sp. ca	–	–	1	3	–	–	–	–			2
Hordeum sp. ri	–	–	–	–	–	–	–	–			–
Hordeum vulgare. ca	–	–	–	–	–	–	–	–			–
Triticum sp. ca	–	1	–	2	–	–	–	–			1
Triticum sp. bri	–	–	–	–	–	–	–	–			–
Triticum sp. spb	–	–	–	–	–	–	–	–			1
Triticum sp. gb	–	–	–	–	–	–	–	–			3
Triticum spelta spf	–	–	–	–	–	–	–	–			–
Triticum spelta gb	–	–	–	–	–	–	–	–			–
Triticum dicoccum spf	–	–	–	–	–	–	–	–			–
Triticum dicoccum gb	–	–	–	–	–	–	–	–			1
Avena sp. ca	–	–	–	–	–	–	–	–			–
Avena sp. a fr.	–	–	–	+	–	–	–	–			–
Ranunculus acris/repens-type	–	–	1	–	–	–	–	–			–
Raphanus raphanistrum	–	–	–	–	–	–	–	–			–
Cruciferae indet.	–	–	–	–	–	–	–	–			–
Silene cf alba	–	–	–	–	–	–	–	–			–
Stellaria media-type	–	5	–	1	–	–	–	–			–
Stellaria graminea	–	–	–	–	–	–	–	–			–
Spergula arvensis	–	–	2	–	–	–	–	–			–
Atriplex patula/hastata	–	–	+	–	–	–	–	–			–
Chenopodium album	–	–	+	–	–	–	–	–			–
Chenopodium sp.	–	+	–	–	–	–	–	–			+
Chenopodiaceae indet.	–	–	–	–	–	–	–	–			–
Malva sp.	–	–	–	–	–	–	–	–			–
Medicago/Trifolium -type	–	–	–	–	–	–	–	–			–
Vicia sp. s.	–	–	–	–	–	–	–	–			1
Vicia sp. co	–	11	–	–	–	–	–	–			–
Vicia cf tetrasperma	–	1	–	–	–	–	–	–			–
Leguminosae indet.	1	–	–	–	–	–	–	–			–
Crataegus monogyna	–	–	–	–	–	–	–	–			–
Polygonum aviculare agg	–	2	–	–	–	–	–	–			–
Polygonum lapathifolium	–	–	–	–	–	–	–	–			–
Polygonum lapathifolium/persicaria	–	–	–	–	–	–	–	–			1
Polygonum convolvulus	–	2	–	1	1	–	1	–			–
Rumex acetosella	–	–	8	–	–	–	–	–			–
Rumex sp.	–	–	–	–	–	–	–	–			–
Polygonaceae indet	–	1	–	–	–	7	–	–			–
Urtica dioica	–	1ct	–	–	–	–	–	–			–
Corylus avellana ns fr	–	–	–	–	–	–	–	–			–
Calluna vulgaris cap	–	–	–	–	–	–	–	–			–
Calluna vulgaris lvs	–	–	–	–	–	–	–	–			–
Ericaceae charcoal	–	–	+	+	+	–	+	–			+
Prunella vulgaris	–	–	–	–	–	–	–	–			–
Plantago lanceolata	–	–	2	–	–	–	–	–			–
Galium aparine	–	1	–	–	–	–	–	–			–
Sambucus nigra	–	1	–	–	–	–	–	–			–
Centaurea sp. fr	–	–	–	–	–	–	–	–			–
Carex arenaria-type	1	–	–	–	–	–	–	–			–
Carex sp.	–	–	–	–	–	–	–	–			–
Eleocharis palustris agg	–	–	–	–	–	–	–	–			–
Bromus mollis/secalinus	–	–	1	–	–	–	–	–			–
Gramineae indet.	–	–	–	–	–	–	–	–			–
Indet st fr	–	–	–	–	1	–	–	–			
Indeterminate.	4	7	4	2	–	3	–	1			1
Sample wt (kg).	10	10	10	10	10	9	10	10			10

Unphased (I?) b.

Context no.	Pit 2257 2382	Pit 2257 2384	Pit 512 2627	Pit 512 2628	Pit 506 2748	Pit 506 2750	Gully 753 3245	Gully 753 3254	Gully 753 3185	Gully 676 3330
Cereal indet. ca.	–	28	5	21	59	64	2	–	3	–
Cereal indet. ca fr.	+	+	+	+	+	+	+	+	+	+
Cereal indet. cn.	–	–	1	–	+	–	–	–	–	–
Hordeum sp. ca	–	7	3	4	7	13	–	1	3	–
Hordeum sp. ri	–	–	–	–	–	1fr	–	–	–	–
Hordeum vulgare. ca	–	–	–	–	–	–	–	–	–	–
Triticum sp. ca	3	14	–	5	32	19	–	–	4	–
Triticum sp. bri	–	–	–	–	6	–	–	–	1	–
Triticum sp. spb	–	–	–	1	27	2	–	–	–	–
Triticum sp. gb	1	–	1	1	42	1	–	–	3	–
Triticum spelta spf	–	–	–	1	–	–	–	–	1	–
Triticum spelta gb	–	–	1	2	2cf	–	–	–	1	–
Triticum dicoccum spf	–	–	–	–	11	4	–	–	–	–
Triticum dicoccum gb	1	–	–	–	21	5	–	–	–	–
Avena sp. ca	–	cf3	–	–	–	–	–	–	–	–
Avena sp. a fr.	+	+	–	–	+	–	–	–	–	–
Ranunculus acris/repens-type	–	–	–	–	–	–	–	–	–	–
Raphanus raphanistrum	–	–	–	–	fr	–	–	–	–	–
Cruciferae indet.	–	–	–	–	–	–	–	–	–	–
Silene cf alba	–	–	–	–	–	–	–	–	–	–
Stellaria media-type	–	–	–	–	–	–	–	–	–	–
Stellaria graminea	–	–	–	–	–	–	–	–	–	–
Spergula arvensis	–	–	–	1	–	–	–	–	–	–
Atriplex patula/hastata	–	–	–	–	–	–	–	–	–	–
Chenopodium album	–	+	+	–	+	+	–	–	+	–
Chenopodium sp.	–	–	–	–	–	–	–	–	–	–
Chenopodiaceae indet.	–	–	–	–	–	–	–	–	–	–
Malva sp.	–	–	–	–	–	–	–	–	–	–
Medicago/Trifolium -type	–	–	–	–	–	–	–	–	–	–
Vicia sp. s.	–	–	–	–	–	–	–	–	–	–
Vicia sp. co	–	–	–	–	–	–	–	–	–	–
Vicia cf tetrasperma	–	–	–	–	–	–	–	–	–	–
Leguminosae indet.	–	–	–	–	–	–	–	–	–	–
Crataegus monogyna	–	–	–	–	–	–	–	–	–	–
Polygonum aviculare agg	–	–	–	–	1	–	–	–	1	–
Polygonum lapathifolium	–	–	–	–	–	–	–	–	–	–
Polygonum lapathifolium/persicaria	–	6	–	–	22	4	–	–	–	–
Polygonum convolvulus	–	6	–	–	5	4	1	–	2	–
Rumex acetosella	–	–	1	–	3	–	–	–	2	–
Rumex sp.	–	1	–	1	3	2	–	–	–	–
Polygonaceae indet	–	–	–	–	1	1	–	–	–	–
Urtica dioica	–	–	–	–	–	–	–	–	–	–
Corylus avellana ns fr	–	–	–	–	–	–	+	+	+	–
Calluna vulgaris cap	–	–	–	–	–	2	–	–	–	–
Calluna vulgaris lvs	–	–	–	–	–	–	–	–	–	–
Ericaceae charcoal	–	+	+	+	+	+	+	+	–	+
Prunella vulgaris	–	–	–	–	–	–	–	–	–	–
Plantago lanceolata	–	–	1	–	–	–	–	–	–	–
Galium aparine	–	–	–	–	–	–	–	–	–	–
Sambucus nigra	–	–	–	–	–	–	–	–	–	–
Centaurea sp. fr	–	–	–	–	1	–	–	–	–	–
Carex arenaria-type	–	–	–	–	–	2	–	–	–	–
Carex sp.	–	–	–	–	2	–	–	–	–	–
Eleocharis palustris agg	–	–	–	–	–	–	–	–	–	–
Bromus mollis/secalinus	2	1	1fr	32	4	6	–	–	2	–
Gramineae indet.	–	–	–	–	1	1	–	–	1	–
Indet st fr	–	–	–	–	–	–	–	–	–	–
Indeterminate.	–	1	1	–	5	–	–	–	5	–
Sample wt (kg).	5	10	10	7	10	10	10	5	10	10

Phase II. (a)

Context no.	Grave 699 700	Pit 3664 1090 [illegible]	1325	Grave 1326 1327	Pit 1694 1695	Pit 2075 2076	Pit 2392 2256	Area 2442 2441	Area 2442 2615	Shaft 2752 2753
Cereal indet. ca.	11	25	-	1	-	1	2	8	-	-
Cereal indet. ca fr.	+	+	+	+	+	+	+	+	-	+
Cereal indet. cn.	1	-	-	-	-	-	-	-	-	-
Hordeum sp. ca	3	1	-	-	1	-	1	3	1	-
Hordeum sp. ri	-	-	-	-	-	-	-	-	-	-
Hordeum vulgare. ca	-	-	-	-	-	-	-	-	-	-
Triticum sp. ca	3	8	-	-	-	4	1	5	-	-
Triticum sp. bri	-	-	-	-	-	-	-	-	-	-
Triticum sp. spb	-	-	-	-	-	-	-	-	-	-
Triticum sp. gb	-	-	-	-	-	-	-	-	-	-
Triticum spelta spf	-	-	-	-	-	-	-	-	-	-
Triticum spelta gb	-	-	-	-	-	-	-	1	-	-
Triticum dicoccum spf	-	-	-	-	-	-	-	-	-	-
Triticum dicoccum gb	-	-	-	-	-	-	-	-	-	-
Avena sp. ca	-	-	-	-	-	-	-	-	-	-
Avena sp. a fr.	-	-	-	-	-	-	-	-	-	-
Ranunculus acris/repens-type	-	-	-	-	-	-	-	-	-	-
Raphanus raphanistrum	-	-	-	-	-	-	2	-	-	-
Cruciferae indet.	-	-	-	-	-	-	-	-	-	-
Silene cf alba	-	-	-	-	-	-	-	-	-	-
Stellaria media-type	-	-	-	-	-	-	-	-	-	-
Stellaria graminea	-	-	-	-	-	-	-	-	-	-
Spergula arvensis	-	-	-	-	-	-	-	-	-	-
Atriplex patula/hastata	-	-	-	-	-	-	-	-	-	-
Chenopodium album	-	+	-	-	-	-	+	-	-	-
Chenopodium sp.	-	-	-	-	-	-	-	-	-	-
Chenopodiaceae indet.	+	-	-	-	-	-	-	-	-	-
Malva sp.	-	-	-	-	-	-	-	-	-	-
Medicago/Trifolium -type	-	-	-	-	-	-	-	-	-	-
Vicia sp. s.	-	-	-	-	-	-	-	-	-	-
Vicia sp. co	-	-	-	-	-	-	-	-	-	-
Vicia cf tetrasperma	-	-	-	-	-	-	-	-	-	-
Leguminosae indet.	-	-	-	-	-	-	-	-	-	-
Crataegus monogyna	-	-	-	-	-	-	-	-	-	-
Polygonum aviculare agg	-	-	-	-	-	-	-	-	-	-
Polygonum lapathifolium	1	-	-	-	-	-	-	-	-	-
Polygonum lapathifolium/persicaria	-	1	-	-	-	-	-	-	-	-
Polygonum convolvulus	-	[illegible]	-	-	-	-	3	-	-	5
Rumex acetosella	-	-	-	-	-	-	-	-	-	-
Rumex sp.	5	-	-	-	-	-	-	1	-	-
Polygonaceae indet	-	-	-	-	-	-	-	-	-	-
Urtica dioica	-	-	-	1	-	-	-	-	-	-
Corylus avellana ns fr	-	-	-	-	-	-	-	-	+	-
Calluna vulgaris cap	-	-	-	-	-	-	-	-	-	-
Calluna vulgaris lvs	-	-	-	-	-	-	-	-	-	-
Ericaceae charcoal	+	+	+	-	-	+	-	+	-	+
Prunella vulgaris	-	-	-	-	-	-	-	-	-	-
Plantago lanceolata	4	-	-	-	-	-	-	-	-	-
Galium aparine	-	-	-	-	-	-	-	2	-	-
Sambucus nigra	-	-	-	-	-	-	-	-	-	-
Centaurea sp. fr	-	-	-	-	-	-	-	-	-	-
Carex arenaria-type	-	-	-	-	-	-	-	-	-	-
Carex sp.	2	-	-	-	-	-	-	-	-	-
Eleocharis palustris agg	-	-	-	-	-	-	-	-	-	-
Bromus mollis/secalinus	5	-	-	-	-	-	-	3	-	-
Gramineae indet.	-	-	-	-	-	-	-	-	-	-
Indet st fr	-	-	-	-	-	-	-	-	-	-
Indeterminate.	1	2	-	1	-	-	1	3	-	2
Sample wt (kg).	10	18	10	10	10	10	5	10	10	10

Phase II (b)

Context no.	Post hole 3033 3025	Gully 672 3200	Gully 3258 3264	Gully 1429 3288	Post hole 3308 3309	Ring ditch 3528 ~~3258~~	Post hole 3465	Outer Ditch 5871
Cereal indet. ca.	49	1	3	4	2	–	–	1
Cereal indet. ca fr.	+	+	+	+	+	+	+	+
Cereal indet. cn.	8	–	–	+	–	–	–	–
Hordeum sp. ca	–	1	–	2	–	1	1	–
Hordeum sp. ri	–	–	–	–	–	–	–	–
Hordeum vulgare. ca	94	–	–	–	–	–	–	–
Triticum sp. ca	14	1	–	1	–	–	–	–
Triticum sp. bri	–	–	–	–	–	–	–	–
Triticum sp. spb	–	–	–	–	–	–	–	–
Triticum sp. gb	–	–	–	–	–	–	–	–
Triticum spelta spf	–	–	–	–	–	–	–	–
Triticum spelta gb	–	–	–	–	–	–	–	–
Triticum dicoccum spf	–	–	–	–	–	–	–	–
Triticum dicoccum gb	–	–	–	–	–	–	–	–
Avena sp. ca	1	–	–	–	–	–	–	–
Avena sp. a fr.	–	–	–	–	–	–	–	–
Ranunculus acris/repens-type	–	–	–	–	–	–	–	–
Raphanus raphanistrum	–	–	–	–	–	–	–	1
Cruciferae indet.	–	–	–	–	1	–	–	–
Silene cf alba	–	–	–	–	–	–	–	–
Stellaria media-type	–	–	–	–	–	–	–	1
Stellaria graminea	–	–	–	–	–	–	–	–
Spergula arvensis	–	–	–	–	–	–	–	–
Atriplex patula/hastata	–	–	–	–	–	–	–	–
Chenopodium album	+	–	–	–	–	–	+	+
Chenopodium sp.	–	–	–	–	–	–	–	–
Chenopodiaceae indet.	–	–	–	–	–	–	–	–
Malva sp.	–	–	–	–	–	1	–	–
Medicago/Trifolium -type	–	–	–	–	–	–	–	–
Vicia sp. s.	–	–	–	–	–	–	–	–
Vicia sp. co	–	–	–	2	–	–	–	–
Vicia cf tetrasperma	–	–	–	–	–	–	–	–
Leguminosae indet.	–	–	–	–	–	–	–	–
Crataegus monogyna	–	–	–	–	–	–	–	–
Polygonum aviculare agg	1	–	–	–	–	–	1	–
Polygonum lapathifolium	–	–	–	–	–	–	–	–
Polygonum lapathifolium/persicaria	–	–	–	–	–	–	–	–
Polygonum convolvulus	–	1	–	1	–	–	–	1fr
Rumex acetosella	–	–	–	–	–	–	–	1
Rumex sp.	1	2	–	1	2	–	1	–
Polygonaceae indet	1	–	–	1	–	–	–	–
Urtica dioica	–	–	–	–	–	–	–	–
Corylus avellana ns fr	–	–	–	–	–	–	+	–
Calluna vulgaris cap	–	–	–	–	–	–	–	–
lvs	–	–	–	–	–	–	–	–
Ericaceae charcoal	+	+	–	+	–	+	–	+
Prunella vulgaris	1	–	–	–	–	–	–	–
Plantago lanceolata	–	–	4	–	13	–	–	–
Galium aparine	1	–	–	–	–	–	–	–
Sambucus nigra	3	–	–	–	–	–	–	2
Centaurea sp. fr	–	–	–	–	–	–	–	–
Carex arenaria-type	–	–	–	–	–	–	–	–
Carex sp.	–	–	–	–	–	–	–	–
Eleocharis palustris agg	–	–	–	–	–	–	–	1
Bromus mollis/secalinus	–	–	–	–	–	–	–	–
Gramineae indet.	5	1	1	3	–	1	–	5
Indet st fr	–	–	–	–	–	–	–	–
Indeterminate.	3	1	–	–	–	–	–	8
Sample wt (kg).	10	10	10	10	10	10	5	79

Phase III (a)

Context no.	Pit 916 917	Post hole 954	1307	Post hole 2662 2663	Post hole 2664 2665	Ditch 364 2918	Post hole 918 2945	Post hole 906 2997	Pit 916 3004	Pit 916 3007
Cereal indet. ca.	–	1	2	80	52	2	–	–	2	2
Cereal indet. ca fr.	+	–	+	+	+	–	+	–	+	+
Cereal indet. cn.	–	1	–	2	1	–	–	–	–	–
Hordeum sp. ca	–	–	2	–	–	–	–	–	–	–
Hordeum sp. ri	–	–	–	–	–	–	–	–	–	–
Hordeum vulgare. ca	–	–	–	131	85	–	–	–	–	–
Triticum sp. ca	–	–	–	6	3	1	1	–	–	–
Triticum sp. bri	–	–	–	–	–	–	–	–	–	–
Triticum sp. spb	–	–	–	–	–	–	–	–	–	–
Triticum sp. gb	–	–	1	–	–	–	–	–	–	–
Triticum spelta spf	–	–	–	–	–	–	–	–	–	–
Triticum spelta gb	–	–	–	–	–	–	–	–	–	–
Triticum dicoccum spf	–	–	–	–	–	–	–	–	–	–
Triticum dicoccum gb	–	–	–	–	–	–	–	–	–	–
Avena sp. ca	–	–	–	1	1 cf.	–	–	–	–	–
Avena sp. a fr.	–	–	+	–	–	–	–	–	–	–
Ranunculus acris/repens-type	–	–	–	–	–	–	–	–	–	–
Raphanus raphanistrum	–	–	–	–	1	–	–	–	–	–
Cruciferae indet.	–	–	–	–	–	–	–	–	–	–
Silene cf alba	–	–	–	–	–	–	–	–	–	–
Stellaria media-type	–	–	–	–	–	1	–	–	–	–
Stellaria graminea	–	–	–	–	–	–	–	–	–	–
Spergula arvensis	–	–	–	–	–	–	–	–	–	–
Atriplex patula/hastata	–	–	–	+	+	–	–	–	–	–
Chenopodium album	–	–	–	+	+	–	–	–	–	–
Chenopodium sp.	–	–	–	–	–	–	–	–	–	–
Chenopodiaceae indet.	–	–	–	–	–	–	–	–	–	–
Malva sp.	–	–	–	–	–	–	–	–	–	–
Medicago/Trifolium -type	–	–	–	–	–	–	–	–	–	–
Vicia sp. s.	–	–	–	–	–	–	–	–	–	–
Vicia sp. co	–	–	–	–	1	–	–	–	–	–
Vicia cf tetrasperma	–	–	–	–	–	–	–	–	–	–
Leguminosae indet.	–	–	–	–	–	–	–	–	–	–
Crataegus monogyna	–	–	–	1	–	–	–	–	–	–
Polygonum aviculare agg	–	–	–	1	–	–	–	2	–	–
Polygonum lapathifolium	–	–	–	–	–	–	–	1	–	–
Polygonum lapathifolium/persicaria	–	–	–	–	–	–	–	–	–	1
Polygonum convolvulus	–	–	–	1	–	–	–	–	–	–
Rumex acetosella	–	–	–	–	–	–	–	–	–	–
Rumex sp.	–	–	–	4	2	–	–	–	2	–
Polygonaceae indet	–	–	–	1	–	–	–	–	–	1
Urtica dioica	–	–	–	–	–	–	–	–	–	–
Corylus avellana ns fr	–	–	–	–	–	–	–	–	–	–
Calluna vulgaris cap	–	–	–	–	–	–	–	–	–	–
lvs	–	–	–	–	–	–	–	–	–	–
Ericaceae charcoal	+	–	+	–	–	+	–	–	+	+
Prunella vulgaris	–	–	–	–	–	–	–	–	–	–
Plantago lanceolata	–	–	–	3	–	–	–	–	1	1
Galium aparine	–	–	–	3	–	–	–	–	1	–
Sambucus nigra	–	–	–	1	2	–	–	–	–	–
Centaurea sp. fr	–	–	–	–	–	–	–	–	–	–
Carex arenaria-type	–	–	–	–	–	–	–	–	–	–
Carex sp.	–	–	–	1	1	–	–	–	–	–
Eleocharis palustris agg	–	–	–	–	–	–	–	–	–	–
Bromus mollis/secalinus	–	–	–	–	–	–	1	–	–	–
Gramineae indet.	–	–	–	4	5	–	–	–	–	–
Indet st fr	–	–	–	–	–	–	–	–	–	–
Indeterminate.	2	1	–	7	6	–	–	–	1	4
Sample wt (kg).	10	10	10	10	10	10	10	10	10	10

Phase III (b)

Context no.	Outer Ditch 5442	Outer ditch 5550	Outer ditch 6071	Inner Ditch 6326	Inner Ditch 6852
Cereal indet. ca.	2	6	3	–	–
Cereal indet. ca fr.	–	+	+	–	–
Cereal indet. cn.	–	+	–	–	–
Hordeum sp. ca	2	2	–	–	–
Hordeum sp. ri	1fr	–	1fr	–	–
Hordeum vulgare. ca	–	–	–	–	–
Triticum sp. ca	1	1	1	1	–
Triticum sp. bri	–	–	–	–	–
Triticum sp. spb	1	–	–	–	–
Triticum sp. gb	1	–	1fr	–	–
Triticum spelta spf	–	–	–	–	–
Triticum spelta gb	–	–	–	–	–
Triticum dicoccum spf	–	–	–	–	–
Triticum dicoccum gb	2	3	–	–	–
Avena sp. ca	–	–	–	–	–
Avena sp. a fr.	–	–	–	–	–
Ranunculus acris/repens-type	–	–	–	–	–
Raphanus raphanistrum	–	–	–	–	–
Cruciferae indet.	–	–	–	–	–
Silene cf alba	–	–	–	–	–
Stellaria media-type	1	–	–	–	–
Stellaria graminea	–	–	–	–	–
Spergula arvensis	–	–	–	–	–
Atriplex patula/hastata	–	–	–	–	–
Chenopodium album	–	–	–	–	–
Chenopodium sp.	–	–	–	–	–
Chenopodiaceae indet.	–	–	–	–	–
Malva sp.	–	–	–	–	–
Medicago/Trifolium -type	–	–	–	–	–
Vicia sp. s.	–	–	–	–	–
Vicia sp. co	–	–	–	–	–
Vicia cf tetrasperma	–	–	–	–	–
Leguminosae indet.	–	–	–	–	–
Crataegus monogyna	–	–	–	–	–
Polygonum aviculare agg	–	–	–	–	–
Polygonum lapathifolium	–	–	–	–	–
Polygonum lapathifolium/persicaria	–	–	–	–	–
Polygonum convolvulus	–	–	–	–	–
Rumex acetosella	–	–	–	–	–
Rumex sp.	–	–	–	–	–
Polygonaceae indet	1	–	–	–	–
Urtica dioica	–	–	–	–	–
Corylus avellana ns fr	–	–	–	–	–
Calluna vulgaris cap	–	–	–	+++	++
Calluna vulgaris lvs	–	–	–	+	++
Ericaceae charcoal	–	+	+	+++	+++
Prunella vulgaris	–	–	–	–	–
Plantago lanceolata	–	–	–	–	–
Galium aparine	–	–	–	–	–
Sambucus nigra	–	–	–	–	–
Centaurea sp. fr	–	–	–	–	–
Carex arenaria-type	–	–	–	–	–
Carex sp.	–	–	–	–	–
Eleocharis palustris agg	–	–	–	–	–
Bromus mollis/secalinus	1fr	1fr	–	–	–
Gramineae indet.	–	2	1	–	–
Indet st fr	–	–	–	–	–
Indeterminate.	–	–	–	1	4
Sample wt (kg).	10	10	10	10	5

Phase IV

Context no.	Ditch 326 2239	Ditch 326 2243	Ditch 326 2259	Ditch 326 2263	Pit 3329 3303	Pit 3329 3304
Cereal indet. ca.	5	1	4	–	–	–
Cereal indet. ca fr.	–	–	+	+	–	–
Cereal indet. cn.	–	–	–	–	–	–
Hordeum sp. ca	–	1	3	–	–	–
Hordeum sp. ri	–	–	–	–	–	–
Hordeum vulgare. ca	–	–	–	–	–	–
Triticum sp. ca	4	–	3	6	–	–
Triticum sp. bri	–	–	–	1	–	–
Triticum sp. spb	–	–	–	–	–	–
Triticum sp. gb	–	–	–	–	–	–
Triticum spelta spf	–	–	–	1cf	–	–
Triticum spelta gb	–	–	–	1	–	–
Triticum dicoccum spf	–	–	–	–	–	–
Triticum dicoccum gb	–	–	–	–	–	–
Avena sp. ca	–	–	–	–	–	–
Avena sp. a fr.	–	–	–	–	–	–
Ranunculus acris/repens-type	–	–	–	–	–	1
Raphanus raphanistrum	–	–	–	–	–	–
Cruciferae indet.	–	–	–	–	–	–
Silene cf alba	–	–	–	–	–	–
Stellaria media-type	–	–	–	–	–	–
Stellaria graminea	–	–	–	–	–	–
Spergula arvensis	–	–	–	–	–	–
Atriplex patula/hastata	–	–	–	–	–	–
Chenopodium album	–	–	–	–	–	–
Chenopodium sp.	–	–	–	–	–	–
Chenopodiaceae indet.	–	–	–	–	–	–
Malva sp.	–	–	–	–	–	–
Medicago/Trifolium -type	–	–	–	–	–	–
Vicia sp. s.	–	–	–	–	–	–
Vicia sp. co	–	–	–	–	–	–
Vicia cf tetrasperma	–	–	–	–	–	–
Leguminosae indet.	–	–	1	–	–	–
Crataegus monogyna	–	–	–	–	–	–
Polygonum aviculare agg	–	–	–	–	–	–
Polygonum lapathifolium	–	–	–	–	–	–
Polygonum lapathifolium/persicaria	–	–	–	–	–	–
Polygonum convolvulus	–	–	–	–	–	2
Rumex acetosella	–	–	–	–	–	–
Rumex sp.	–	–	–	–	–	–
Polygonaceae indet	–	–	–	–	–	–
Urtica dioica	–	–	–	–	–	–
Corylus avellana ns fr	–	–	+	–	–	–
Calluna vulgaris cap	–	–	–	–	+++	+++
lvs	–	–	–	–	+	+++
Ericaceae charcoal	+	–	+	+	+++	+++
Prunella vulgaris	–	–	–	–	–	–
Plantago lanceolata	–	–	–	–	–	–
Galium aparine	–	–	–	1	–	–
Sambucus nigra	–	–	–	–	–	–
Centaurea sp. fr	–	–	–	–	–	–
Carex arenaria-type	–	–	–	–	–	–
Carex sp.	–	–	–	–	–	–
Eleocharis palustris agg	–	–	–	–	–	–
Bromus mollis/secalinus	–	–	–	–	–	–
Gramineae indet.	–	–	1	–	–	–
Indet st fr	–	–	–	–	–	–
Indeterminate.	–	–	–	–	–	1
Sample wt (kg).	10	10	10	10	5	10

Plates

Plate 1: Carbonised grains of six-row hulled barley (Hordeum vulgare) from context 2663. ca. 5×

Plate 2: Charcoal of Calluna vulgaris from context 3304. ca. 3×.

Plate 1.

Plate 2.