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Summary

Small quantities of carbonised plant material were recovered from the garden features. These remains, consisting of cereal grains, chaff fragments and weed seeds, probably originated in a mixture of burnt crop processing waste, garden refuse and domestic waste which may have been dug into the soil in compost. Spelt wheat, cf. bread/club wheat, hulled barley and possibly oats were represented amongst the cereal remains and an opium poppy seed may be evidence of one of the plants grown in the garden for culinary and/or medicinal purposes. Some fragments resembling burnt bread were examined under a Scanning Electron Microscope and found to contain fragments of spelt or bread-type wheat.

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Excavations in 1985/6 in the area east of Fishbourne Roman Palace revealed bedding trenches and a variety of other features. Samples were taken for the recovery of environmental remains, eighteen of which produced carbonised plant material which was submitted to the Ancient Monuments Laboratory for identification. The samples originated from the bedding trenches, pits, ditches and a post-hole.

Thirteen of the samples had been processed in 1986 by sieving up to 2kg of soil through a mesh of 1mm. The carbonised material had been picked out from the resulting residues and stored in foil inside plastic bags.

A further five samples were processed in 1991 by soaking them in hot water overnight, sieving through an 8mm sieve to remove large stones, and pouring off the flots through 500 and 250 micron meshed sieves. The samples were re-floated and the flots poured off several times in order to ensure that all of the carbonised remains were recovered. The flots were dried and sorted under a binocular microscope at x10 and x20 magnifications, and the carbonised material was picked out and stored in glass tubes. Sample sizes for these samples varied from 0.2 kg to 2.1 kg. This information is given at the bottom of the species list, Table 1.

DISCUSSION

Very few remains were recovered from the samples sieved in 1986, but this is not surprising considering the small size of the samples and the fact that they were sieved to 1mm, as some small weed seeds and chaff fragments would pass through a mesh of this size. The few cereal grains recovered were in a poor state of preservation, and this could be due to a number of reasons, such as high temperature carbonisation, erosion prior to deposition, or post-depositional erosion resulting from soil cultivation and weathering.

The larger samples which were floated using a finer meshed sieve (250 microns) produced a surprisingly wide range of material for this type of context. The remains from the bedding trenches and holes produced carbonised assemblages typical of crop processing waste with perhaps some domestic refuse. The ratio of grains to chaff and weed seeds was roughly 2.5 : 1 : 1.5 grain:chaff:weeds, which suggests that these remains were not pure crop processing waste as this type of assemblage would contain fewer grains. It is possible that post-depositional disturbance through soil cultivation may have caused differential destruction of chaff fragments and so altered the ratio, but it is perhaps more likely that these remains were derived from a variety of waste products including household waste which would have consisted primarily of grain.

The crop plants represented include spelt (Triticum spelta), cf. bread/club wheat (cf. T. aestivocompactum s.l., grain distorted) hulled barley (Hordeum sp.) and possibly oat (Avena sp.), although the awn fragments and grain could have come from a weed oat. No emmer was positively identified and it is likely that all of the emmer/spelt (T. dicoccum/spelta) grains and glume bases were from spelt, as emmer is generally found in small quantities on most sites in the Roman period, if at all.

The recovery of a single opium poppy (Papaver somniferum) seed could indicate a garden plant which might have been grown for medicinal, culinary and ornamental purposes. It is an introduced plant which first appears in Britain in the Iron Age (Godwin, 1975) but is much more common on Roman sites, particularly where sewage is present. This suggests that at least some poppy seed was consumed.

The fortress ditches at Bearsden, Scotland (Knights *et al*, 1983) and Exeter (Straker *et al*, 1984), and ditches at Alchester (Giorgi & Robinson, 1984) and Aston Tirrold (Carruthers, 1990) contained seeds of this plant. The presence of the seed in a carbonised form at Fishbourne, and amongst so many other cereal remains and weeds of cultivation could indicate that, in this case, the plant was growing as an arable weed, possibly as a relict of an earlier crop of poppies or as a garden escape. However, it was suggested earlier that the assemblage is likely to have been composed of a variety of waste products, including garden and household waste, so ornamental or culinary uses are also possible. Opium poppy is included in the list of Roman garden plants given by

Murphy and Scaife (1991, p.88) for which macrofossil evidence has been recovered. Murphy (1984) recovered seeds of this plant from Boudiccan destruction deposits in Colchester where they were associated with a sack of coriander and a variety of other 'exotic' garden and orchard crops.

Columella (Forster & Heffner, 1979), in discussing plants to be grown in the garden, says that poppies " will bind elusive sleep". He goes on to describe the planting of poppies, recommending that in places with a hard winter seedlings should be planted out after February 13th. Although no further identification is given to the poppies, the slightly tender nature of the plants and their sedative effect does suggest opium poppy.

The few other weed seeds present indicate soils which are high in nitrogen (fat hen, Chenopodium album) and wet or marshy soils (spike-rush, Eleocharis subg.Palustres). As with the poppy, these plants may have been growing as arable weeds, perhaps in low-lying fields bordering a ditch or river in the case of the spike-rush, or they may have been deposited amongst other kinds of domestic or garden waste. It is possible that some of the remains were dug into the garden soil in compost, as Columella recommends composting waste from hedgerows, leaves, droppings, ferns, sweepings from courtyards, ashes and human sewage.

Excavations at Frocester Court Roman Villa, Gloucestershire (Gracie & Price, 1979) revealed bedding trenches in a formal garden. The beds were filled with dark soil which contained pot-sherds, bone and other artefacts. It was suggested that this resulted from manuring with compost from the kitchen refuse dump. No plant remains were reported as having been recovered from the beds, but charcoal of box was recovered from the site, a plant often used for ornamental hedging in the Roman period.

The burnt 'bread'

Further evidence for the deposition of burnt domestic waste was the recovery of a number of small fragments which had the appearance of burnt bread. These were found in the bottom layer of ditch D1002. The remains consisted of a vacuolated matrix containing fragments of grain. No whole grains were present so Scanning Electron Microscopy was carried out in the hope of identifying the cereals using characteristics of the surface structure.

S.E.M. studies of carbonised cereals by Körber-Grohne and Piening (1980) have shown that the structure of the transverse cell layer (the lower layer of the pericarp, the outer covering of the grain) can be diagnostic. Plates 1 and 2 show Scanning Electron Micrographs of two fragments of grain in the 'bread' from Fishbourne.

The long, narrow transverse cells arranged in a regular pattern most closely resembled spelt or bread-type wheat, according to the characters described by Körber-Grohne and Piening (*ibid*). The preservation was not good enough to permit the taking of many measurements of cells from the micrographs, but a range of 70-150 microns was found for the length, the breadth being an average of c.9% of the length. This data is inconclusive as measurements of cell length and relative breadth overlap between these taxa, although spelt cells are generally broader (9-17% as opposed to 7-11%). It is clear, however, that all six fragments of grain examined were either spelt or a free-threshing wheat, and this is further evidence to suggest that the material was not a random agglomeration of waste fragments but is quite likely to have been bread.

Although the list of plant macrofossils from Fishbourne only contained two grains of possible bread-type wheat, the total amount of evidence recovered from the site was small. Bread wheat is quite frequently present on Roman sites and would have certainly been readily avaliable to a high status establishment like Fishbourne. It produces a lighter textured bread than spelt and therefore is likely to have been more highly valued for this purpose.

Archaeobotanical evidence of garden plants

Evidence of garden plants in dry garden soils is only likely to be preserved if garden waste has been burnt *in situ* or burnt waste has been dug back into the soil. Murphy and Scaife (1991) discuss more fully the problems of preservation of the evidence and identification limitations for both pollen and plant macrofossils.

Carbonised remains of probable garden plants have been found in non-garden features, such as the charred seeds of asparagus (Asparagus officinalis), columbine (Aquilegia cf.vulgaris) and beet (Beta vulgaris) found in Roman Alcester (Moffett, 1988), but it is only because of the 'exotic' nature of these

remains that it can be suggested that they were likely to have been grown in gardens. Many other seeds of garden plants cannot be distinguished from their wild counterparts as easily, so that when the seeds of these plants are found in garden contexts it is usually uncertain whether they represent cultivated plants or weeds.

Wet soils or water-filled features next to gardens are more likely to preserve evidence of garden plants, as demonstrated by the recovery of caper spurge (Euphorbia lathyrus), celery (Apium graveolens) and summer savory (Satureja hortensis) seeds from a well or waterhole in the garden of Bancroft Villa (Pearson & Robinson, forthcoming).

Pollen analysis of garden soils is only likely to provide evidence of plants which are left to flower, so that many leaf and root vegetables and hedge-plants (where the hedge is clipped) are unlikely to be represented. Even where pollen is produced, the identification is not often precise enough to enable grains to be identified to species. However, the main problem is that conditions in a garden soil will rarely be suitable for the preservation of pollen unless the soil is very acidic or sufficiently wet, as cultivated soils are very active microbially and may have been limed, and these factors cause the decay of pollen grains (Murphy & Scaife, *ibid*). Problems of poor preservation were encountered by Greig (1971) on examining samples of damp clay from bedding trenches and other deposits in the garden at Fishbourne (1966-7 excavations). Pollen analysis provided evidence of only a few of the more resistant taxa, and none of these were necessarily garden plants.

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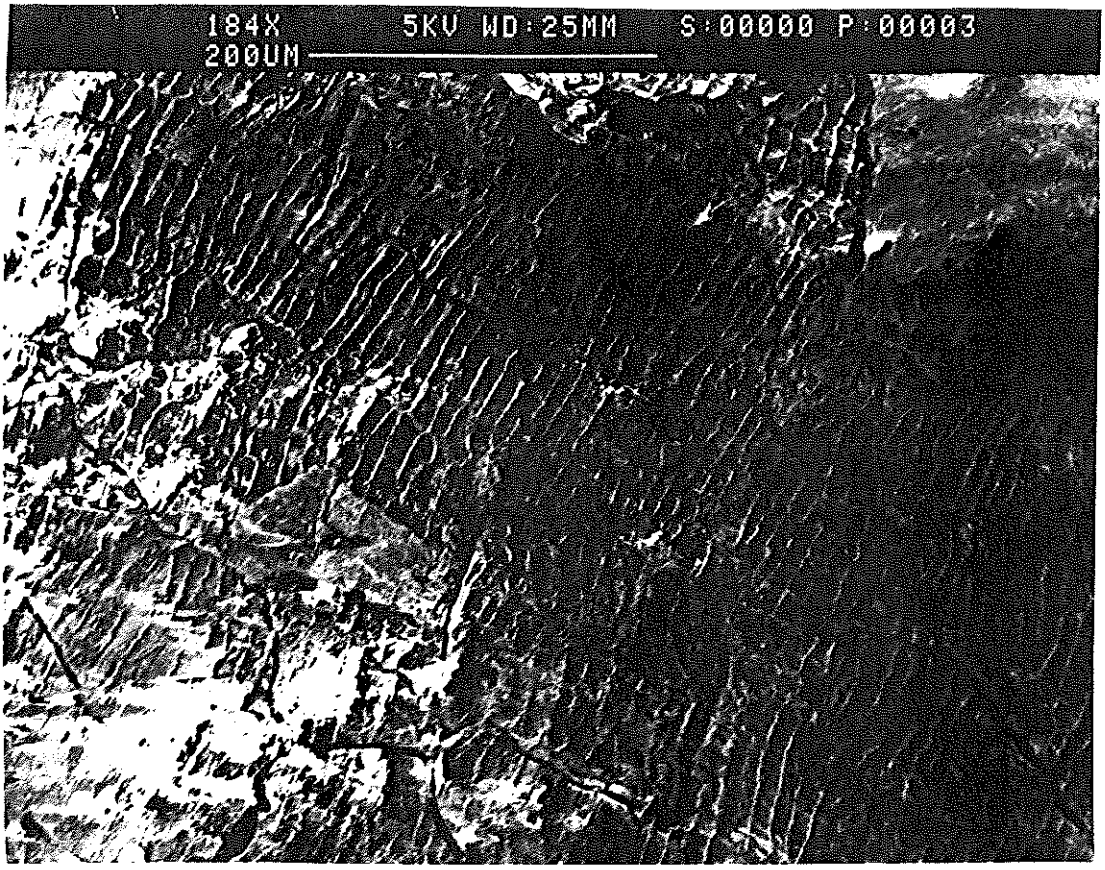
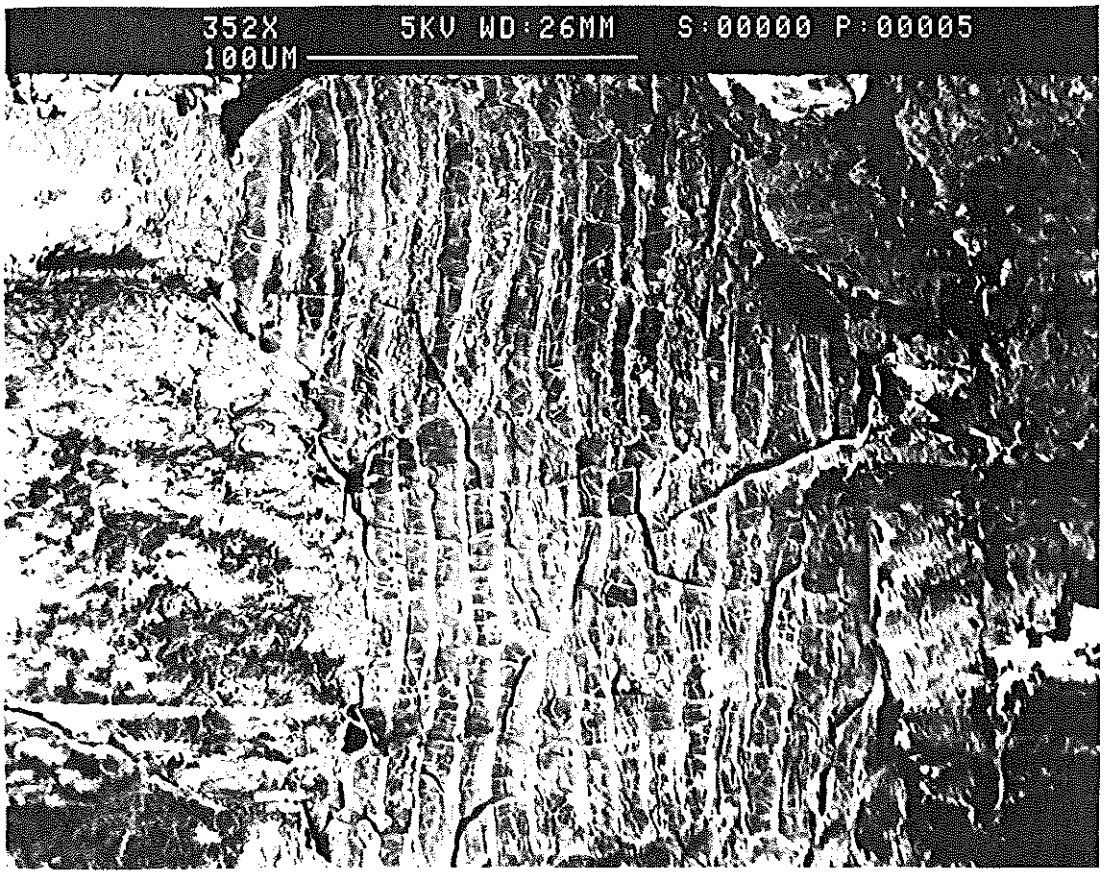
TABLE 1 : THE CARBONISED PLANT REMAINS

Sample	Context description	Taxa	Number
Samples sieved in 1986;			
F10	bedding trench	-	
F41	bedding trench	unidentifiable	1
F52(1)	ditch sump	"	3
F52(2)	ditch sump	"	3
F52(4)	ditch sump	"	1
E205(1)	bedding trench	"	3
E221(2)	small pit, near bottom	"	1
D1002(2)	ditch fill	small pieces of ?bread with fragments of cereal grain included	15
D1067	bedding trench	Corylus avellana L. (hazel nut shell fragment)	1
D1085(3)	ditch fill	unidentifiable	2
D1107	post-hole	Triticum dicoccum/spelta (emmer/spelt grain)	1
D1108(1)	bedding hole	cf.Hordeum sp. (cf. barley grain)	1
D1129(2)	bedding trench	cf.Hordeum sp. (cf. barley grain)	1
Samples sieved in 1991;			
F41	(1.8 kg) bedding trench, bottom of section	Triticum dicoccum/spelta (emmer/spelt grain)	1
		T. dicoccum/spelta (emmer/spelt glume base)	1
		TOTAL =	2

TABLE 1 (contd)

Sample	Context description	Taxa	Number
E152	(2.1 kg wet) ?bedding hole,near bottom of section	T. dicoccum/spelta (emmer/spelt grain)	1
		T. dicoccum/spelta (emmer/spelt glume base)	2
		cf.T. aestivocompactum s.l. (cf.bread/club wheat grains)	2
		Avena sp. (wild/cultivated oat grain)	1
		Indeterminate cereals	10
		Bromus sect. Bromus (chess, brome grass)	1
		Gramineae (small grass)	1
		Eleocharis subg.Palustres (spike-rush)	2
		Rumex sp. (dock)	7
		TOTAL =	27
E199	(2.1 kg) bedding trench	Triticum spelta L. (spelt glume bases)	4
		T. dicoccum/spelta (emmer/spelt glume bases)	3
		Avena sp. (oat awn frag.)	1
		Indeterminate cereals	2
		TOTAL =	10
D557(1)	(0.2 kg) bedding trench	Unidentifiable	1
D1153	(1.6 kg) bedding trench, middle to lower part of section	Triticum spelta L. (spelt glume bases)	2
		T. dicoccum/spelta (emmer/spelt grain)	1
		T. dicoccum/spelta (emmer/spelt glume bases)	3
		Hordeum sp. (hulled barley grains)	6
		Hordeum sp. (barley rachis fragments)	2
		Avena sp. (oat awn fragments)	6
		Indeterminate cereals	17
		Chenopodium album L. (fat hen)	8
		Papaver somniferum L. (opium poppy)	1
		Rumex sp. (dock)	3
		TOTAL=	49





Plates 1 & 2 : Scanning Electron Micrographs of transverse cells on the surfaces of cereal grain fragments within the burnt 'bread'.