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Evaluation of biological remains from a Roman timber drain at 21 St Peters Street, Colchester (site code: 2007.124)

by

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Summary

A subsample from a Roman timber drain was selected for detailed evaluation for its bioarchaeological potential, primarily insect remains. Both plant and insect taxa were present and in excellent condition, though rather sparse. Analysis of the plant remains revealed the presence of both wild and domestic occupation taxa including the presence of an exotic, fig. The insect fauna was largely synanthropic in nature and resembled the indicator group associated with stable manure. Given the context, the synanthropes are believed to be primarily background fauna suggesting the redeposition of the material, most likely during the in-filling of the drain. The insect fauna also revealed some of the earliest evidence for the presence of grain pests in Britain.

Keywords: COLCHESTER; ROMAN DRAIN; INSECT REMAINS; PLANT REMAINS

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Introduction

In 2008, Colchester Archaeological Trust Ltd. excavated a nine metre long and 101.6 cm wide timber drain at the 21 St Peter's Street site, within the town's Dutch Quarter. Using dendrochronology, the construction of the drain has been dated to approximately AD 62, and the investigating field archaeologists place the in-filling around 65-80 AD. Because of the presence on the site of some deposits with waterlogged preservation (a very rare phenomenon in Roman Colchester), a 1.5 kg subsample (Context 127) was submitted to the Centre for Human Palaeoecology, University of York for evaluation of bioarchaeological potential, primarily through insect remains.

Methods

The sediment sample was inspected in the laboratory broadly following the procedures of Kenward *et al*. (1980; 1986), for the recovery of plant and invertebrate macrofossils (three cycles of admixture paraffin, 3 floatations). Plant and invertebrate remains in the resulting residue and washover were recorded by 'scanning' using a low-power binocular microscope. Identification of insect remains was carried out through comparison with material in the reference collection of the former Environmental Archaeology Unit, University of York. Taxonomy and nomenclature for the insects follow Kloet and Hincks (1977). Data were recorded on paper before being transferred to personal computer.

Results

Context 127 (organic lowest fill of timber drain; silts sealed by *in situ* timber lid)

Sample 6 (1.5kg sieved to 300 microns with paraffin floatation)

Moist, light-dark brown, stiff to crumbly, sandy-silt.

The washover yielded some mammalian bone fragments (a charred sheep ulna with coloration suggesting firing temperatures around 700 degrees centigrade, an ungulate scapula, as well as ungulate rib with evidence of butchery), eggshell, and oyster shell. Plant remains in the flot and residue both consisted of 'waterlogged' seeds and fruits in a moderate state of preservation. The flot also contained ample insect remains.

Most of the wild plant taxa recovered, including spike rush (*Eleocharis* sp.), lesser spearwort (*Ranunculus flammula* L.), and *Glyceria* sp., are typical of wet places of various kinds. Orache (*Atriplex* sp.) knotgrass *Polygonum* and docks (*Rumex* sp.) commonly inhabit disturbed ground. There were a few taxa indicative of occupation and here, probably, domestic waste: traces of seeds of fig (*Ficus carica* L.), fruitstone fragments of *Prunus* (sloe, plum, etc.) and nutshell fragments of *Corylus avellana* L. (hazel). Some sclerotia (resting bodies) of the soil-dwelling fungus *Cenococcum* may simply have arrived in imported soil or have formed from fungal mycelia that lived in the deposit at some stage after formation.

The flot contained a relatively small number of insect remains. The fauna were primarily synathropic (defined here as species associated with human occupation). The flot yielded one heavily fragmented chrysomelid (leaf beetle) elytron, potentially representing a non-synanthropic species, although this cannot be conclusively deduced due to the condition of the fossil. Additionally, the presence of *Phyllodrepa ?floralis/salicis* could represent a nearby woodland environment or equally be evidence of a more human-associated habitat through haystack refuse or stable dung (Koch 1989). Given the context, it is also interesting to note the lack of aquatic invertebrates.

A high percentage (84%) of the recovered insect remains consisted of synanthropic taxa, presumably representative of the fauna of nearby buildings. *Ptinus ?fur* and *Tipnus unicolor* are both characteristic of this category. While it has been found to inhabit bird nests, *Ptinus fur* is common in mouldy straw and hay in barns and stables as well as cereal debris (Koch 1989). *Tipnus unicolor* is found to frequent similar environments (Koch 1989) but is typical of older buildings. The recovery of individuals of *Lathridius minutus* group and *Gyrohypnus ?fracticornis* is further evidence to support the presence of mouldy decaying vegetation, particularly straw or hay (Böcher 1988; Koch 1989). Although not necessarily indicative of the presence of hay or straw, *Cercyon analis* has been found in decomposing plant debris and has been recovered from compost heaps and leaf litter (Hansen 1987). Although *Aphodius granarius* has been recorded in rotting vegetation, the dung beetle is common in stable manure heaps and may indicate the presence of foul matter.

While the drain fauna consisted primarily of facultative synanthropes (those forms most commonly found in artificial environments but capable of surviving in nature), 27% of the synanthropic assemblage itself was contributed by strong synanthropes. The single individual of *Sitophilus granarius* is evidence for the presence of cereal grains. *S. granarius* is capable of feeding on damaged as well as undamaged grain, although it has been noted to have difficulty breaching husked kernels. *Cryptolestes ferrugineus* is regarded as a secondary pest of cereals and is often found in grains that have been worked or damaged. *Palorus ratzeburgi* is a scavenger of very spoiled grain and is known to prey upon other grain pests. Both *C. ferrugineus* and *P. ratzeburgi* are also found in other stored products, including flour, bran meal, and non-cereals such as dried fruit (Salmond 1957; Hunter *et al.* 1973; Freeman 1980).

Discussion

Pests of stored products

One of the most interesting features of the Roman timber drain at 21 St Peter's Street is the presence of species associated with cereals and other stored products.

Sitophilus granarius, the granary weevil, is a common pest in granaries where both larvae and adults feed on whole cereals (Hoffman 1986). *S. granarius* is considered a major pest of cereals and is noted to be very destructive, resulting in considerable loss of stored grain. In the United Nations Food and Agriculture Organisation's report of 1947, it was suggested that 10% of the world's cereal production was lost to insect attack; five decades ago 5% of the loss was attributed to infestation by the granary weevil (Munro 1966).

Whilst the granary weevil has been known to feed on grains in the early stages of spoilage (Coombs and Woodroffe 1963), the other species present are often

considered pests of cereals that have been broken and become wet and mouldy, often as a result of attack by *S. granarius*. Observing the natural succession of the infestation of stored grains, Coombs and Freeman (1955) have considered species such as *Cryptolestes ferrugineus* and *Palorus ratzeburgi* to be secondary pests of stored product cereals.

Although these stored product pests are believed to be able to overwinter successfully in the unheated grain stores of Britain today as a result of the warmer-than-ambient temperatures existing in the internal microhabitats (Solomon and Adamson 1955), the archaeological record indicates that they were absent from Britain prior to the Roman invasion. Buckland (1978) proposes that this pre-Roman absence is due to a combination of minimal importation of grain from the continent during the Iron Age and the storage of grains in pits which would create a sealed carbon dioxide-rich environment inhibiting infestation. The mass importation of cereals by the Roman army and civil administration as well as the use of ventilated above-ground granaries may have enabled the pests to survive and flourish.

The pre-Boudiccan deposits at One Poultry, London (Smith 2000) suggest that the species entered Britain almost immediately after the Roman invasion. Moreover, having seemingly entered Britain with the Romans, biogeographical mapping (*c.f.* King in press) suggests that the species spread across England along with the Roman legions, entering the Roman Fort at the Millennium site at Carlisle Castle by AD 72/3 (Smith and Tetlow n.d.) and the fort at Ribchester, Lancashire, by AD 71-4 (Large *et al.* 1994; Buxton and Howard-Davis 2000). Furthermore, with the Roman departure from Britain, the granary beetles become notably absent from the record until the Norman Conquest.

At a minimum, the presence of the grain pests at the site in question here suggests the mass storage of grains in the area and puts forth the possibility that the cereals may have been imported rather than native.

Origin and deposition of material

Although the recovery of grain pests indicates the storage of grains near the site, they are not necessarily evidence of the timber drain having serviced a granary, as was similarly proposed for the Roman sewer in York (Buckland 1976). Kenward and Hall (1997) have also proposed that the presence of grain pests along with 'hay' fauna, house fauna, and decomposers is characteristic of stable manure, most likely equine. The grains would have served directly as a part of the mammals' diet or, less possibly, the grain pests could have invaded residue grain in straw or chaff that was used for bedding (Kenward forthcoming). Osborne (1983) demonstrated that insect fragments could successfully pass through a human dietary tract without damage; it seems plausible that the same would hold true for large non-ruminant herbivores.

An indicator group of organisms for stable manure is now recognised (Kenward and Hall 1997). From the invertebrates, stable manure can often be recognised through a combination of grain pests, 'hay' insects, house fauna from the stables, and decomposers often associated with foul matter. Along with the grain pests, the sample from 21 St Peters Street contained two commonly associated house fauna taxa (*Tipnus unicolor* and *Ptinus ?fur*) and the dung beetle *Aphodius granarius* which is strongly associated with stable manure. It also produced a range of fauna associated with plant debris, particularly decaying hay and straw. This combination of fauna strongly supports the origin deposit as stable manure.

While the presence of a stable manure indicator fauna in the timber drain could be indicative of contemporaneous runoff and redeposition from the stable, the lack of aquatic insects supports the possibility for in-fill or deliberate dumping as appears to be the case for the Roman deep wells at Skeldergate and Bedern in York (Hall *et al.* 1980; Kenward *et al.* 1986).

Most of the plant remains were taxa likely to have been part of a local weed flora or to have been imported with cut wetland vegetation (as litter for stables?), though with evidence from hazel nut and fig for some material from domestic occupation. In the case of the fig, an exotic origin for the fruit seems highly likely. The lack of evidence for cereals in a deposit containing grain pests is not especially problematic since the routes by which such remains can travel on their way to a forming deposit are complex (Hall and Kenward 1998).

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Table 1. Complete list of invertebrate remains recorded from the 'detail' recorded subsample from the Roman timber drain at 21 St Peter's Street, Colchester. Order and nomenclature follow Kloet and Hincks (1964-77) for insects. Ecological codes used in calculating statistics and minimum number of individuals (MNI) are given (they are explained in Table 2). The remains were of adults unless stated. 'Sp.' indicates that record was probably an additional taxon, 'sp. indet.' that the material may have been of a taxon listed above it.

Taxon	MNI	Ecological Code
Arachnida		
Acarina sp.	1	--
Insecta		
Diptera		
Diptera sp. (pupa)	3	--
Coleoptera		
Cercyon analis (Paykull)	2	rt
Phyllodrepa ?floralis/salicis	1	rt
Gyrohypnus ?fracticornis (Muller)	1	rt
Aleochara sp.	1	u
Aphodius granarius (Linn.)	2	ob-rf
Tipnus unicolor (Piller & Mitterpacher)	1	rd
Ptinus ?fur (Linn.)	2	rd
Cryptolestes ferrugineus (Steph.)	2	g
Lathridius minutus group (Linn.)	1	rd
Palorus ratzeburgi (Wiss.)	4	g
Chrysomelidae sp. indet.	1	--
Sitophilus granarius (Linn.)	1	g
Coleoptera sp.	1	--
Coleoptera (larvae)	1	--
Hemiptera		
Psylloidea sp. (nymph)	1	--

Table 2: Abbreviations for ecological codes used for interpretation of insect remains in text and tables. Lower case codes in parentheses are those assigned to taxa and used to calculate the group values (the codes in capitals). Indivs - individuals (based on MNI); No - number.

No ‘certain’ outdoor taxa (oa) SOA
No ‘certain’ outdoor indivs NOA
No OA and probable outdoor taxa (oa + ob) SOB
No OB indivs NOB
No aquatic taxa (w) SW
No aquatic indivs NW
No damp ground/waterside taxa (d) SD
No damp D indivs ND
No strongly plant-associated taxa (p) SP
No strongly P indivs NP
No heathland/moorland taxa (m) SM
No M indivs NM
No wood-associated taxa (l) SL
No L indivs NL
No decomposer taxa (rt + rd + rf) SRT
No RT indivs NRT
No ‘dry’ decomposer taxa (rd) SRD
No RD indivs NRD
No ‘foul’ decomposer taxa (rf) SRF
No RF indivs NRF
No synanthropic taxa (sf + st + ss) SSA
No synanthropic indivs NSA
No facultatively synanthropic taxa SSF
No SF indivs NSF
No typical synanthropic taxa SST
No ST indivs NST
No strongly synanthropic taxa SSS
No SS indivs NSS
No uncoded taxa (u) SU
No indivs of grain pests (g) NG

Table 3: Complete list of plant remains in the residue from the subsample of St Peters Street, Colchester. All material was preserved by anoxic 'waterlogging' unless otherwise indicated.

Nomenclature and taxonomic order follow Tutin et al. (1964-80) for vascular plants. Abundance is presented using a four-point semi-quantitative scale from 1—one or a few fragments or individuals (or a very small component of the original sample volume) to 4—abundant remains or a large component of the sample volume.

Name	Vernacular	Part recorded	Abundance
Eleocharis sp.	Spike-rush	nutlets	2
Ranunculus flammula L.	lesser spearwort	achenes	2
Glyceria sp.	sweet grass	caryopsis/es	1
Atriplex sp.	orache	seeds	2
Polygonum sp.	knotgrass	nutlet/s	1
Rumex sp.	docks	nutlet/s	2
Ficus carica L.	fig	seed/s	1
Prunus sp.	sloe, plum, etc	fruitstone/s	1
Corylus avellana L.	hazel	nutshell fragment/s	1