

Southampton French Quarter 1382

Specialist Report Download E9: Mineralised and waterlogged fly pupae, and other insects and arthropods

By David Smith

Methods

In addition to samples processed specifically for the analysis of insect remains, insect and arthropod remains, particularly mineralised pupae and puparia, were also contained in the material sampled and processed for plant macrofossil analysis. These were sorted out from archaeobotanical flots and heavy residues fractions by Dr. Wendy Smith (Oxford Archaeology) and relevant insect remains were examined under a low-power binocular microscope by Dr. David Smith. The system for 'intensive scanning' of faunas as outlined by Kenward *et al.* (1985) was followed.

The Coleoptera (beetles) present were identified by direct comparison to the Gorham and Girling Collections of British Coleoptera. The dipterous (fly) puparia were identified using the drawings in K.G.V. Smith (1973, 1989) and, where possible, by direct comparison to specimens identified by Peter Skidmore.

Results

The insect and arthropod taxa recovered are listed in Table 1. The taxonomy used for the Coleoptera (beetles) follows that of Lucht (1987).

The numbers of individual insects present is estimated using the following scale:

+ = 1-2 individuals

++ = 2-5 individuals

+++ = 5-10 individuals

++++ = 10-20 individuals

+++++ = 20- 100 individuals

+++++++ = more than 100 individuals

Discussion

The insect and arthropod faunas from these samples were often preserved by mineralisation with any organic material being replaced. This did make the identification of some of the fly pupae, where some external features were missing, problematic. The exceptions to this were samples 108 (from a Post Medieval pit), 143 (from a High Medieval pit) and 146 (from an Anglo-Norman well) where the material was partially preserved by waterlogging.

For a number of the samples examined (e.g. 51, 55, 101, 102, 179) the only arthropod or insect remains encountered consisted of the exoskeletons of Diplopoda centipedes and of a wood louse (probably the common rough woodlouse, *Porcello scaber*). Personal experience suggests that these taxa are often encountered as relatively recent 'contaminants' in dry sites particular where there is 'made' or porous ground, some disturbance and slight traces of organic matter. The contexts that these samples came from are mainly a range of hearth and destruction layers of Anglo Norman and High Medieval date. These samples have been excluded from Table 1.

However, a number of other samples, mainly from a range of well or pit deposits, contain relatively large populations of fly pupae and sometimes the cuticle remains of adult beetles given the ecology described below it is clear that these are contemporary with the deposition of material into these features as the archaeological record was formed.

A range of Anglo Norman pit and well fills (Samples 70, 141, 146, 150, 159, 176) and High Medieval cess pit fills (48, 68, 96, 143 and 196) all contained substantial faunas, often hundreds of individuals, of a range of dipterous pupae. In the case of sample 96, from a High Medieval rubbish pit 5237 this consisted of several thousands of individuals. The large population of pupae suggests that these pit/ cess pits at Southampton must have been particularly 'fly blown' in the later stages of their depositional history.

The fly pupae identified from these deposits are typical of the insect life that develops in archaeological cess pits and, often today in septic tanks (Skidmore 1999; Robinson 2005). All the species recovered are described as being '*resistant to adverse environmental conditions*' (Robinson 2005). By far the most abundant of these is the small fly *Thoracochaeta zosteriae* which occurred in almost all the samples examined often in large numbers. This is a species that Skidmore (1999) suggests is typical of archaeological cesspits. Today it is only found in accumulations of seaweed at the high water mark on the shore (Belshaw 1989; Skidmore 1999; K.G.V. Smith 1989; Webb *et al.* 1998). Belshaw (1989) holds that its presence suggests that archaeological cesspits often contained water and other substances with a highly 'saline' nature and that this probably resulted from the inclusion of both faecal material and stale urine. Webb *et al.* (1998) are less clear but suggest a similar environment.

Another fly found in a two of pits (96 and 146) is *Eristalis tenax*, 'the rat tailed maggot' or the 'drone fly'. Larvae of this species are rather specialised inhabitants of water and wet compost containing high concentrations of faecal material and other foul matter. It floats just below the surface or on the bottom of shallow ponds of faecal material and uses its 'rat tail' as a snorkel (Skidmore 1999; K.G.V. Smith 1973, 1989; Robinson 2005). A similar environment is also utilised by the larvae of the appropriately named 'latrine fly' *Fannia scalaris* which uses the prominent air filled spikes on its body to float on the surface of liquid cess and waste (Skidmore 1999; K.G.V. Smith, 1973, 1989; Robinson 2005). Pupae of the 'common fruit flies' *Drosophila* spp. were also recovered from sample 72 from the Anglo Norman cess pit fill (f5090). Species of this genus are normally associated with rotting fruit, vegetable waste and rubbish (K.V.G. Smith 1989; Robinson 2005).

Sample 108 from a Post Medieval limestone tank 3549 contained a very different insect fauna to the rest of the material examined. The insects present had been preserved through waterlogging and consisted of fragments of a range of adult beetles. These species are also very ecologically specific. Between 10-20 individuals of the 'granary weevil' *Sitophilus granarius* and 5-10 individuals of the 'saw toothed grain beetle' *Oryzaephilus surinamensis* were recovered. Both species are pests of stored grain, warehouses and flour mills (Freeman 1980; Hunter *et al.* 1973). Their presence probably indicates that either rotting grain had been deposited directly into this feature or that the faecal material present contained a large amount of poor quality and infected grain. Several studies of cess pit faunas have suggested that grain pests can commonly enter cess pits via this route (Osborne 1983; D. Smith 1997; 2002; 2006). In addition, dumps of infested grain are not unknown for this period (D. Smith 1997).

Conclusion

It is clear from the species of insect recovered that these deposits from the French Quarter at Southampton are primarily from the fills of cess and rubbish pits. It is also clear that conditions within these pits had been allowed to become very foul with material in exceptionally advanced state of decay and often with patches of standing water. The number of fly pupae recovered also indicates that the pits must have been 'fly blown', unsanitary and particularly smelly. It is also clear that the human population of Southampton may have taken periodic remedial measures to lessen this problem. Many of the faunas of fly pupae recovered clearly show that the adult flies had failed to emerge and that the pupae had been killed suddenly. This is clearly seen with some of the specimens of *T. zosteriae*, particularly in the High Medieval rubbish pit 5237, where the 'shadow' of the near adult flies was clearly to be seen within the

pupae. This indicates a 'sudden kill off' event. Skidmore (1999) suggests that intentional 'liming' of cess pits is one form of behaviour that could result in this pattern.

The insect faunas studied here are typical of medieval cess pits and are directly comparable with those from 12th century Worcester (Osborne 1983) and 12th to 14th century London (Smith 1997; 2002; 2006).

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Table 1. The insect remains from Southampton French Quarter

Sample no.	72	146	150	159	70	141	176	48	68	143	196	96	182	108
Context no.	5091	4574	4817	7169	5162	4438	7576	1107	5163	442	8241	5240	8029	3640
tenement no.	278	237	238	168	178	237	167	173	180	237	241	177	243	237
description	cesspit	well	well	pit	cess pit	pitfall	Cesspit	pitfall	Cesspit	pit	surface	Rubbish pit	Burnt destructio n layer	pit
Phase	AN	AN	AN	AN	AN	AN	AN	HMED	HMED	HMED	HMED	HMED	LMED	PMED
Date	1066- 1250	1066- 1250	1066- 1250	1066- 1250	1070- 1250	1070- 1250	1070- 1250	1250- 1350	1250- 1350	1250- 1350	1250- 1350	1350- 1510	1400- 1500	1720- 1780
Volume floted (L.)	40	40	35	1	10	20	40	20	10	10	40	40	40	
Proportion of flot %	100	1/8	100	100	100	1/6	100	100	100	1/4	100	100	100	100
Waterlogged (WL)	M	WL	M	M	M	M	M	M	M	WL	M	M	M	WL
Mineralised (M)														
DIPLOPODA														
Family, genus and spp. indet	-	-	-	-	++	++++	-	+	++	++	+	-	++	++
MALACOSTRACA														
Isopoda														
?Porcello scaber (Lat.)	-	-	-	-	+	-	-	-	++	+	-	-	-	++
DERMAPTERA														
Forficulidae														
Forficula auricularia (L.)	-	-	-	-	-	-	-	-	-	-	+	-	-	-
HEMIPTERA														
Family, genus and spp. Indet.	-	-	-	-	-	-	-	-	-	-	-	-	-	+
COLEOPTERA														
Cucujidae														
Oryzaephilus surinamensis (L.)	-	-	-	-	-	-	-	-	-	-	-	-	-	+++
Lathridiidae														
Enicmus minutus (Group)	-	+	-	-	-	-	-	-	-	-	-	-	-	-
Anobiidae														
Xestobium rufovillosum (Geer)	-	+	-	-	-	-	-	-	-	-	-	-	-	-
Ptinidae														
Ptinus fur (L.)	-	-	-	-	-	-	-	-	-	+	-	-	-	-
Cuculionidae														
Sitophilus granarius (L.)	-	+	-	-	-	-	-	-	-	-	-	-	-	++++
DIPTERA														
SUBORDER NEMATOCERA														
Scaptopsidae.														
?Scatopse notata (L.)	-	-	-	-	-	-	-	-	-	-	-	-	-	+
SUBORDER CYCLORRHAPHA														
Syrphidae														
Eristalis ?tenax (L.)	-	++	-	-	-	-	-	-	-	-	-	+++	-	-

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Helomyzidae														
Heleomyza serrata (L.)	-	-	+	-	-	-	-	-	-	-	-	-	-	-
Sphaeroceridae														
cf. Telomerina flavipes (Meigen)	-	-	-	-	+	-	-	-	+	++	-	-	-	-
Thoracochaeta zosteræ (Hal.)	++	+++++	+++++	+++++	-	++	++	+	-	++	-	+++++	+	-
Drosophilidae														
Drosophila sp.	++++	-	-	-	-	-	-	-	-	-	-	-	-	-
Fanniinae														
Fannia scalaris (F.)	-	-	-	-	-	-	+	-	-	-	-	++	-	-