Insect remains from alluvial deposits at Pudding Mill Lane (Crossrail Project)

(MoLA Site Code XSK10)

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Introduction

Nine environmental bulk samples, each of approximately 10 litres, were taken from a section through alluvial deposits associated with the River Lea. The three samples examined for insect remains came from an organic clay deposit overlying peaty mud [12] at the base of the sequence below the weirs (sample {8}), from the overlying sandy river bed [11} into which the weir posts and stakes were driven (sample {6}), and from the interface between these two deposits (sample {7}).

Methods

The material consisted of three flots from 8-litre sub-samples that had been recovered using standard methods of flotation, with recovery to 0.25mm. The flots had previously been examined for plant remains. Paraffin flotation to extract insect remains was carried out following the methods of Kenward *et al*. (1980) with recovery on 0.3mm mesh. The paraffin flots are currently stored in jars of industrial methylated spirits (IMS).

Beetle (Coleoptera) and bug (Hemiptera) sclerites were removed from the paraffin flots onto moist filter paper for examination under a low-power stereoscopic zoom microscope (x10 – x45). Identification was by comparison with modern specimens and reference to standard published works. Numbers of individuals and taxa of beetles and bugs were recorded, and taxa were divided into broad ecological groups for interpretation based on those used by Kenward *et al*. (1986) and Kenward (1997) (see Table 1 for codes used). For the largest assemblage, aquatic taxa were subtracted from the rest to calculate percentages for particular ecological groups among the terrestrial fauna; waterside taxa were included among the terrestrial group. Insects other than beetles and bugs were recorded semi-quantitatively on a four-point scale: + 1 - 3 individuals; ++ 4 - 10 individuals; +++ 11 - 50 individuals; ++++ 50+ individuals. Other invertebrates were recorded as P – present, C – common, A – abundant. Nomenclature for Coleoptera follows Duff (2012). Information on the food plants of phytophagous species has chiefly been obtained from Cox (2007) and Morris (2002; 2012).

The insect assemblages

Lists and abundances of taxa in each sample are shown in Table 1.

The grey, organic clay [12]{8} overlying the peaty mud at the base of the sequence produced a small beetle assemblage. The only aquatic beetle was a single *Haliplus.* A record of *Cercyon ustulatus* suggests that the banks of the channel were muddy with litter, at least in places. There were very slight hints from taxa such as *Sitona*, and a tentative identification of ?*Sphaeridium* which is usually associated with herbivore dung, that there could have been grassland habitats close to the channel. An elytral fragment of *Trox scaber* (a hide beetle) was

in a much poorer condition to the rest of the remains in the sample, being both reddened and eroded, providing a suggestion that an element of occupation waste may have entered the channel, perhaps in run-off upstream. *T. scaber* is rare at the present day, usually occurring in birds' nests especially where bones or dried animal matter are present (Jessop 1986, 14), but it is regularly recorded from urban archaeological sites where it appears to be especially associated with the floors of ancient buildings, which presumably provided a comparable habitat (Carrott and Kenward 2001). In some cases there appears to be a connection with the working and tanning of skins, leather working or horn processing (Hall and Kenward 2011).

Sample {7} from the interface between the clay deposit [12] and the overlying sandy channel bed [11] produced a somewhat wider range of beetles and bugs. Aquatic taxa included a riffle beetle (Elmidae) found in clean, clear, running, fresh water, and several taxa were indicative of damp water margins with litter. Another group of beetles provided an indication for open grassland habitats around the channel; these included *Graptus triguttatus* and *Mecinus pyraster* found on ribwort plantain (*Plantago lanceolota*), and *Sitona* on leguminous plants (Fabaceae). A woodworm beetle (*Anobium punctatum*) may have infested structural timbers associated with the channel although it is also found in dry, dead, naturally occurring wood. A body segment of a bee was also recorded.

Sample {6} from the sandy river bed [11] into which the posts and stakes of the weir were driven produced the largest insect assemblage. Almost a quarter of it consisted of aquatic taxa (23%) and clean, clear, running fresh water was indicated by three species of riffle beetles (Elmidae: *Elmis aenea*, *Oulimnius*, ?*Riolus* or *Normandia*). Damp ground and waterside taxa accounted for 18% of the terrestrial fauna and they included *Dryops* found in wet waterside mud, *Prasocuris phellandrii*, a leaf beetle that feeds on marsh marigold (*Caltha palustris*) and other wetland Ranunculaceae, and *Notaris acridulus* which is chiefly associated with reed sweet-grass (*Glyceria maxima*). There was good evidence from the plant remains for the presence of willow (Anne Davis, plant report) and the presence of the weevil *Isochnus foliorum* ties in with this. A record of *Psylliodes,* a genus of flea beetles particularly associated with Brassicaceae, may hint at the presence of areas of disturbed ground, but there were stronger indications for open grassland used for grazing animals from taxa such as *Sitona* and *Hypera* (both typical grassland weevils) and a group of scarabaeoid dung beetles (Geotrupinae, *Aphodius contaminatus*, *Aphodius* sp.). There was again a suggestion that small amounts of anthropogenic material may have entered the channel at some point: the grain weevil (*Sitophilus granarius*) infests stored grain and would not have lived in the wild. Woodworm beetle (*Anobium punctatum*) may have infested timbers associated with the weir or dry, dead, naturally occurring wood. A honey bee (*Apis mellifera*) was also recorded.

Discussion

The insect evidence from deposits [12] and [11] accords with that from the plant remains suggesting that the environment was more consistently wet at the time [11] was laid down. There were good indications for clean, clear, running fresh water, from both the interface

between the two deposits and the sandy river bed. Plants on the water margins or on damp ground close to the channel included wetland Ranunculaceae such as marsh marigold (*Caltha palustris*), and reed sweet-grass (*Glyceria maxima*). All three samples provided some evidence (albeit of a very limited nature in the lowermost sample) for the presence of grassland in the vicinity. Scarabaeoid dung beetles were recorded from deposit [11] indicating that local land was used for grazing. The land may have been largely open, but trees or shrubs, including willows (*Salix*) would have grown along the river bank. All three samples also provided hints of the introduction of very small amounts of anthropogenic material (derived from human occupation and activity) into the channel, perhaps in run-off from adjacent land. There was no evidence to suggest substantial dumping events in this locality.

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