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Insect remains from the Blackfriars Street Site (CAR 78, BLA)

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Introduction

Insect assemblages from 21 samples from the Blackfriars Street excavations were received as sorted or paraffin-floated concentrates, the material having been processed at the Durham Environmental Laboratory under the supervision of D. J. Rackham. Standard methods are described by Kenward et al. (1980); treatment of some samples was not standard but this seems unlikely to have greatly affected recovery.

Preliminary inspection showed that the assemblages were either unsuitable for, or did not require, quantitative examination using methods of the kind discussed by Kenward (1978; forthcoming a). Some were too small, others clearly poorly preserved and not accurately quantifiable, and others dominated by a few abundant species with unequivocal implications. The material was therefore examined qualitatively, recording a list of species from each sample, and a subjective assessment of abundance was made (Table 1).

The general implications of the assemblages

The only striking characteristic of the assemblages from Blackfriars Street is the abundance of grain beetles of three species; Oryzaephilus surinamensis (the 'saw-toothed grain beetle'), Cryptolestes ferrugineus (the 'rust-red grain beetle') and Sitophilus granarius (the 'grain weevil'). A few other species associated with

stored products are present; notable among these are Palorus ratzeburgi, Tenebrio obscurus and Tenebroides mauritanicus. The biology of these species is summarised by Kenward and Williams (1979, 92). Several of the remaining beetles are often found in stored products and in poorly-heated buildings, but most are at least as common in other habitats. Two are discussed in some detail elsewhere: Aglenus brunneus (Kenward, 1975a 1976) and Tipnus unicolor (Kenward, forthcoming b).

This kind of insect assemblage is emerging as characteristic of urban Roman deposits. A huge assemblage almost entirely composed of storage pests has been recorded from the foundations of a 1st century wooden store-building at Coney Street, York (Kenward and Williams, 1979), while the fauna from the Roman well at Skeldergate, York, included more than 50% of domestic and stored-products beetles (Hall et al., 1980). Work on deposits at Alcester, Droitwich and elsewhere has similarly served to emphasise the abundance of grain pests in the Roman period (Osborne, 1971, 1977; Buckland, 1978). Insects other than domestic and stored products species are, in Roman urban deposits, typically both relatively and absolutely rather rare. The conclusion drawn is that the deposits formed in reasonably clean circumstances, analogous, perhaps, with those in British towns of the first half of the 20th century.

Grain was undoubtedly used in quantity or stored near to the site, but none of the deposits necessarily formed where there was spoiling grain. The three charred grains and very small number of arable weed seeds recorded (Donaldson, p. 00) can hardly stand as

firm evidence either. Grain pests may emigrate from stores in large numbers to become part of the background fauna in deposits formed tens or even hundreds of metres away; just how many grain beetles may occur and over what distance is not yet known but their sheer abundance in Roman towns makes their appearance in most urban death assemblages of the period seem inevitable. The grain beetles found in the fills of the Roman sewer in Church Street, York (Buckland, 1976) may well have entered in this way.

The evidence from York shows that grain beetles were so abundant that they may have posed a very serious problem in a society lacking modern storage technology. However elegantly constructed (Rickman, 1971), Roman granaries can hardly have maintained grain at a low enough moisture content to prevent the development of grain pests, or have excluded them. Even if hermetically sealed, granaries would almost inevitably have been contaminated when grain was brought into them; grain pests are not confined to built-up areas, and infestations are common on isolated farms today. Infestations occurred on sites away from major settlements in the Roman period too (Barnsley Park, Coope and Osborne, 1968; Winterton, Robinson, pers. comm.; Rudston, Buckland, 1980), so grain brought into granaries doubtless often contained pests.

Once present, the insects would have reproduced at an increasing rate as their metabolic heat raised the temperature in the grain and shortened their generation time. Infested grain would quickly become visibly contaminated, although not a health hazard and still acceptable to a palate unaffected by 20th century squeamishness.

However, it would eventually become so tainted by the excretory products of insects, mites and moulds as to be inedible or cause digestive upsets (for references see Kenward and Williams 1979, 73). How soon this stage would be reached is uncertain, but loss of grain to insects and other destructive agencies seems likely to have been an important, perhaps occasionally limiting, factor in Roman Britain.

Apart from buildings and stored products, other habitats existed on the site or in its surroundings, attested as follows: dead wood (Anobium punctatum); water (Helophorus spp., Agabus bipustulatus); marshy ground (Notaris acridulus, and probably Carpelimus spp. and Anotylus nitidulus); foul rotting matter (Cercyon spp., Gyrohypnus ?punctulatus, Anotylus sculpturatus group, Platystethus arenarius, Cryptopleurum minutum, Oxytelus sculptus); probably dung (Aphodius spp.); moss (Simplocaria ?semistriata); leguminous plants (Sitona spp.); cruciferous plants (Phyllotreta nemorum or undulata) and open ground (Amara). None of these habitats are well-represented, however, and the insects from them may all or mostly be 'background fauna' (Kenward 1975b, 88). Their relative abundance cannot reliably be estimated as the number of individuals is small in each case; together, they indicate rather open ground with sparse vegetation and some dung or other foul matter, with, probably at some distance, water and waterside habitats. This accords well with the botanical evidence (Donaldson, p. 00).

Notes on the sample assemblages

Samples which gave too few insects for any interpretation are not mentioned.

A 558 (destruction material and foundation deposit sealed below clay wall; first half of 2nd century)

The sample gave a quite large assemblage. Grain pests predominate, making up perhaps 95% of the individuals, with, in order of abundance, Oryzaephilus surinamensis, Cryptolestes ferrugineus, Sitophilus granarius and a few Palorus ratzeburgi. The remaining species are each represented by only one to three specimens; only five individuals are of species unlikely to occur in stored products or quite clean buildings. It is possible, but by no means certain, that the destruction material was derived from a building in which grain was stored. The overall concentration of insects was very low (at most a few hundreds per kilogramme of deposit) when compared with the material from Coney Street, York, where there were almost 100,000 beetles per kilogramme. The two charred cereal grains recorded by Donaldson (p. 00) may be the residue left after the decay of infested grain containing a few seeds charred in drying, but in view of their very small number they cannot be used as evidence; charred grains are very resistant and likely to be transported and reworked (Hall et al., forthcoming).

D 9 (2nd century pit)

Material from four subsamples, each of 1.4 or 1.5 kg, was examined; the variation in concentration of insects was considerable. Only the grain beetles are numerous, with the order of abundance as in sample A558. Species from outdoor habitats form quite a large proportion of the remainder of the assemblage and suggest sparse low vegetation. As in the previous sample, however, this outdoor component may well have originated as background fauna.

D 416 (midden, early 2nd century)

This sample gave quite large numbers of insects, but preservation was poor and counts could not be made. Oryzaephilus surinamensis, Cryptolestes ferrugineus and the spider beetle Ptinus ?fur are the most abundant species in this assemblage, but the grain pests are rare in comparison with the previous two samples. About 40 other species from a wide variety of habitats are present, but there is no indication that any of them bred in the pit.

D 497 (pitfill, Flavian)

Three assemblage from different layers of the pitfill were examined; there was no significant variation between them. A moderate number of species are present, but even the grain pests are not abundant. There is no suggestion that any of these species bred in the pit; perhaps this, D9 and D416 were all rapidly sealed, after the decomposer species had invaded but before their numbers were built up by breeding. The practice of rapidly sealing pits containing foul matter would accord well with the impression of good hygiene given by

the other insect evidence.

D 509 (no information)

Grain beetles predominate in this assemblage, with their relative frequencies as in A 558, to which it is very similar. Only four specimens are not likely to have originated in store buildings.

D 531 (slot fill, Flavian/Hadrianic)

This assemblage may consist entirely of background fauna. Various habitats, including stored products, are represented. The only striking feature is the relatively high abundance of Carpelimus and Anotylus spp., but these are suspected to be typical of the background rain under some circumstances (Kenward 1978, 7).

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Table 1. Coleoptera from the Blackfriars Street site, Carlisle. Abbreviations: m - moderately abundant; a - very abundant. 'Indet.' indicates the material may include types previously listed for that sample. Where 'sp.' only is used, material is believed to differ from species previously listed. Nomenclature follows Kloet and Hincks (1977); author abbreviations Joy (1932, I, xx). In addition to Coleoptera there were some Homoptera (samples A558, D416, D582), a bee sting (D497.2), an ant (Myrmica sp., D531), and earthworm egg capsules (most samples). As no sample numbers coincide, the prefixing letters have been omitted.

Clivina ?fossor (L.), 582; Trechus quadristriatus (Schr.) or obtusus Er., 416; Trechus sp. indet., 9; Amara sp., 9, 497.2; Carabidae spp., 497.3, 509; ?Hydroporus sp., 497.2; Agabus bipustulatus (L.), 416; Helophorus spp., 558 (2 spp), 9, 416, 497.2; Cercyon analis (Pk.), 416, 509; C. spp., 497.3, 507; Megasternum obscurum (Marsh.), 9 m), 416, 497.1, 497.2, 507, 538, 582; Cryptopleurum minutum (F.), 416, 531; ?Dendrophilus punctatus (Hbst.), 416, 509; Onthophilus striatus (Forst.), 9, 497.1, 497.2,; Histeridae indet., 416, 507; Ptinella sp., 497.1, 497.3, 531; Catops sp., 9; Megarthrus sp., 9; Omalium ?rivulare (Pk.), 416; Omalium sp., 416; Xylodromus concinnus (Marsh.), ?416; 497.1, 497.3, 509; Carpelimus ?bilineatus Steph., 416; Carpelimus spp., 497.1-3, 531, 538; Platystethus arenarius (Fourc.), 416, 497.1, 497.3, 531; Anotylus nitidulus (Gr.), 558, 416, 497.1, 531; A. rugosus (F.), 416; A. sculpturatus (Gr.) group, 9; A. ?tetracarinatus (Block), 416, 497.1-3, 531; Oxytelus sculptus Gr., 416; Stenus sp., 160, 416, 497.1; Lathrobium sp., 507; ?Rugilus sp., 531; Leptacinus sp.,

497.3; Gyrohypnus ?angustatus Steph., 416; G. fracticornis (Müll.), 416, 497.1-2; Xantholinus linearis (Ol.) group, 9, 531; Philonthus sp., ?531, 582; Quedius boops (Gr.) group, 9; Quedius sp., 497.1; Staphylininae indet. spp., 416 (3 spp.); Tachyporus sp., 9; Tachinus ?signatus Gr., 416; ?Cilea silphoides (L.), 416; Aleocharinae spp., 558, 160, 416 (c. 6 spp.), 497.1 (spp.), 497.2-3, 531, 582 (spp.); Euplectus sp., 497.3; Pselaphidae indet., 497.1; Geotrupes sp., 497.2; Aphodius spp., 558, 9 (spp), 416 (3 spp.), 497.1, 497.2 (spp.), 497.3, 499, 505, 509 (spp.), 531, 582; Simplocaria ?semistriata (F.), 9, 497.2; Anobium sp., probably punctatum (De G.), 558, 9, 497.1, 509; Tipnus unicolor (Pill. and Mitterpacher), 558; Ptinus ?fur (L.), 558, 416 m; Lyctus sp., 416; Tenebroides mauritanicus (L.), 558, 9, 509; Cateretinae sp., 416; Monotoma sp., 538; Cryptolestes sp., probably all ferrugineus (St.), 558 a, 160, 9 a, 416 m, 497.1-3, 509 a, 531, 538; Oryzaephilus surinamensis (L.), 558 a, 160 ?, 9 a, 416 m, 491.1-3, 509 a, 531, 538, 582; Cryptophagus sp., 558, 9, 416, 497.1, 509, 531, 538; Atomaria sp., 160; Lathridius minutus (L.) group, 558, 160, 416, 497.2, 531; Enicmus sp., 9, 531 ?; Corticaria sp., 531; Typhaea stercorea (L.), 558, 9, 497.1, 509; Aglenus brunneus (Gyll.), 558, 9, 509; Palorus ratzeburgi (Wiss.), 558 m, 9 m, 497.1, 509 m, 531; Tenebrio obscurus F., 558, 509; Phyllotreta nemorum (L.) or undulata Kuts., 497.1, 538; Halticinae sp., 9; Apion sp., 9, 416; Sitona hispidulus (F.), 509, 582; S. sp., 9, 497.1, 531; Sitophilus granarius (L.), 558 a, 9 a, 416, 497.1, 507, 509 a, 538, 582; Notaris acridulus (L.), 9; Ceutorhynchus sp., 416; ?Xyleborus saxeseni (Ratz.), 497.2-3.