Archaeoentomological investigations at Skútustaðir, Mývatnssveit, N-Iceland

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Introduction

Extensive midden deposits dating from the Settlement Period (871-930 AD) to the Early Modern Period (17- 19th century) were partly investigated at the site of Skútustaðir, Mývatnsveit, N-Iceland during the summer of 2008 by a team of archaeologists from City University of New York (CUNY) and the Institute of Archaeology of Iceland (FSÍ). In order to reconstruct long-term economics and human ecology at the site, a number of specialist analyses (zooarchaeology, archaeobotany, soil analysis, archaeoentomology) are carried out since then on material recovered during the 2008 and 2009 field seasons.

Reports presenting the general context, goals and investigation strategies for the Skútustaðir research project as well as reports discussing the results of zooarchaeological premilinary analyses are available on the North Atlantic Biocultural Organization (NABO) website: www.nabohome.org. The present report describes the sampling methodology that was used for the collection of bulk samples for archaeoentomology during the summer of 2008, and discusses the results of the preliminary analysis undertaken in 2009-2010.

Sampling strategy

Sediment samples for archaeoloentomological analysis were collected from four different sections in the test trenches that have been excavated in midden deposits during the 2008 field season, plus one additional sample which was collected from earth located under a wooden floor in a sheep house that is currently used for storage, for comparative purposes [Table 1].

Instead of collecting one sediment sample from each excavated context, it was decided to take bulk samples from deposits located between visible tephras. It was believed that this technique would allow the association of archaeoentomological reconstructions with specific time periods. While it can be difficult to know whether each context excavated from a midden is related to a single "dumping" event, or to connect it to a specific time period, the presence of several tephra horizons in the midden at Skútustaðir provides us with an opportunity to reconstruct changing economics, environments and human dynamics within a good chronological framework.

Table 1. Sediment samples collected for archaeoentomological analysis at Skútustaðir in 2008.

Area	Context	Sample #	Details
off-site	None	2	Sheep house floor
E	Between [010] and [008]	31	Midden, north facing section
E	Between [012] and [010]	32	Midden, north facing section
E	Between [014] and [012]	33	Midden, north facing section
E	Between [026] and [014]	34	Midden, north facing section
E	Between [026] and [024]	35	Midden, east facing section
E	Between [024] and [022]	36	Midden, east facing section
E	Between [022] and [020]	37	Midden, east facing section
E	Between [020] and [014]	38	Midden, east facing section
E	Between [014] and [012]	39	Midden, east facing section
E	Between [012] and [010]	40	Midden, east facing section
E	Between [010] and [008]	41	Midden, east facing section
D	Below [064]	42	Midden, west facing section
D	Between [031] and [064]	43	Midden, west facing section
D	Above [031]	44	Midden, west facing section
F	[077]	52	Midden, east facing section
F	[075]	53	Midden, east facing section
F	[073]	54	Midden, east facing section
F	[069]	55	Midden, east facing section
F	[045]	56	Midden, east facing section
F	[036]	57	Midden, east facing section
F	[035]	58	Midden, east facing section

Table 2. Details about the insect traps set in the environment around the excavation area at Skútustaðir.

Trap #	Type	Details
1	Pitfall	Damp Buttercup and grass meadow near the Mývatn Science Station, E of the excavation area
2	Pitfall	In luxuriant vegetation by the lake shore, NE of the excavation area
3	Pitfall	In rather moist ground with Angelica, buttercup and dandelion vegetation, N of the excavation area
4	Pitfall	In grassland on top of the midden, W of the excavation area
5	Pitfall	In luxuriant grassland, E of the excavation area
6	Pitfall	In a bumpy area of dry grassland near the marshes, SE of the excavation area
7	Pitfall	In very damp soil by the marshes, S of the excavation area
8	Pitfall	In loose earth underneath the wooden floor of the sheephouse, S of the excavation area
A	Interception	In luxuriant vegetation by the lake shore, NE of the excavation area
B	Interception	In grassland on top of a hill, E of the excavation area
C	Interception	In very damp soil by the marshes, S of the excavation area

Figure 1. Left: interception trap # A located near a lake bank northeast of the excavation area. Right: pitfall trap # 1 located in a buttercup and grass field near the Mývatn science station east of the excavation area.

In order to draw a comparison with modern insects from the surrounding environment, eight pitfall traps and three interception traps were placed in different locations around the site (Table 2 and Fig. 1). The traps were active from June 23rd to July 10th, and were emptied every two days. The location of each trap was recorded using a total station, and the beetles collected in each of them were kept separately. These insects are currently stored in ethanol in the Environmental Archaeology Laboratory of Université Laval, Quebec City, Canada, and have not been identified yet. Therefore, the results of this part of the analysis will not be presented here.

Preliminary analysis

Seven samples from the east facing section of Area E were selected for preliminary examination (S-35 to S-41, Figure 2). As the deposits visible in this section date from the 9th to at least the 14th century, it was hoped that the results of the analysis would indicate whether the conditions necessary for the preservation of insect remains occur in earlier deposits from Skutustaðir, and thus show the potential for further archaeoentomological investigations at the site.

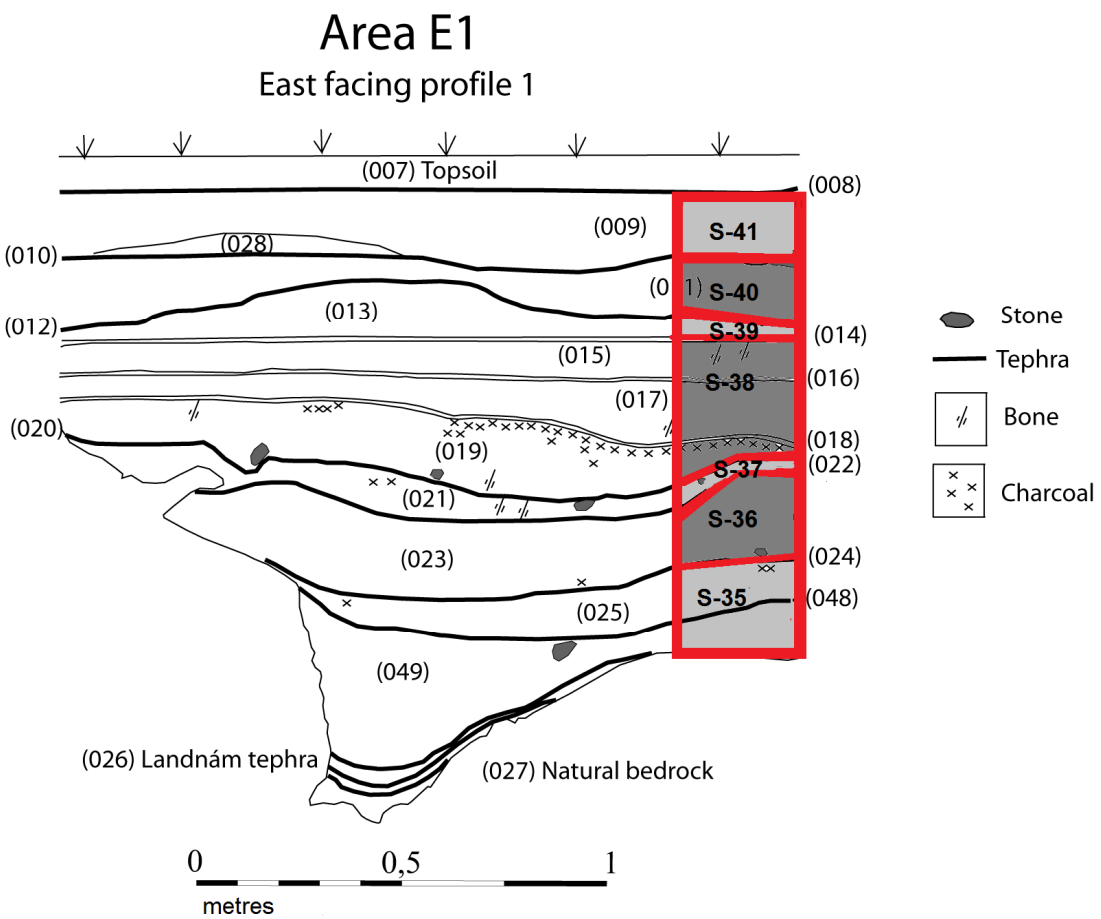

Figure 2. Location of sediment samples S-35-41, collected from the East facing profile of Area E (adapted from an illustration by Á. Edwald).

The sediment samples were inspected in the laboratory broadly following the procedures of Kenward *et al.* (1980; 1986) and modified by Bain (2001), for the recovery of invertebrate macrofossils (samples were sieved to 250 microns and floated in admixture kerosene). The resulting residue and washover were examined using a low-power binocular microscope.

Results

The results of the archaeoentomological processing are presented in Table 3. The targeted samples were largely devoid of insect remains. Sample S-38 yielded a few heavily fragmented remains of legs and joint fragments. While largely unidentifiable, the robustness and morphology of the remains is

similar to that observed in the *Otiorhynchus* species which have been noted in the region. However, a conclusive identification was not possible on the basis of the recovered fragments. A single staphylind elytron was also present in the sample. Members of the Staphylinidae taxonomic family are often associated with decaying organic material and litter, particularly vegetation.

Table 3. Description of samples during processing and a record of coleopteran remains.

Sample #	Description	Coleopteran remains
S-35	Volume: 2.75 L Brown sandy silt 84% sand and gravel; 15% slag; 1% faunal remains	Not observed
S-36	Volume: 3.75 L Brown sandy silt 73% stone and sand; 25% slag; 2% bone and teeth fragments	Not observed
S-37	Volume: 1.75 L Browish sandy-clay 93% stone and sand; 5% slag; < 1% burnt bone fragments	Not observed
S-38	Volume: 3.75 L Brown silt 80% sand and stones; 15% slag; 5% faunal remains	Heavily fragmented remains; largely unidentifiable Robust legs and joint fragments reminiscent of weevils, cf. *Otiorhynchus* sp. A single staphylinid elytron
S-39	Volume: 3.25 L Very dark brown silt 98% sand; 1% burnt bone fragments; <1% charcoal	Not observed
S-40	Volume: 1.75 L Very dark brown silt 99% tephra silt/sand; 1% burnt bone fragments	Not observed
S-41	Volume: 2.5 L Brown silt 65% sand; 20% slag; 15% burnt bones (fragmented)	Not observed

Discussion and Future Recommendations

Considering the volume of sediment processed, the samples yielded a paucity of insect fragments. Moreover, the few recovered arthropod remains were poorly preserved and severely disarticulated.

Because of the lacuna of recovered fauna, inferences concerning palaeoeconomical activities and palaeoecological reconstructions were unable to be formulated during this preliminary assessment.

The results of this analysis likely reflect a regional and contextual component. Previous examinations of archaeological insect remains from Icelandic sites (cf. Amorosi *et al.* 1992, 1994; Buckland *et al.* 1992; Perry *et al.* 1985) have not typically provided the rich assemblages of their more temperate waterlogged-preserved counterparts (e.g. Hall and Kenward 1976; Kenward and Hall 1995; King *et al.* 2010). However, the preservation on Icelandic sites has occasionally been excellent, allowing for the recovery of soft-bodied insects such as ectoparasites (Buckland and Perry 1989) and has contributed insight into human activities and living conditions in the region.

Contextually, middens are not generally targeted for the retrieval of archaeoentomological remains (English Heritage 2002). This is likely due to taphonomical factors, such as exposure to the elements, more so than the insects' habitat specifications. Regardless, insect remains have been recovered in low numbers from contemporary middens in Iceland (King in prep.) and may be found in the Skútustaðir contexts upon further investigation.

It is the recommendation of the authors that archaeoentomological analyses continue to be attempted at Skútustaðir. Prior to additional sampling being conducted, the remainder of the material in store at the Université Laval should be analyzed to assist in the development of a sampling strategy. The samples which have been evaluated so far come from deposits accumulated from the 9th to the 14th century. The results might show that the conditions required for the preservation of insect remains do not occur in deposits from an early date at Skútustaðir, but it is still possible that insect remains are preserved in deposits from a later date. The assessment of a selection of samples from areas D and F, which spans the Late Medieval Period and the Modern Period, would thus be recommended. It is also suggested that, where possible, larger bulk samples (5-10 litres) be collected in an effort to enhance the recovery of insect remains from the site. Furthermore, the identification of the trap specimens should be completed as it will provide information regarding the modern entomofauna which may serve as a foundation to assist the archaeoentomological examinations.

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