Hrönn Konráðsdóttir

An Archaeoentomological research of Skriðuklaustur samples I

Skýrslur Skriðuklaustursrannsókna XX
2008

An Archaeoentomological Research of Skriðuklaustur Samples I.
Skýrslur Skriðuklaustursrannsókna XX.
Ritstjóri skýrsluraðar: Steinunn Kristjánsdóttir.
Útgefandi: Skriðuklaustursrannsóknir.
Útgáfustaður: Reykjavík.

Forsíðumynd: Two heads of *Melophagus ovinus* (L.), the sheep ked from sample 2007-459.

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1. Project aim

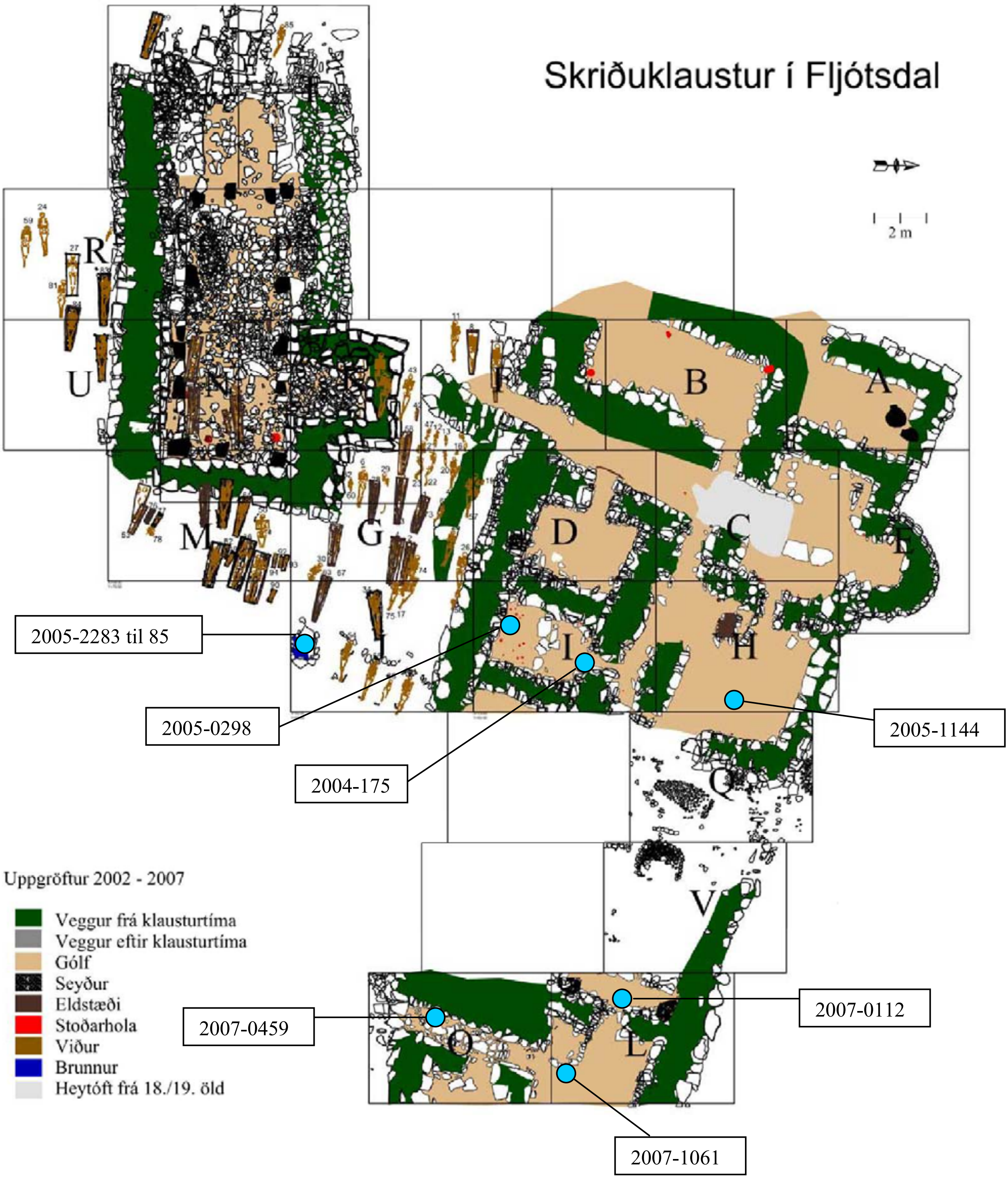
The objective of this project was to analyse samples from the last few years of excavation at Skriðuklaustur and identify the insect remains. The focus was initially to analyse samples from different rooms in the complex in order to assess the difference between the rooms and their use. In addition to those, a sample from a well was also analysed in the hope that it would give an idea of the local environment at the time of its use. Seven samples from seasons 2004-2007 were floated, the insect remains picked out and identified and with the help of the computer program BugsCEP (Buckland & Buckland 2006) the natural habitats and preferences of the identified specimens were used to address aspects of the local environment and human activities from where the samples came.

2. Methods

The seven samples that were processed all came from areas J, I, H, L and O. Their position inside the excavation is demonstrated in picture 1 and all of them, except samples 2005-36-2283, 2284 and 2285, were from floor layers. The other three were from the well. The sample size varied a bit but this could not be helped as they were taken in previous seasons and were therefore not enlargeable. The amount used for the entomological analysis varied from 1 to 5 litres depending on the size of the sample itself (list 1). They were then floated with paraffin flotation (e.g. Buckland *et al* 2004), at the ecology lab at the University of Iceland, where the insect remains were also sorted out of the samples under a electron microscope. The identification was done with the use of the modern entomological collection at the Icelandic Institute of Natural History where they were also counted to MNI (Minimum Number of Individuals). The results were interpreted using the BugsCEP program (Buckland & Buckland 2006), excel and the relevant literature on the subject.

Sample	Litres
2005-36-2283, 84 and 86	5
2004-36-175	2
2005-36-298	2
2007-36-112	3
2007-36-1061	2,5
2007-36-459	1
2005-36-1144	5

Table 1. Amount of samples used for archaeoentomological analysis



Picture 1. Plan of the excavation after the 2007 season (by Ragnheiður Gló Gylfadóttir) and the location of the samples in sky blue that were used for archaeoentomological analysis.

3. Results

The samples were quite varied both in number of individuals and in composition, the MNI count for each sample was from 1 and up to 2103 individuals in each sample and of course the variability can be observed in graph 2 although the dominant species in most of the samples are mould feeding beetles. The total number of individuals was 3339 and the most abundant species was *Corticaria elongata* (Gyll.), a staggering 2101 individuals in all. The number of species was 31 although not all specimens could be identified to species level. List 2 is a list of all species found in the samples as well as the MNI count for the samples.

Species	2005 2283-85	2004 175	2005 298	2007 112	2007 1061	2007 459	2005 1144
Coleoptera							
Carabidae							
Nebria rufescens (Ström.)				1			
Patrobus sp.		1					
Pterostichus diligens (Sturm)						1	
Calathus melanocephalus (L.)					1		
Dytiscidae							
Colymbetes dolabratus (Payk.)					1		
Staphylinidae							
Omalium rivulare (Payk.)		1		3	1		
Omalium excavatum Steph.			3	1	5		
Xylodromus concinnus (Marsham)			2	32	91	4	172
Stenus sp.			1	1	3		2
Quedius fulvicollis (Steph.)		1					
Atheta sp.			2			2	
Atheta spp.				6	25		4
Oxypoda sp.		5				1	
Oxypoda spp.				32	12		
Cryptophagidae							
Cryptophagus scanicus (L.)				1			
Cryptophagus laticollis Lucas					1		
Cryptophagus sp.							3
Atomaria spp.			5	29	52	4	107
Latridiidae							
Latridius pseudominutus (Strand)			1	17	87	6	58
Latridius sp.			4	35	188	5	138
Corticaria elongata (Gyll.)			29	243	247	10	1572
Mycetophagidae							
Typhaea stercorea (L.)			6	4	3		28
Endomycidae							
Mycetaea subterranea (Marsham)							1
Ptinidae							
Tipnus unicolor (Pill. & Mitt.)				1	2	3	4
Scarabaidae							
Aphodius lapponum Gyll.				1	1	1	1
Curculionidae							
Otiorhynchus arcticus (O. Fabricius)		1			1	1	3
Otiorhynchus nodosus (Müll.)		1	1	2	1	1	

Otiorhynchus sp.	1						
Barynotus squamosus Germ.					1		
Tropiphorus obtusus (Bonsd.)							5
Rhynchaenus (s.l.) sp.					2		
Diptera							
Hippoboscidae							
Melophagus ovinus (L.)						3	5
Melophagus ovinus puparia				1		8	5

Table 2. MNI count of species in each sample

The preservation was good in most cases, although some samples did not yield many fossils. It is unlikely that this is due to bad preservation on the site as there were quite a lot of insect remains in other samples, which would indicate either very different fauna in the various rooms or a inconsistent sampling method. As the samples were taken by different people in different years it is quite difficult to assess how much impact this had on the samples. An additional reason could possibly be the storing method as not all of the sample bags were closed properly so at least one sample (2005-36-1144) dried completely up although they were kept in a cold dark room as are the best conditions. On the other hand this does not seem to have had a very serious impact as this sample yielded the largest amount of insect remains of all the samples.

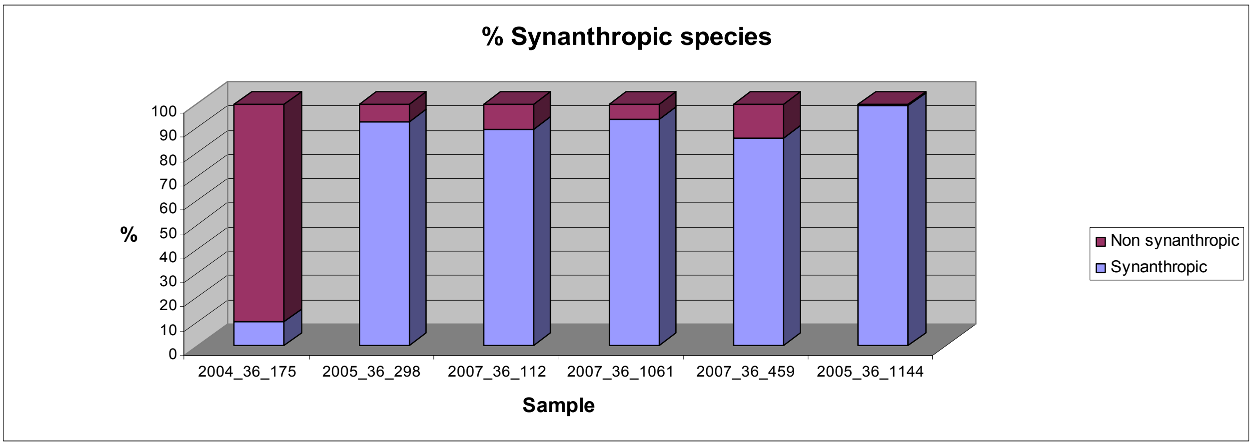
To aid the interpretation a simplified version of the general habitat of the species found in the samples was used to compare the species in the different areas. This was done using the BugsCEP eco-codes (Buckland & Buckland 2006) as well as texts as to the general habitat in Iceland, mainly Larsson & Gígja from 1959. In the end the level of classification into habitats reflect the authors views of course although backed up by the relevant literature. The species were also classified into synanthropic (living exclusively inside human habitat) and non synanthropic in order to assess how much of the fauna was restricted to the inside environment. Both this and the habitat classification are illustrated in table 3.

Species	Synanthropic	Habitat
N. rufescens	no	Eurytopic
Patrobus sp.	no	wetland/meadow
P. diligens	no	Wetland
C. melanocephalus	no	Heathland
C. dolabratus	no	standing water
O. rivulare	yes	dung/carrion
O. excavatum	yes	dung/foul
X. concinnus	yes	dung/foul
Stenus sp.	no	Eurytopic
Q. fulvicollis	no	wetland/meadow
Atheta sp.	no	Eurytopic
Atheta spp.	no	Eurytopic
Oxypoda sp.	no	Eurytopic
Oxypoda spp.	no	Eurytopic
C. scanicus	yes	moulding refuse
C. laticollis	yes	moulding refuse
Cryptophagus sp.	yes	moulding refuse
Atomaria spp.	yes	moulding refuse
L. pseudominutus	yes	moulding refuse

Latridius sp.	yes	moulding refuse
C. elongata	yes	moulding refuse
T. stercorea	yes	moulding refuse
M. subterranea	yes	moulding refuse
T. unicolor	yes	dry moulding refuse
A. lapponum	no	Dung
O. arcticus	no	Meadow
O. nodosus	no	Meadow
B. squamosus	no	Meadow
T. obtusus	no	Eurytopic
Rhynchaenus (s.l.) sp.	no	Woodland
M. ovinus	yes	Parasite
M. ovinus puparia	yes	Parasite

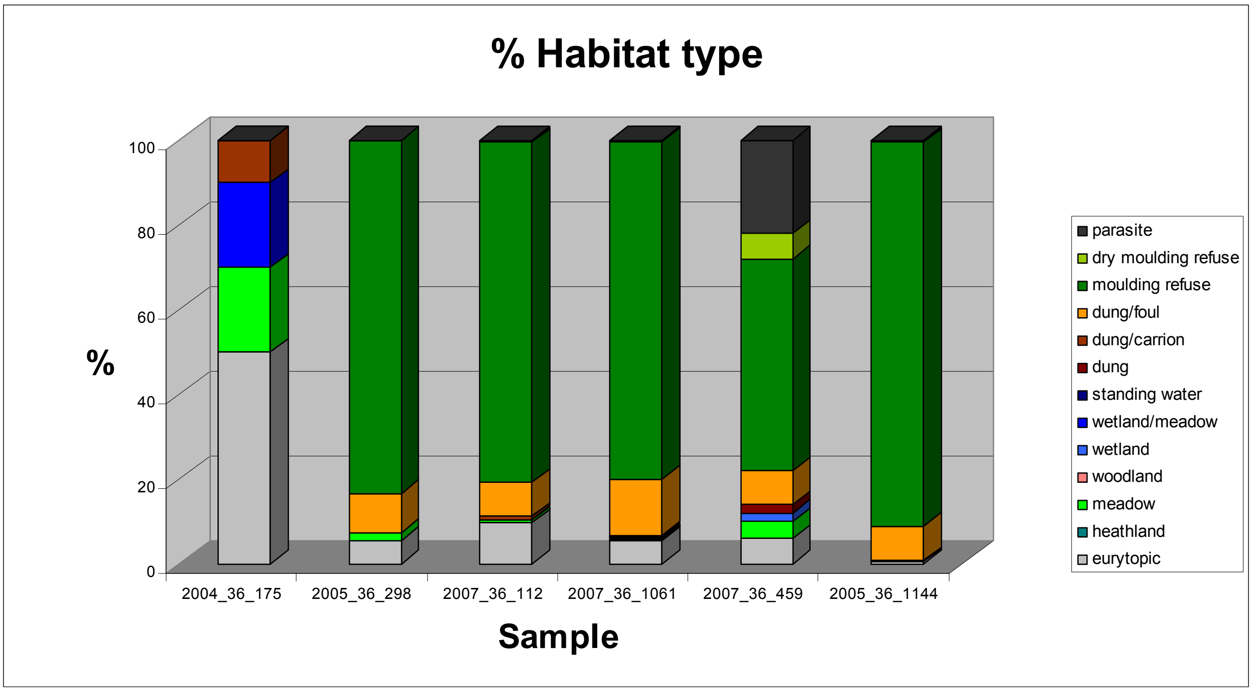
Table 3. Classification of species into synanthropic or non synanthropic species and general habitats

Of course this is quite a general classification, but it can give some idea as to how the insects in the various rooms represent the contents and activities inside the room in question. The percentage of synanthropic species gives evidence as to how much of the fauna are species that can only survive inside human habitat. The samples from the well were not included in this analysis as there was only one species in that sample and therefore it cannot be used statistically to any extent. Most of the samples had a majority of synanthropic species compared to the non synanthropic, except for sample 175 from 2004, see picture 2. This gives a general idea of inside environment which is most likely heated to some extent, at least it is a haven from the weather outside.



Picture 2. Percentage of synanthropic and non synanthropic insect species in Skriðuklastur's samples

The natural habitats of the insects give a very good idea as to what was present in the area from which they were taken from, as is very useful in the archaeological context as much of the material present has decayed beyond recognition, disappeared completely or been moved to another location. The percentage breakdown of species into habitats is depicted in picture 3, where the species that live in moulding refuse are most dominant in all the samples except for sample 175 from 2004 which again looks very different from the other samples.



Picture 3. Percentage breakdown of species from Skriðuklaustur's samples into habitats

Area J, "The Well"

Samples 2005-36-2283, 2284 and 2285

These samples were all taken at the same time and with the same coordinates so they were processed as one sample, the confusion was probably due to the fact that they were divided into three bags. Five litres were floated but very little floated up to the surface with the paraffin. What came out of this was analysed and a part of the residue (about 200mL of the sieved residue) was also analysed to make sure that the lack of entomological remains was not due to the method of extraction.

The only fossil in the sample was a part of a Otiorhynicus thorax, which is a common weevil that lives in most types of vegetation albeit not very wet ones (Larsson & Gígja 1959), unlike water beetles which is what one would rather expect in a well, although it is questionable whether there would be a lot of insect remains in a well of this sort, especially if it was closed when it was not in use. Perhaps a more likely reason for this lack of entomological remains could be the sampling method. The two most likely reasons for this are that the sample was either taken from loess which filled the well up after its use or from under the well floor. The sample is therefore not usable for any analysis of the environment based on the insect fossils.

Area I

Samples 2004-36-175 and 2005-36-0298

According to the Skriðuklaustur report from 2004 the room in this area, room 4 was quite small, but the use of it was not determined during this season. Later comparative research into monasteries in other countries from the same time indicates that this may be a sort of a hospital room for sick people that would come to the monastery in need of help. Interestingly the two samples from here had only one species in common, which is also present in all the other samples from the site. So they do not have much in common. They were taken in different years and are from different floors and different places inside the room. This is most likely the reason for the difference in the samples.

There is not much to be said about sample 175 from 2004, the species are quite typical for the Icelandic nature and can be found all around the country, and are mostly found in grassland. One species stands out though, *O. rivulare* is a synanthropic species, which means that it depends on the warmer environments inside houses to survive (Larsson & Gígja 1959). These beetles are usually found in compost and old hay, although they can be found in all sorts of decaying organic remains (Larsson & Gígja 1959). They are therefore a indication of mouldering remains inside the room, but as there is just one of them in this sample it could of course come into the room by accident an interpretation based on only one specimen of one species is not very reliable. This sample was taken from the upper areas of the entrance to this room, and in view of the insect fauna it could very well be that this is some sort of a fill from later years and possibly with material from the outside as the samples differ quite a lot.

Sample 0298 from 2005 on the other hand is quite interesting as the majority of the species in this sample are synanthropic, mould and spore feeding beetles. The highest number of individuals was *C. elongata*, but *Latridius sp.*, *L. pseudominutus* and *T. stercorea* which were all abundant in the sample live in the same kind of environment, which is all sorts of damp vegetable material, e.g. in hay and food commodities. In modern times the members of the Cryptophagidae and Latridiidae families are an indication of poorly stored products (Rees 2004), but of course the standards have changed somewhat from the 15th century. It is therefore likely that some food material was moulding in this room and it must have been quite damp as well.

Area H

Sample 2005-36-1144

The sample was taken from the centre of the room in area H. In the beginning this was thought to be some sort of working area but in light of the comparative studies this could be the refectory where the inhabitants of the monastery dined and is connected to the kitchen.

The staggering amount of small beetles that live in moulding refuse supports this view of the room, as a large amount of leftovers and food falling on the floor in the room would be an ideal breeding ground for these beetles. Lindroth (*et al* 1973) mentions that *C. elongata* are almost exclusively found in hay barns, but bearing in mind that this is derived from research in the 20th Century and the fact that housing had changed a lot from the time of Skriðuklaustur's monastery this cannot be taken on face value. In warmer countries in Europe *C. elongata* lives in all sorts of moulding organic remains in nature (Koch 1989) so the reason that it is inside this room does not have to be that the room was full of old hay. But it might suggest that old hay was used for flooring to some extent. The amount and variety of mould feeding beetles in this room, containing Atheta, Cryptophagus, Latridius, Corticaria, Typhaea, Mycetaea and Tipnus indicates that this may be more than hay. *T. unicolor* is more often associated with dried animal and vegetable origin (Reese 2004) which indicates that the conditions inside the room were not entirely damp and foul, although they must have been to some extent as many species in this sample are typically found in damp and foul conditions. There were quite a few individuals of *M. ovinus* in this sample, which is the sheep ked, a parasite on sheep that lives in the wool. The puparia of the species is very well attached to the wool and it does not come off easily (Lehane 2005). There were five puparia found and five adults but of course this could be the same individuals, although one would believe that the amount would then be larger, if they were breeding in the area. These are more likely connected with wool being in this room, and possibly being handled in some way, although it could have come from clothing made of wool if it was not washed properly. The rest of the species in this sample are fauna that live outdoors in meadows and grasslands.

Area L

Samples 2007-36-0112 and 2007-36-1061

These two samples were taken from two localities in this room, 0112 was from the north-west part of the room and 1061 was from the centre of the room. According to the report from 2007 the rooms are thought to have had upper floors. These are now believed to have been storages or outhouses.

Although the samples were only 2 and 2,5 litres the contained quite a large amount of insect remains. These were largely species that have been discussed before, small mould feeding beetles. There are also some carrion feeders in this group, but they also feed in general on vegetable refuse and compost. Only one dung beetle was found in this sample, *A. lapponum*, and that species can fly (Lindroth *et al* 1973) and can therefore have come from another place in the complex where there is animal dung. The samples were quite similar in content, with the exception that sample 1061 contained a species of water beetle, *C. dolabratus*, which lives in ponds and stagnant water (Larsson & Gígja 1959, Lindroth *et al* 1973). This means that there was some water brought into this room, either through the room on route from the water source or for some purpose inside the room. This could of course be to feed animals if this were a outhouse, but the lack of dung beetles and amount of fungus feeding beetles does suggest that it is more likely to be a storage room, perhaps for food and such.

Area O

Sample 2007-36-0459

The sample from this area was from a tunnel connecting the room in area L to something else on the south side, which has not been excavated yet. The sample is very much like the sample from the room in area L, with the exception that there were more specimens found of the sheep ked in this sample than in any of the other samples. This may be because the outhouses are through this corridor, but this is of course just a guess, the amount of ked is not far from the ones found in area H so this can just as well be a coincidence. Samples from the adjoining area, which has not been opened yet could reveal whether or not this hypothesis is right.

Conclusions

There is no evidence in the insect remains that supports the theory that the pit found in area J was a well, but this does not mean that it was not a well, it is perhaps more likely that this is due to the sampling method. This research also shows how important sampling methods are as in the case of sample 175 from 2004 which is possibly a levelling layer of some sort as the fauna in that sample does not comply with other samples in the area. Other rooms fit quite nicely with the latest plan of the various rooms in the complex. It is more likely that the room in area H was a dining room than a working space, unless it was a storage of some sort. The remains of some of the small mould feeding beetles were quite varied in size and this has been taken to be an indication that they were breeding at the site and therefore there must have been ample rotting and moulding material on the floor. This is especially apparent in the material from area H, but both areas L and O have a lot of the same beetle species as in area H, although in smaller quantities. It is likely that these rooms were storage rooms and some water from the outside was carried into or through the room as there was one beetle in there that lives in stagnant pools of water.

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