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Paleo-ecological evidence of insect remains from the areni-1 cave, Armenia

Noushig Zarikian, Margarit Marjanyan and Boris Gasparyan

Abstract
Systematic archaeological excavations at Areni-1 cave in the Republic of Armenia provided rich archaeozoological remains, among of which a large collection of insects (class *Insecta*) was separated. The recorded 33 species belong at least to 3 Orders (*Coleoptera, Diptera/Hymenoptera* and *Siphonaptera*) which provide important information about the prevailing ecology during the periods of habitation and usage of the cave by Late Chalcolithic and Medieval inhabitants.
The archaeological and zoological evidence could suggest a possible occurrence of other invertebrates or predators feeding on these classes. Finally, abundant archaeozoological remains refer that changes in insect fauna in the cave were insignificant parallel to the vertebrate and botanical fauna.

Keywords: Insect remains, Areni-1 cave, Armenia, Paleoentomology

Introduction

The importance of insect remains, particularly beetles, to the archaeological/palaeoecological reconstruction lies in the ability to extrapolate from the presence and associations of particular species in each context important habitat data, which can sheds light on environmental change (Robinson 2001). Analysis of insect remains can contribute to an understanding of living conditions within occupation zones, and the use of structures or yards for animal stabling, tanning, wool-processing and butchery activities (Reilly 2011, 2014a). They can also indicate the importation of wood, water, peat, foodstuffs and other materials onto a site (Whitehouse 2007; Reilly 2014a). Certain fly species can help to clarify the length of time bodies were exposed prior to burial (Lynch and Reilly 2012). Insects are also used in wetland contexts to understand local site environment, longevity of site use, and natural and human-forced environmental change (Reilly 2005, 2014b).

Materials and Methods

The material presented in this paper is originating from Areni-1 cave (Trenches N 1, 2, and 3) excavated during the 2007-2010 excavation seasons (description of the stratigraphy and the excavated trenches see below). A comprehensive sampling strategy was adopted at Areni-1, and insect remain samples were collected from every possible archaeological context if exists. Each sample consisted of 5 L of sediment. Since the organic remains are desiccated, and contact with water results in their disintegration, dry sieving was used to recover them. All sediment samples were sieved using a 1 mm sieve and material <1mm was discarded. Of the sieved material in the >1mm fraction, 1 L of filtered soil was collected for investigation and the remaining filtered soil was placed in a labeled bag and stored within the cave for future generations to examine. The 1 L bag of filtered soil was then subject to detailed analysis and all organic remains (plants, insects, micromammals), bones, pottery fragments, etc., were separated via hand-picking and labeled appropriately (Smith, *et al.* 2014) [16].
Most of the samples have been through the second processing stage in the laboratory (the ‘washing’ stage), which consists in disaggregating the samples in warm water and passing them through a 300µ-mesh sieve. For each sample processed, the floating material (the organic fraction) was collected and stored in jars with ethanol in a refrigerator, while the heavy residue was left to dry. These heavy residues were scanned under a lamp with a magnifying glass to aid the description of the samples’ contents.
For few samples full archaeoentomological analysis has been completed. The organic fractions of these samples were submitted to paraffin floatation, following the standard procedure used in archaeoentomology, originally devised by Coope and Osborne (1968) [8] and described in

detail in Kenward (1980) [9]. Paraffin floatation was undertaken once for each sample. The resulting 'flots' were stored in ethanol and examined under a low power binocular microscope in order to retrieve insect remains.

Identifications of the insects were achieved through anatomical comparisons with modern specimens collections of NAS RA Scientific Center of Zoology and Hydrogeology and aided by consultation of entomological publications (Balthasar, 1963 [13]; Sazhnev, 2010 [11]; Khnzorian, 1967 [12]; Kabakov, 2006 [13] Abdurakhmanov and Nabozhenko, 2011). The minimum number of individuals was calculated from the most abundant insect part. Remains of flies (*Diptera/Hymenoptera*) were collected but not identified.

Areni-1 cave

Areni-1 (also known as Birds' Cave) is a three-chambered karstic cave located on the left-hand side of the Arpa River basin, a tributary of the River Araxes, within the eastern portion of the modern village of Areni in the Vayots Dzor Region of southern Armenia (Figures 1 and 2). Excavations at the site began in 2007 and were directed by Boris Gasparyan (Institute of Archaeology and Ethnography, National Academy of Sciences, Armenia) and co-directed by Ron Pinhasi (School of Archaeology, University College Dublin, Ireland) and Gregory Areshian (Cotsen Institute of Archaeology at UCLA, USA). The major significance of the site was abundantly clear during the initial excavations when very well preserved Chalcolithic (4300–3400 cal BC) and Medieval (4th–18th centuries AD) occupations were exposed (Areshian, *et al.* 2012 [20]; Pinhasi, *et al*. 2010 [17]; Wilkinson, *et al.* 2012) [15, 20]. Chalcolithic finds within the first gallery of the cave include numerous large storage vessels, some of which contain human skulls of adolescent females. Grape remains and vessels typical of wine storage, associated with chemical analyses of the contents of the vessels point to Chalcolithic wine production at the site (Barnard, *et al.* 2010) [19]. It appears that from the end of the 5th millennium BC onwards, people used the cave for different purposes—as a habitation, for keeping animals and storing plant foods, for the production of wine, as well as for ritual purposes. The data from the cave demonstrate clear evidence for incipient social complexity. The workshops, wine producing complex, and the funerary features or "burials" represent a common ritual and production oriented complex (Smith, *et al.* 2014) [16].

Medieval finds in the cave span the entire medieval period from the fourth to the eighteenth centuries AD. Remains of a well preserved circular dwelling span the 7th to 9th centuries. Later finds dating to the 11th to 14th centuries AD include structures, a fragment of an Armenian manuscript, two well-preserved ovens, a wine-storage jar, associated pottery, fragments of glass, and other small finds (Areshian, *et al.* 2012 [20]; Pinhasi, *et al.* 2010 [17]; Wilkinson, *et al.* 2012) [15,20]. A group of limited small finds dated via ^{14}C dating document early usage of the cave between the 4th and the 7th centuries AD as well as later during the 15th to 18th centuries AD (Smith, *et al.* 2014) [16].

Very limited, and what appear to be short-lived, Middle and Late Bronze Age and Iron Age occupations are also evident at Areni-1. Roughly a dozen artifacts dating to these time periods (ceramic sherds, a bronze axe, and jewelry fragments) were recovered from Trenches 1 to 5. A lack of associated architecture and an overall scarcity of finds underscores the brevity of these occupations. Minimal temperature oscillations and constant levels of low humidity within the cave have provided an ideal environment for preservation of organic remains. As a consequence of this constant microclimate, Areni-1 has yielded large quantities of exceptionally well-preserved organic remains including the world's oldest leather shoe (Pinhasi, *et al.* 2010 [17]) along with basketry and clothing (Stapleton, *et al*. 2014) [14].

Six trenches are currently being excavated at Areni-1 (Figure 2). Trench 1 is located in the main or first gallery inside the cave and contains artifacts and features that clearly relate to funerary ritual, including human remains, as well as wine making paraphernalia dating to 4000–3800 cal BC. Trench 2, within the same gallery as Trench 1, has yielded pots containing cremations, as well as isolated human remains recovered from loci between the pots (Figure 2). Trench 3 is located under the overhang of the cave on the outer edge at the main entrance to the first gallery (Figure 3). This trench contains medieval dwellings cutting into at least three Late Chalcolithic occupational phases designated as Chalcolithic Horizons I–III (4300–3400 cal BC). Of the three horizons, the first uppermost horizon tends to be most truncated; it is present only in Trench 3 and the slope at the entrance of the cave complex. Within Trench 3, Horizon I was damaged by the construction of an Early medieval (7th to 9th centuries) house or hut and by later medieval (11th to 14th centuries) storage pits and ovens. Horizon I is represented by hard packed and repeatedly rebuilt dirt floors atop household pits and jar burials and dates to the final phase of the Late Chalcolithic (3700–3400 cal BC). Chalcolithic Horizon II underlies Horizon I but is separated from it by a layer of zoogenic humus (dung layer). Horizon II occupies a more extensive area beginning in Trench 3, outside the entrance to the first gallery and extends into the cave, to the rear part of the first gallery spanning Trenches 1 and 2. It also reaches into Trench 3, where it is characterized by hard packed and repeatedly finished floors and wooden constructions or buildings and large, unfired bins. A set of radiocarbon dates from Horizon II yield a date range of 4000–3800 cal BC, which places it in the middle phase of the Late Chalcolithic. The third Chalcolithic Horizon encompasses a rather small area and appears in multiple areas beneath Horizon II. Horizon III is separated from Horizon II by a layer of zoogenic humus in Trench 3 and inside the first gallery, where it spans Trenches 1 and 2. Traces of very high quality plastered floors and partially destroyed stone constructions (damaged by intrusive bins dug during Horizon II) are recorded in Trench 3. Dates for this Horizon range between 4300–4000 cal BC placing the Horizon III occupation in the early phase of the Late Chalcolithic (Smith, *et al.* 2014) [16].

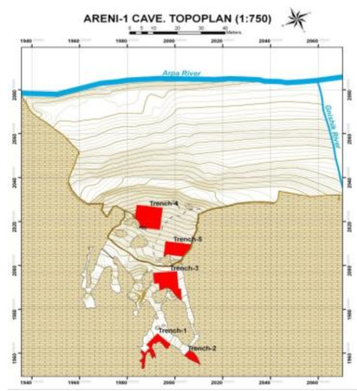

Fig 1: Areni-1 cave location in nature

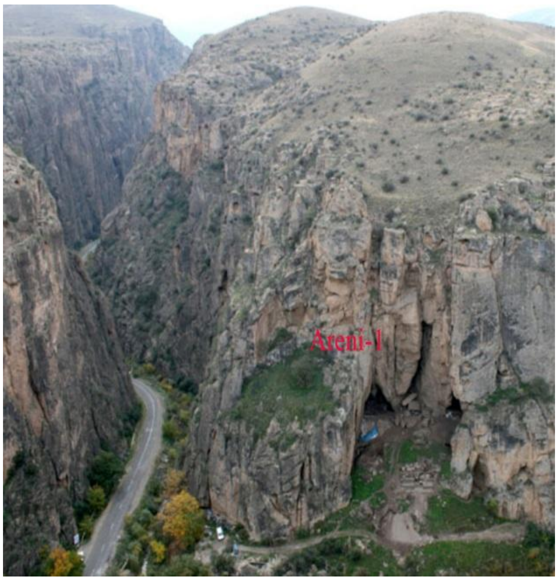

Fig 2: Areni-1 cave topoplan

Description of sub fossilized insects preserved samples of Areni-1

The number of materials that came out as a result of Areni-1 cave excavation Tranches one and thrre is 88, most of which was good preserved and easy identified sub-fossils.
Order Coleoptera (Fig. 4)

Family Carabidae

Chilotomus sp. Chaudoir, 1842. This black colored ground beetle insect has 8.8mm length and special elytra. Identified by the structure and punctuation of elytra. Preserved most of the body.

Family Trogidae

Trox scaber (Linnaeus, 1758) This Solid body terete owned insect has 6,8mm length. The pronotum is bordered on all sides fringe wide scales, elytra is clear and distinctive. The abdomen with 5 sterna. Identified by elytra structure. Preserved most of the body.

Trox sp Fabricius, 1775. This unidentified gnawer beetle species length is 4.8mm, also has distinctive elytra and identified by the pubescence and seta on its elytra.

Family Scarabaeidae

Scarabaeus typhon Fisher von Waldheim, 1883. This Solid instance has 28mm length. Identified on the basis of frontier tibia, clypeus and punctuation of front. The preserved body is with broken legs and antennae.

Scarabaeus pius Illiger, 1833. This species length is 24 mm. Identified by the front legs structure, the presence of the frontal wrinkles and the pygidium point. The preserved body is with broken legs and antennae (just one pair of leg is unbroken)

Scarabaeus sp. Linnaeus, 1758. This unidentified dung beetle species length is 14 mm; with one elytra preserved which has distinctive punctuation. Identified by the pubescence and coloration of the elytra.

Copris lunaris (Linnaeus, 1758). The four individuals of these horned dung beetles vary between 12-19 mm; all samples have well preserved body, three of them are with broken legs and antennae and the last beetle without head, pronotum and legs. Identified on the basis of frontal tibia, clypeus, punctuation and structure of pronotum and elytra.

*Copris hisparus (*Linnaeus, 1758). Poorly preserved the body and the 7 mm length frontal half pronotum. Identified by the structure of mesathorax and pronotum.

Copris sp. This unidentified genus represented only by preserved the chitinous mesathorax. Identified by the unique mesacoxae structure of mesathorax.

Onthophagus (Palaeontophagus) gibbosus (Scriba, 1790) this well preserved beetle body length is 9 mm; the sample is without legs. Identified depending on the frontal tibia, clypeus, head pronotum, mesacoxae and elytra structure.

Onthophagus (Palaeontophagus) cnf. formaneki Reitter, 1897. The preserved part of this insect is the black colored head with its distinctive clypeus. Identified on the basis of frontal board and structures of clypeus and head, punctuation of forehead and anterior board of frontal.

Onthophagus (Palaeontophagus) cnf. amyntas (Olivier,1789) The length of preserved body is 5 mm, the width of the pronotum is 5.5 mm. The brilliant background pronotum structure was the basis of identification.

Gymnopleurus mopsus (Pallas, 1781). This sample has 9.5 mm length; the well preserved body is without head, pronotum, prothorax and legs. Identified by the structures of mesathorax, metathorax, abdomen and elytra.

Aphodius fimetarius (Linnaeus, 1758). The well preserved black colored body has 8.5 mm length with broken legs. Identified by the structures of mesathorax, metathorax, abdomen and peculiar elytra.

Family Tenebrionidae

Leptodes semenovi Reitter, 1892. These well preserved two bodies of darkling beetles have lengths 5.6 and 6 mm. Identified depending on the structure, punctuation and pubescence of elytra.

Cyphogenia lucifuga (Adams, 1817). The preserved body length is 19 mm. The sub-fossilized sample is without a head and legs. Identified on the basis of pronotum structure, elytra, metathorax and sternites of abdomen.

Trachyderma christophi (Faust, 1875). The well preserved bodies' lengths of four beetles vary between 18-22 mm. One separated body parts sample have been observed; prothorax 4.5 mm, pronotum 5.0 mm, elytra 13 mm; mesa-metathorax 4 mm and abdomen 8 mm and one sample was without legs. Identified basically by the structure of black colored distinct elytra, thorax, pronotum and punctuation of the body.

Blaps cnf. scabriuscula scabriuscula Menetries, 1832. Three individuals was observed. First beetle has well preserved body without the left legs, 26 mm length. The seconds fossilized body was without head and pronotum and last abdominal sternites, 14 mm length, while the third sample presented by pair of elytra with 18.5 mm length. Identified depending on elytra structure and abdominal sternites and their punctuation.

Blaps kovali Abdurachmanov&Nabozhenko, 2011.This beetle's length is 20 mm, with preserved elytra, mesa-, metathorax. Identified on the basis of structure of elytra, metathorax. In spite of being recently identified species, but this sub fossil sample is an endemic species having its narrow environment the cave Areni-1.

Blaps ominosa Menetries, 1832. These two samples lengths are 40 and 23 mm. The well preserved parts are head, pronotum, thorax, elytra, abdomen. The antennae uncompleted the left with 6 segments, and the right with 9 segments. The unique structure of labrum, metathorax and first abdominal segments helped to identify this species.

Blaps puella Allard, 1880. Well preserved body length of this beetle is 17 mm. The well-kept punctuation of the elytra, mesa-, metathorax and the sternites of abdomen lead to easily identify this sample.

Blaps lethiphera pteropalpa Fischer von Waldheim in Menetries,1832. Body length of this Tenebrionid beetle is 24 mm. The body was poorly preserved with broken antennae and legs. Identified upon the body.

Blaps sp. Fabricius, 1775. One of these unidentified samples was presented as single elytra, the second was 16 mm length pair of elytra, while the third sample had better preserved parts; elytra was 12 mm length, mesa-, metathorax,1-3 abdominal segments.

Gonocephalum sp. Chevrolat 1849. Only preserved part was the pronotum, which length is 2.5 mm. Identified by the structure and punctuation of pronotum?

Family Histeridae

Saprinus sp. Erichson, 1834. This clown beetle has 5 mm length preserved elytra (pair), mesa-, metathorax, mesa legs. Identified by the structure and punctuation of elytra, mesa-metathorax, mesa legs.

Family Ptinidae

Niptus hololeucus Faldermann, 1836. This well preserved golden spider beetle's length 4.1 mm. The distinct elytra, mesa-, metathorax, 4 abdominal sternites and hind legs preserved. Identified by the structure and punctuation, pubescence of rare elytra, mesa-, metathorax and legs.

Gibbium psylloides (Czeninski, 1778). The preserved elytra length of this spider beetle is 3.0 mm. The preserved parts of the body was the head with pronotum, which was separated from the elytra, mesa-, metathorax and the abdomen. The structure and punctuation and pubescence (thickness) of the elytra, mesa-, metathorax, abdomen, legs were the identification characteristics.

Family Chrysomelidae

Gallerucella luteola Mueller. This elm-leaf beetle 6 mm length. The fossilized body is without legs. Identified by the structure and body color.

Family Dermestidae

Antrenus sp. Geoffroy, 1762. Carpet beetle only remains are the molting larva skin with the caudal tuft of long hair, which was unique for this genus.

Family Curculionidae

This family's belonging remains to this family are pronotum and prothorax with 4 mm length.

Family Staphylinidae

The only remain is a head 4 mm length with mandibles and 4.2 mm pronotum.

Order Siphonaptera

Ctenocephalides felis (Bouche´, 1828). The well preserved body length of this fossilized files is 1.5 mm. The antennae and legs also well preserved. Identified by the special body shape, antennae segments and hind legs (with 2 claws).

Diptera / Hymenoptera.

The two unidentified preserved pupas have 5.4 and 8.0 mm length.

Discussion and Conclusion

The habitat ecology of Insects as paleoindicators has been reviewed many times and we will therefore comment upon some few points of interest for the present paper

Table 1. Insects remain collected from Areni-1 cave

No	Sample scientific name	Order: Family	Horizon	MNI	Habitat	Age
1. 1	*Chilotomus* sp.	Coleoptera: Carabidae	T32 sp.7 Areni1/3	1	ws, l	3,700–3,400 Cal BC
2. 2	*Trox scaber* (L.)	Coleoptera: Trogidae	T32 sp.7 Areni1/3	1	df, nst	3,700–3,400 Cal BC
3.	*Trox* sp.	Coleoptera: Trogidae	J34 sp.10 Areni1/3	1	df, nst	3,700–3,400 Cal BC
4.	*Scarabaeus typhon F.*	Coleoptera: Scarabaeidae	T24 sp.6 Areni1/3	1	l, df	3,700–3,400 Cal BC
5.	*Scarabaeus pius* (Linnaeus,1758)	Coleoptera: Scarabaeidae	T24 sp.6 Areni1/3	1	g, df	3,700–3,400 Cal BC
6.	*Scarabaeus* sp.	Coleoptera: Scarabaeidae	P35 sp.7 Areni1/3	1	df	3,700–3,400 Cal BC
7.	*Copris lunaris* (Linnaeus, 1758)	Coleoptera: Scarabaeidae	J23 sp.8 Areni1/3	4	g, df	3,700–3,400 Cal BC
8.	*Copris hisparus* (Linnaeus, 1758)	Coleoptera: Scarabaeidae	P 30/31 sp.7 Areni1/3	1	g, df	3,700–3,400 Cal BC
9.	*Copris sp.*	Coleoptera: Scarabaeidae	R33 sp.6-7 Areni1/3	1	df	3,700–3,400 Cal BC
10.	*Onthophagus (Palaeontophagus) gibbosus* (Scriba,1790)	Coleoptera: Scarabaeidae	R34 sp.7 Areni1/3	1	l, df	3,700–3,400 Cal BC
11.	*Onthophagus (Palaeontophagus) cnf. formaneki* Reitter, 1897	Coleoptera: Scarabaeidae	J34 sp.10 Areni1/3	1	df	3,700–3,400 Cal BC
12.	*Onthophagus (Palaeontophagus) cnf amyntas* (Olivier,1789)	Coleoptera: Scarabaeidae	117 unit2 Sp.9-10 Areni1/1	1	df	4,000–3,800 Cal BC
13.	*Gymnopleurus mopsus* (Pallas,1781)	Coleoptera: Scarabaeidae	J/K19 Unit2 sp.3-5 Areni1/1	1	df	4,000–3,800 Cal BC
14.	*Aphodius fimetarius* (Linnaeus, 1758)	Coleoptera: Scarabaeidae	P30/31 sp.7 Areni1/3	1	df	3,700–3,400 Cal BC
15.	*Leptodes semenovi* Reitter, 1892	Coleoptera: Tenebrionidae	T32 sp.7 Areni1/3	2	lv, l	3,700–3,400 Cal BC
16.	*Cyphogenia lucifuga* (Adams,1817)	Coleoptera: Tenebrionidae	S32 sp.7 Areni1/3	1	lv, l	3,700–3,400 Cal BC

17.	*Trachyderma christophi* (Faust,1875)	Coleoptera: Tenebrionidae	J21 sp.6 Areni1/3	5	lv, l	3,700–3,400 Cal BC
18.	*Blaps cnf. scabriuscula scabriuscula* Menetries, 1832	Coleoptera: Tenebrionidae	J34 sp.9-10 Areni1/3 L17^40 Areni1/1	2	lv, l	3,700–3,400 Cal BC
19.	*Blaps kovali* Abdurachmanov& Nabozhenko, 2011	Coleoptera: Tenebrionidae	I26 ^9 sp.7 Areni1/3	1	lv, l	3,700–3,400 Cal BC
20.	*Blaps ominosa* Menetries, 1832	Coleoptera: Tenebrionidae	Q16 unit3 sp.19 Areni1/1 S32 sp.3 Areni1/3	2	lv, l	4,000–3,800 Cal BC
21.	*Blaps puella* Allard, 1880	Coleoptera: Tenebrionidae	N32 sp.10 Areni1/3	1	lv, l	3,700–3,400 Cal BC
22.	*Blaps lethiphera pteropalpa* Fischer von Waldheim in Menetries,1832	Coleoptera: Tenebrionidae	N32 sp.10 Areni1/3	1	lv, l	3,700–3,400 Cal BC
23.	*Blaps* sp. Fabricius, 1775	Coleoptera: Tenebrionidae	N32 sp.10 T32 sp.7 Q33 sp.7 J34 sp.10 Areni1/3	3	lv, l	3,700–3,400 Cal BC
24.	*Gonocephalum* sp. Chevrolat, 1849	Coleoptera: Tenebrionidae	J34 sp.10 Areni1/3	1	lv, l	3,700–3,400 Cal BC
25.	*Saprinus* sp. Erichson, 1834	Coleoptera: Histeridae	117 unit2 sp.9-8 Areni1/1	1	lv, with mammals	3,700–3,400 Cal BC
26.	*Niptus hololeucus* Faldermann, 1836	Coleoptera: Ptinidae	J34 sp.10 Areni1/3	1	nst (bees, birds)	3,700–3,400 Cal BC
27.	*Gibbium psylloides* (Czeninski, 1778)	Coleoptera:Ptinidae	J24 sp.8 Areni1/3	1	lv	3,700–3,400 Cal BC
28.	*Gallerucella* cnf. *luteola* Mueller	Coleoptera: Chrysomelidae	J30 sp.6 Areni1/3	1	Elm leaves, l	3,700–3,400 Cal BC
29.	*Antrenus* sp.	Coleoptera: Dermestidae	J24 sp.8 Areni1/3	1	carpets	3,700–3,400 Cal BC
30.		Coleoptera: Curculionidae	S35 sp.7 Areni1/3	1		3,700–3,400 Cal BC
31.		Coleoptera: Staphylinidae	S35 sp.7 Areni1/3	1		3,700–3,400 Cal BC
32.	*Ctenocephalides felis* (Bouche´, 1828)	Siphonaptera	J24 sp.8 Areni1/3	1		780–1000 AD
33.		Diptera / Hymenoptera	K24 sp.10 N32 sp.7 Areni1/3	2		-

ws - waterside species either from muddy banksides or from waterside vegetation
lv - species normally associated with decaying leaves, rotting wood, fresh plant matter, grains, and fungi
df - species associated with dung and foul matter
g - species associated with grassland and pasture
l - species either associated with trees or with woodland in general nst-nests of many birds and mammals

Areni -1 Cave had harbored extraordinary ecosystems inhabited by equally remarkable Insects (table 1). Tenebrionidae family was dominated 41%, whereas the Scaraebids were 32% (Fig.3). This article refers to the cave biome (not only insects) in a various geological periods, highlighting the period 4000- 3400 Cal BC.

The results presented here suggest that it is possible to distinguish four separate large mammal species on the basis of beetle assemblages associated with their dung.

For example *Coprissp.*, which belongs to family Scaraebidae prefers mesophilic station, rich with cow and horse manure, while *O. amyntas, O. orcas, Aphodius sp., G. mopsus, Eu. gibbosus, Scarabaeus sp.*, prefers the goat or sheep dung balls. These are such evidences for presence of domesticated animal and human main activity dependency on animal Husbandry and agriculture. Other interesting evidence is *Ctenocephalidesfelis*the cat flea's which primary host is the domestic cat, but it is also the primary flea infesting dogs in most of the world. This shows drover being of humans lived that place occasionally with their dogs, which used as defenders in the pastures.

This study shows also the fact of occurrence of dung beetles predators including birds, bats, reptiles and other insect-eaters, which remains are found nearby.

The preserved insects belonging to various horizons and in different amounts proves the opinion, that the cave was lived by short durations as a shelter or was used as a repertory for another periods, due to unchanged primary biome of the region and comparing with related vegetation and animal biodiversity.

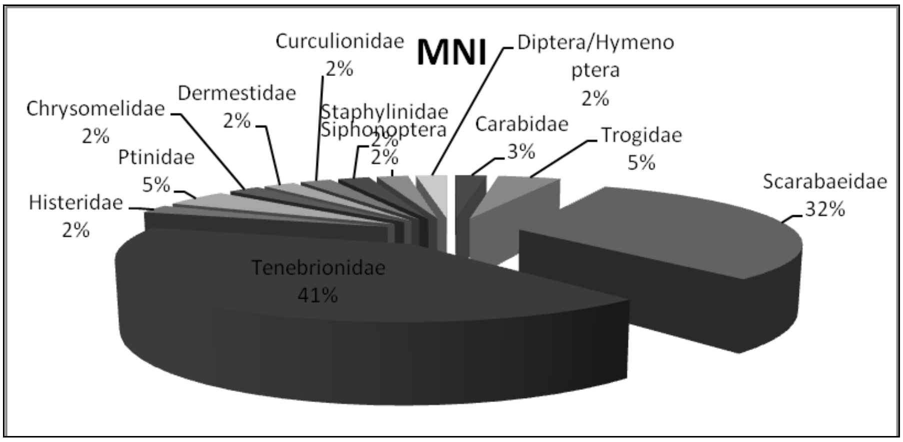

Fig 3: MNI % of the Insects families.

Fig 4: *1. Blaps ominosa, 2. Scarabaeus typhon, 3.Scarabaeus pius, 4.Trox scaber 5. Copris hispanus, 6.Chilotomus sp., 7. Leptodes semenovi 8. Gibbium psylloides 9. Niptus hololeulus 10.Onthophagus (Palaeontophagus) cnf. formaneki 11. Aphodius fimetarius*

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