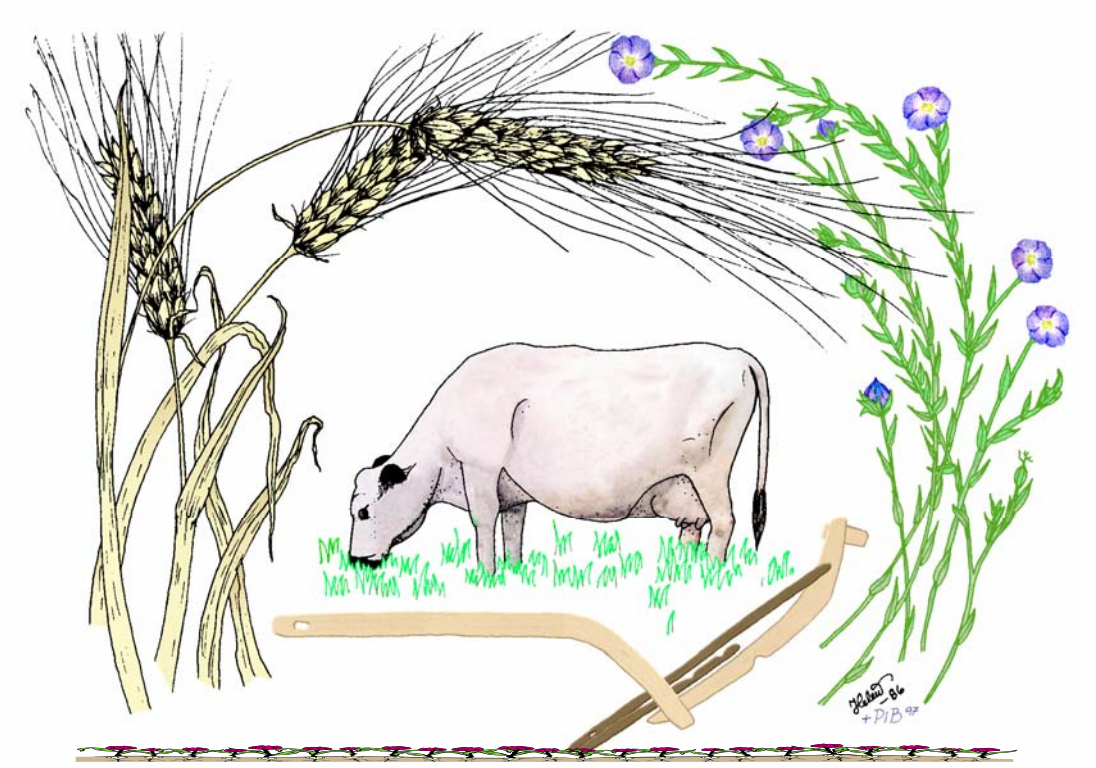
ENVIRONMENTAL ARCHAEOLOGY LAB.

REPORT nr. 2006-26



Fossil insect remains from Pálstóftir, Kárahnjúkar, Iceland

By

P. I. Buckland

DEPARTMENT OF ARCHAEOLOGY & SAMI STUDIES

UMEÅ UNIVERSITET

Fossil insect remains from Pálstóftir, Kárahnjúkar, Iceland

By Philip I. Buckland

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Project: Iceland: Karahnjukar
Contractor's reference: KHN05
MAL's Reference: 06.0012

Number of samples: 4
Job scope: Fossil insect analyses of floated and extracted insect remains.
Analyses & report by: Phil Buckland

Produced for:
Institute of Iceland
Bárugata 3
101 Reykjavik
Island

1 Introduction

Four pre-floated and sorted samples of fossil insect remains were analysed with respect to their environmental, archaeological and palaeoclimatic implications.

2 Methods

Specimens were identified under binocular microscope at a magnification of between 10x and 40x. Digital microscope photographs (Nikon DS-U1) were taken when necessary to aid comparison with modern reference specimens. Standard identification keys (see references), along with information in the BugsCEP Coleopteran Ecology Package software (Buckland & Buckland 2006), were used to confirm characters. Environmental, archaeological and climatic interpretation and diagram creation was aided by the BugsCEP software (*op. cit.*). Ecological classification of taxa follows BugStats software Beta version 1.008b (*op. cit.*). Thermal reconstruction was performed using the Mutual Climatic Range (MCR) method of Atkinson *et al.* (1986) as implemented in the BugsCEP software (Buckland & Buckland 2006). Temperatures are not calibrated, and most probably underestimate cold winters and warm summers.

Results

Overall preservation varied from poor to good, with a high degree of fragmentation and what appeared to be mineral concretion on the surface of some fossil. The extent of the latter was not great enough to hinder identification. Both sample and species abundance were poor, the largest sample (<18>[71]) containing no more than 27 identifiable individuals (MNI), and the most abundant taxon (*Patrobus septentrionis Dej*.) consisted of 13 individuals. The identified taxa by sample are shown in Table 1. Original sample volumes are presented in Table 2.

Taxon	<18>[71]	<106>[252]	<15>[71]	<4>[48]	*Taxon Sum*
Carabidae indet.	1				*1*
Patrobus septentrionis Dej.	10	1	2		*13*
Amara quenseli (Schön.)	1				*1*
Byrrhidae indet.		1	1		*2*
Byrrhus fasciatus (Forst.)	1				*1*
Aphodius lapponum Gyll.	1				*1*
Otiorhynchus arcticus (O. Fabricius)	6	1			*7*
Otiorhynchus nodosus (Müll.)	7	4		1	*12*
Otiorhynchinae indet.			1		*1*
Sample Sum	*27*	*7*	*4*	*1*	

Table 1. Identified taxa by sample.

Site code	Sample number	Sample volume (l)	Context number	Context type
KHN05	4	1	48	Aeolian with sheet midden
KHN05	15	4	71	Floor deposit
KHN05	18	15	71	Floor deposit
KHN05	106	4	252	Floor deposit

Table 2. Original sample volumes.

3 Discussion

A reliable environmental interpretation with such small numbers is at best tentative, and a climatic interpretation somewhat unreliable, although the MCR technique allows even small abundances to provide useful information. The interpretations should however be considered as provisional, and be considered in the light of other analyses from the same samples.

3.1 Environment

Sample <18>[71] contained enough identifiable fragments for a rudimentary environmental reconstruction, Figure 1 showing the relative environmental indications of the taxa in each sample. The greatest influence is of Meadowland and Heathland/moorland species, although abundance weighting shifts this balance a little towards the damper environments of wetland/marshes, with the larger numbers of the slightly hygrophilous Carabid *Patrobus septentrionis* Dej.. The moss feeder *Byrrhus fasciatus* (Forst.) tends to prefer dryer habitats. Although only one fragmented head was found, the dung beetle *Aphodius lapponum* Gyll. is an interesting occurrence. Breeding only in the excrements of larger mammals, its presence before the human colonisation of Iceland is improbable (Larsson & Gígja, 1959), and thus the find can provide a useful maximum age horizon for the sample. *A. lapponum* is one of the most common beetles in Iceland at the present day (Larsson & Gígja, 1959), extending out to all places were sheep and other livestock graze.

Sample <106>[252] indicates a somewhat similar environment to the above, although with considerably lower abundances and without the dung component.

Samples <15>[71] and <4>[48] contained only a few fragments of species already present in the above samples.

3.2 Climate

Too few MCR species were found to be able to reliably reconstruct the climate represented in any of the samples. The MCR diagram (Figure 2) is provided as an indication only, and may provide useful information in the context of other proxy data. All the species in the samples are currently present in Iceland and there is no indication of a climate different from the present day.

4 Conclusions

All samples represent what could considered as natural background faunas at the present day, indicating a heathland/moorland or meadow environment, probably more moist than dry. In addition sample <18>[71] could also easily represent any post Landnám environment where large herbivores are present.

5 References

Atkinson, T. C., Briffa, K. R., Coope, G. R., Joachim, J. M. & Perry, D. W. (1986) Climatic calibration of coleopteran data. In B. E. Berglund (ed.) Handbook of Holocene Palaeoecology and Palaeohydrology, 851-858. J. Wiley && Son, Chichester

Buckland P.I. (*in prep.*) Bugs Coleopteran Ecology Package Software. PhD Thesis. Environmental Archaeology Lab. Umeå University.

Buckland P.I. & Buckland P.C. (2006) Bugs Coleopteran Ecology Package Software [Components used: BugsCEP Beta 7.33; BugsMCR Beta 1.55b; BugStats Beta 1.008b; Bugsdata Beta 7.07] [Downloaded/CDROM: 20060808].

Larsson, S.J. & Gígja, G. (1959). Coleoptera. Zoology of Iceland 43a. Munksgaard, Copenhagen.

6 Figures

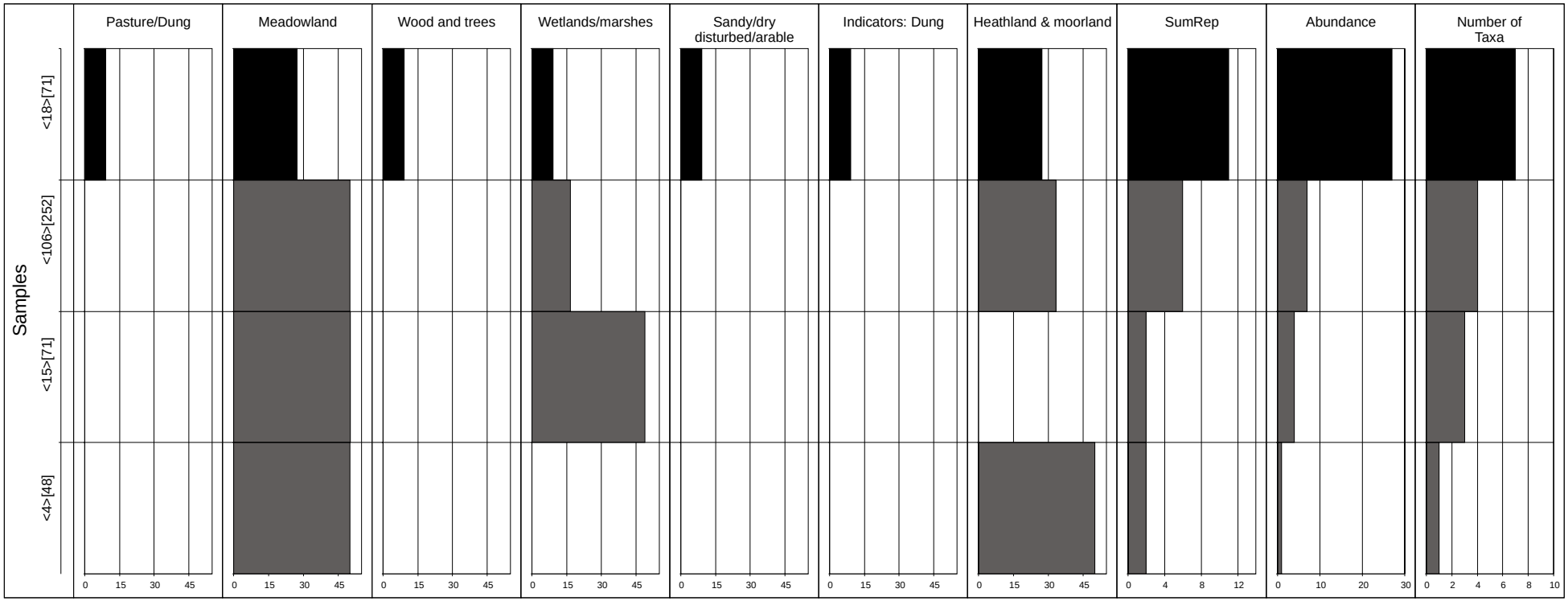

Figure 1. Bugs Ecofig showing proportional representation of environmental classes derived from the Karahnjukar samples. Horizontal scale is percent of environmental representations, and lighter shading shows samples with lower abundance than required for a reliable reconstruction. The diagram provides a rapid overview of the environment represented by the fossil insects, but should not be considered a true landscape reconstruction.
SumRep = Sum of environmental representations of species in sample – an indication of the relative reconstruction power of the sample.
Diagram produced by BugsCEP BugStats module Beta 1.008b (Buckland, in prep.).

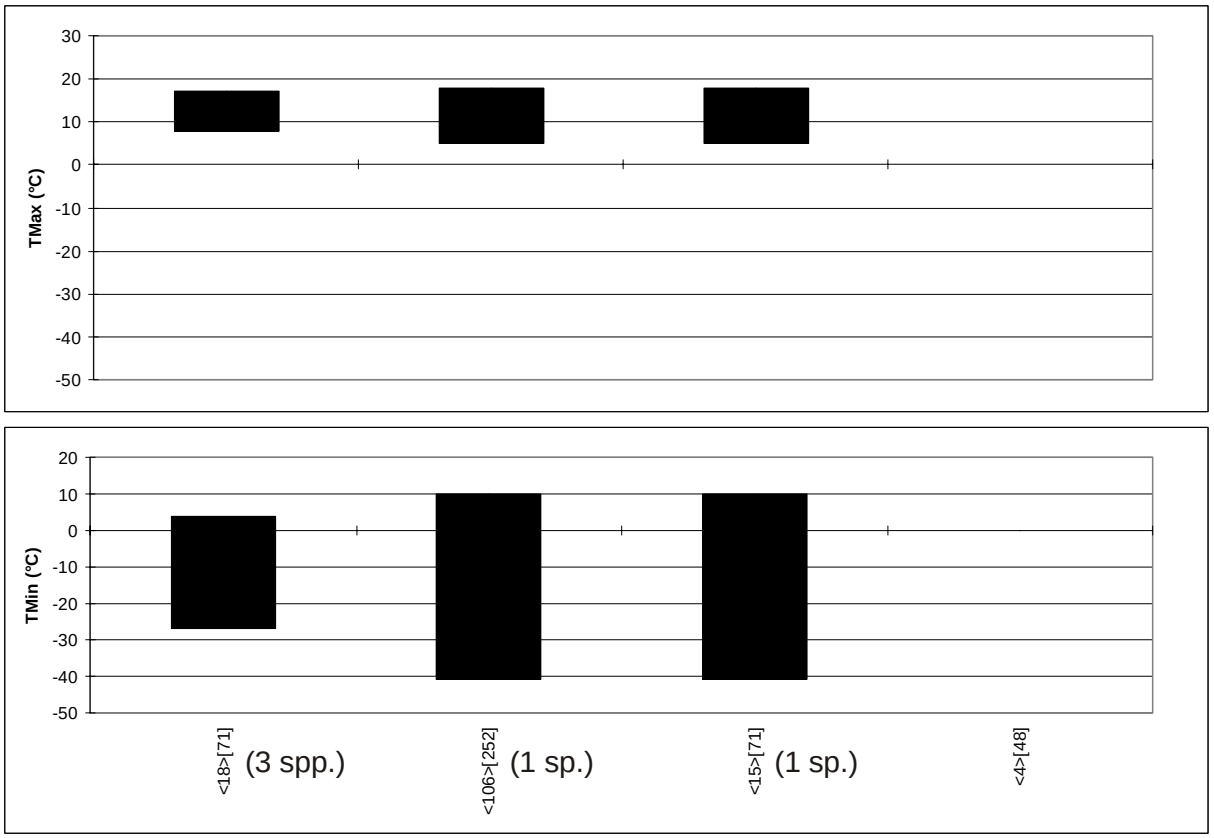

Figure 2. Mutual Climatic Range (MCR) thermal reconstruction in degrees Celsius for Karahnjukar samples.
TMax = mean temperature of warmest month
TMin = mean temperature of coldest month
The bracketed numbers show the number of species available for MCR reconstruction – the more species the more reliable the reconstruction.

Sample:	<18>[71]			
	Patrobus septentrionis Dej.	**CODE:** 1.032001	**Abundance:**	10
	BEco03	Meadowland		
	BEco05a	Wetlands/marshes		
	Amara quenseli (Schön.)	**CODE:** 1.065031	**Abundance:**	1
	BEco06b	Sandy/dry disturbed/arable		
	Byrrhus fasciatus (Forst.)	**CODE:** 47.011001	**Abundance:**	1
	BEco04	Wood and trees		
	BEco12	Heathland & moorland		
	Aphodius lapponum Gyll.	**CODE:** 85.019059	**Abundance:**	1
	BEco02	Pasture/Dung		
	BEco07c	Indicators: Dung		
	Otiorhynchus arcticus (O. Fabricius)	**CODE:** 93.015048	**Abundance:**	6
	BEco03	Meadowland		
	BEco12	Heathland & moorland		
	Otiorhynchus nodosus (Müll.)	**CODE:** 93.015057	**Abundance:**	7
	BEco03	Meadowland		
	BEco12	Heathland & moorland		
Sample:	<106>[252]			
	Patrobus septentrionis Dej.	**CODE:** 1.032001	**Abundance:**	1
	BEco03	Meadowland		
	BEco05a	Wetlands/marshes		
	Byrrhidae indet.	**CODE:** 47	**Abundance:**	1
	BEco03	Meadowland		

	BEco05a	Wetlands/marshes			
	BEco07a	Dung/foul habitats			
	BEco13	Halotolerant			
	Otiorhynchus arcticus (O. Fabricius)	**CODE:**	93.015048	**Abundance:**	1
	BEco03	Meadowland			
	BEco12	Heathland & moorland			
	Otiorhynchus nodosus (Müll.)	**CODE:**	93.015057	**Abundance:**	4
	BEco03	Meadowland			
	BEco12	Heathland & moorland			
Sample:	<15>[71]				
	Patrobus septentrionis Dej.	**CODE:**	1.032001	**Abundance:**	2
	BEco03	Meadowland			
	BEco05a	Wetlands/marshes			
	Byrrhidae indet.	**CODE:**	47	**Abundance:**	1
	BEco03	Meadowland			
	BEco05a	Wetlands/marshes			
	BEco07a	Dung/foul habitats			
	BEco13	Halotolerant			
	Otiorhynchinae indet.	**CODE:**	93.015168	**Abundance:**	1
	BEco02	Pasture/Dung			
	BEco03	Meadowland			
	BEco04	Wood and trees			
	BEco05a	Wetlands/marshes			
	BEco06a	Disturbed/arable			
	BEco06b	Sandy/dry disturbed/arable			
	BEco09a	General synanthropic			
	BEco12	Heathland & moorland			
	BEco13	Halotolerant			
Sample:	<4>[48]				
	Otiorhynchus nodosus (Müll.)	**CODE:**	93.015057	**Abundance:**	1
	BEco03	Meadowland			
	BEco12	Heathland & moorland			

Table 3. Sample by sample breakdown of Bugs Ecology codes for Karahnjukar. Output produced by BugsCEP BugStats module Beta 1.008b (Buckland, 2006).

MAL
Miljöarkeologiska laboratoriet
Umeå Universitet
901 87 UMEÅ
Telefon: 090-786 50 00
Telefax: 090- 786 76 63
email: mal@arke.umu.se
Hemsida: http://www.umu.se/envarchlab/mal