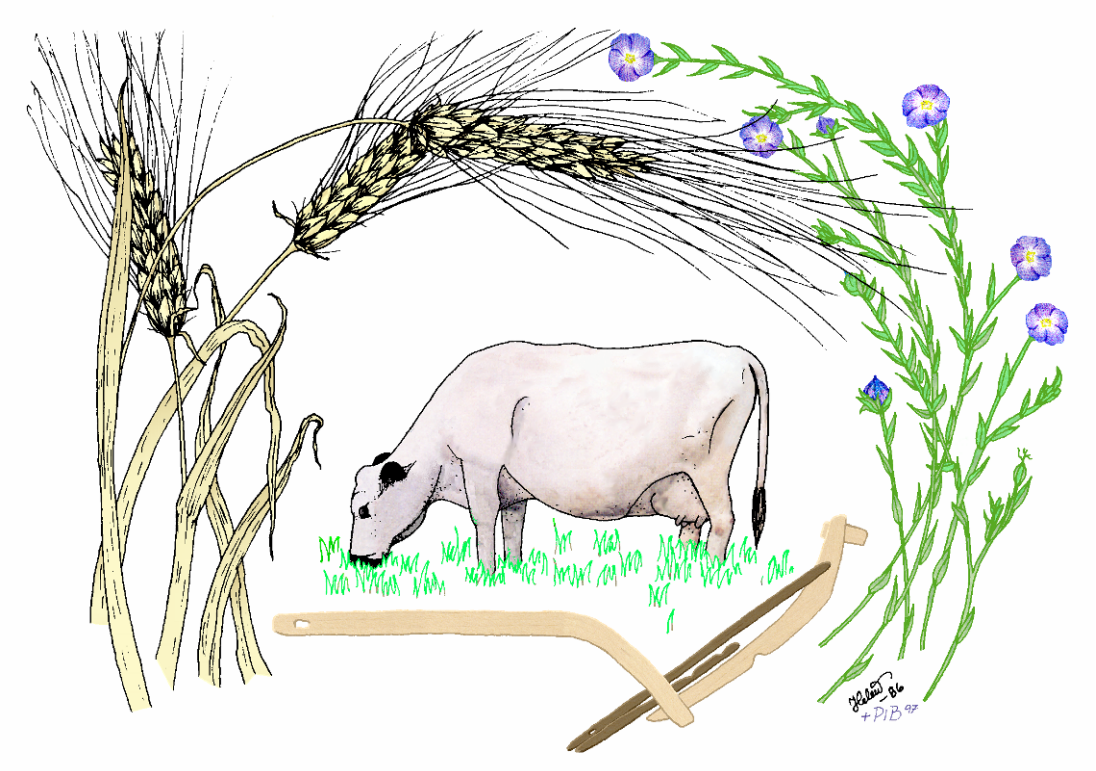
MILJÖARKEOLOGISKA LABORATORIET

RAPPORT nr. 2021-013



Environmental archaeological analysis of samples from the site Sa 20.6 Nygård, Långbergsöda Socken, Åland

Kristian Hristov, Samuel Eriksson

INSTITUTIONEN FÖR IDÉ – OCH SAMHÄLLSSTUDIER

UMEÅ UNIVERSITET

Environmental archaeological analysis of samples from the site Sa 20.6 Nygård, Långbergsöda Socken, Åland

Kristian Hristov, Samuel Eriksson

Sample information

Analysis type: Macrofossil analysis of unfloated samples and soil chemical analysis.
Number of samples: 4 macrofossil sample, 2 soil chemical samples.

Introduction

Four samples from three different test pits that are connected to the Stone Age settlement Sa 20.6 were provided for analyses. The previously known parts of the settlement were dated to 4400 BP. The settlement represents the transition between comb ceramic and pit ceramic at Åland. Samples JP 7, 8, 9 (test pits 78 and 83) come from the adjoining newly discovered settlement area, probably an older phase. JP 5 (test pit 38) comes from the opposite shore of the previously known settlement. The place was divided by a bay. One of the questions is whether the western shore is contemporary with the eastern one. Other question is what had happened at the site like burning activities, etc.
The samples were provided by Jenni Lucenius, Ålands landskapsregering.

Materials and Methods

Macrofossil analysis

Before the analysis the samples were stored in a drying room (+30°) until the moisture has disappeared. Afterwards they were floated using sieve meshes of 2 mm and 0,5 mm. The samples volume before floatation was between 0,3 and 1,1 liters and after it between 5 to 35 ml. The sieved material was sorted and identified under stereomicroscope. The results from the analyses are presented in Table 2. The amount of woody charcoal was estimated as relative proportion of the floated sample volume as follows: x = up to 25%, xx = up to 50%, xxx = up to 75%, xxxx = about 100%.

Sample analysis was performed by Kristian Hristov.

Soil chemistry

Prior to all analyses the samples were dried at 30°C. Samples were then passed through a 1.25 mm sieve and any presence of material of cultural significance noted (such as bone, charred material, ceramics etc.). The chemical methods employed here are the same as those used in Swedish soil chemical studies following the methodological approach of Engelmark and Linderholm (1996 and 2008). The parameters analysed and abbreviations used are explained in Table 1.

Table 1. Geoarchaeological methods and abbreviations as used in this report.

Abbreviation	Method	Description
MS	Magnetic Susceptibility	Magnetic susceptibility measured on 10g of soil, with a Bartington MS3 system with an MS2B probe (Dearing 1994). Data are reported as SI-units per ten grams of soil, (corresponding to X_{lf}, 10^{-8} m^3 kg^{-1}) (Thompson & Oldfield 1986).
MS550	Magnetic Susceptibility after burning at 550ºC	Magnetic susceptibility after 550° C ignition (units as above)
LOI (%)	Loss On Ignition	Soil organic matter, determined by loss on ignition at 550° C, in percent (Carter, 1993).
Cit-P	Inorganic phosphate content (mg P/kg dry matter, ppm)	Extraction with 2% citric acid (corresponding to the Arrhenius method (Arrhenius 1934)

These methods have been developed and adapted for soil prospection and the bulk analysis of occupation soils and features. Analysed parameters comprise organic matter (loss on ignition [LOI], Carter 1993), two fractions of phosphate (inorganic [Cit-P], and sum of organic and inorganic [Cit-POI]) (Engelmark and Linderholm 2008, Linderholm 2007) and magnetic susceptibility (MS-χlf) and MS550-χlf (Linderholm 2007, Engelmark and Linderholm 2008). These analyses provide information on various aspects concerning phosphate, iron and other magnetic components and total organic matter in soils and sediments, and their relation to phosphate.

Soil chemical analyses were undertaken by Samuel Eriksson and Kristian Hristov.

Results

Macrofossil analysis

Four samples were analysed for macro remains. All samples contained very small amounts of charcoal fragments, in most of the samples just few fragments. All charcoal fragments were very small, less than or about 5 mm which made their identification very difficult or impossible. Three of the samples (JP7/ provgrop 78, JP8/ provgrop 83, and JP9/ provgrop 83) contained sufficient wood material for 14C dating. The rest of the samples volume consisted of modern vegetative parts such as roots and stems. The result from the analysis is presented in Table 2 and 3.

Sample 20_0041_0001/ JP5

The sample volume before floatation was 1,1 litres and after flotation – 10 ml. No charred material was preserved in the sample. The floated sample volume was presented by modern vegetative parts such as roots and stems.

Sample 20_0041_0002/ JP7

The sample volume before floatation was 400 ml and after flotation it was 30 ml. About ten to fifteen small charcoal fragments were found in the sample. The rest sample consisted of modern plant parts. One charcoal fragment of deciduous wood was selected for 14C dating.

Sample 20_0041_0003/ JP8

The sample volume before floatation was 0,8 litres and after floatation it was 35 ml. The amount of charcoals in the sample was less than 25% of the floated sample volume. Most of the charcoals were small stems/twigs. No other plant remains were preserved in the sample. The rest of the sample contained modern roots/stems. Few small twigs of coniferous wood were selected for 14C dating.

Sample 20_0041_0004/JP9

The sample volume before floatation was 300 ml and after flotation – 5 ml. The floated sample comprised mainly modern vegetative parts. Only few very small pieces of charcoal were detected and all of them were selected for 14C dating.

Soil chemistry

The results from the soil chemical analysis is presented in table 4.

Discussion and Conclusions

The low amount of charcoal fragments in the samples could infer that almost no burning activities have been performed in the studied areas. The lack of fire/ burning could be the reason that no other plant remains such as seeds and fruits were preserved. The poor preservation does not allow any further interpretations concerning the studied features.

The results for magnetic susceptibility does not indicate that the sediments have been the primary recipient of any heat generating process. The amount of inorganic phosphates in sample 20_0041_002/ Jp7 might indicate accumulation from low intensity or very occasional phosphate accumulating activities. To get a better understanding of soil formation and land use a much more extensive sampling would need to be done

References

Anderberg, A.-L., & Anderberg, A. (u.d.). Den virtuella floran. Hämtat från http://linnaeus.nrm.se/flora/welcome.html

Carter, M.R. 1993. *Soil Sampling and Methods of Analysis*. London.

Dearing, J. 1994. Environmental Magnetic Susceptibility. Using the Bartington System. Bartington Instruments Ltd.

Engelmark, R., Linderholm, J. 2008. *Miljöarkeologi: människa och landskap - en komplicerad dynamik*. Malmö: Malmö kulturmiljö.

Linderholm, J. 2007. Soil chemical surveying: a path to a deeper understanding of prehistoric sites and societies in Sweden. *Geoarchaeology* 22 (4), 417–438.

Mossberg, B., Stenberg, S. 2018. *Nordens flora*. Naturhistoriska riksmuseet Stockholm.

Thompson, R. and Oldfield, F. (1986) *Environmental Magnetism*. Allen & Unwin: Springer, London.

Figures and tables

Table 2. Archaeobotanical results from the studied sites.

MAL nr	Samples No	Provgrop	Volume before float	Volume after float	Charcoals	Others
20_0041_0001	JP 5	38	1100 ml	10 ml	0	modern roots and stems
20_0041_0002	JP 7	78	400 ml	30 ml	x	modern roots and stems
20_0041_0003	JP 8	83	800 ml	35 ml	x	modern roots and stems
20_0041_0004	JP 9	83	300 ml	5 ml	x	modern roots and stems

Table 3. Material selected for 14 C.

MAL nr	Makro nr	Material	Vikt
20_0041_0002	JP7	deciduous wood	13 mg
20_0041_0003	JP8	coniferous (twigs)	19 mg
20_0041_0004	JP9	twigs/stems/charcoals	5.5 mg

Table 4. Soil chemical analysis

MALNo	FieldNo	FeatureNo	Layer	MS	MS550	CitP	CitPOI	PQuota	LOI
20_0041_0002	JP7	78	N3/4	12	52	176	255	1,45	4,3
20_0041_0003	JP8	83	N2-3	2	2	9	20	2,35	0,9

MAL
Miljöarkeologiska laboratoriet
Umeå Universitet
901 87 UMEÅ
090-786 50 00
https://www.umu.se/mal/
mal@umu.se