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VÄLITÖÖD  
EESTIS

ARCHAEOLOGICAL  
FIELDWORK  
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Koostanud ja toimetanud  
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*Esikaas: 13.–14. sajandist pärit ribiline väike klaaspudel Tartu vanalinnast.*

*Cover: Fragment of a 13.-14 cc small glass bottle (Ribbenflasche) from Old Tartu.*

*Tagakaas: Tervena säilinud keskaegne nahkjalats Tartu vanalinnast.*

*Back cover: Well preserved leather shoe from Old Tartu.*

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# ARCHAEOLOGICAL RESEARCH AT JÄGALA JÕESUU HILLFORT AND ITS CLOSEST SURROUNDINGS

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## INTRODUCTION

Although the field season in 2007 was not the first one at Jägala Jõesuu hillfort (reg. no. 17535<sup>1</sup>) many unanswered questions remain. The first archaeological research was carried out already at the end of 19<sup>th</sup> century, the object arouse into the interest of archaeologists again in the 1920s: during several years excavations were conducted there by Artur Spreckelsen and Aarne-Michaël Tallgren (Spreckelsen 1924/1925). After over half a century's break archaeologists showed their interest in the hillfort again at the end of the 20<sup>th</sup> and at the beginning of the 21<sup>st</sup> century: several preliminary researches and field walks were carried out then (Tõnisson *et al.* 2008; Vedru 1999; Lavi 1999, 2002; Smirnov & Jaanits 2001). The last archaeological excavations at the hillfort were held in 2005 by Kristiina Johanson and Martti Veldi, graduate students of the University of Tartu (Johanson & Veldi 2005/2006, 2006).<sup>2</sup>

## RESEARCH QUESTIONS

Three main aspects motivated the research work at Jägala Jõesuu hillfort in 2007. First and foremost, the scientific interest towards the object arouse after the excavations in 2005. Secondly, as the survival of the cultural layer on the hillfort is nowadays been put in danger by human activity – a thought, which has been brought forth earlier (e.g. Lavi 1999) –, showed the necessity of rescue excavation. Last but not least, the interest of NPO Jägala Linnamäe towards the development of the hillfort and its closest surroundings (Lõhmus 2008) demanded more information about the object under discussion. According to those aspects following research questions were posed: what was the construction of the northern rampart like and are different fortification phases visible? If and to what extent is the

<sup>1</sup> Here and forth the data from *Kultuurimälestiste riiklik register* – <http://register.muinas.ee/> (05.05.2008).

<sup>2</sup> The research history of the hillfort is presented in more detail in Johanson & Veldi 2006.

cultural layer preserved on the plateau of the hillfort and what characterises it? Thirdly, what is the nature of the cultural layer of the settlement site (reg. no. 17534) at the foot of the hillfort and whether the settlement and hillfort are linked to each other? As the future hillfort was already inhabited during the Middle and Late Neolithic, it was also important to locate the Neolithic cultural layer on the area of the excavation plot at the north-eastern part of the promontory.

## RESEARCH METHODS

The excavation was located on the north-eastern part of the northern rampart, where the fortification was best preserved according to visual observation. First an area measured 11 x 3 meters (33 m<sup>2</sup>) was opened; later on an extension of 3 m<sup>2</sup> was added to the southern end, i.e. towards the plateau, to obtain the border of the collapsed stone construction. To locate the cultural layer on the hillforts plateau and settlement site altogether 105 test pits were dug. A digital elevation map of the hillfort and partly of the assumed settlement site of its northern bottom were drawn with total station<sup>3</sup> (Fig. 1).

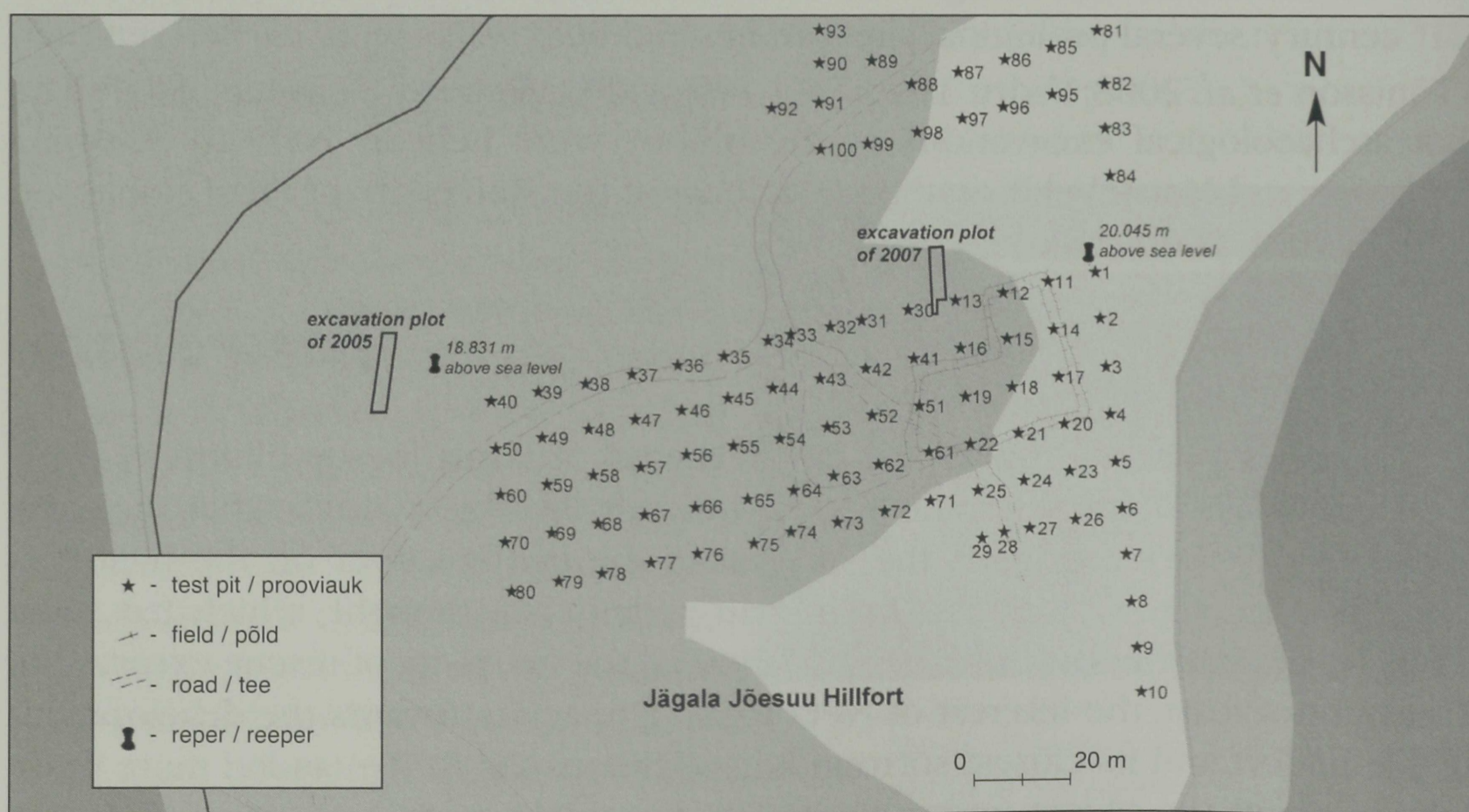


Fig. 1. General map of Jägala Jõesuu hillfort.  
Jn 1. Jägala Jõesuu linnamäe üldplaan.

<sup>3</sup> The mapping was conducted due to the help of Marge Konsa, Maili Roio and Martti Veldi.

As all the stratigraphic units were defined in terms of their physical composition, we tried to observe their natural/cultural deposition with the excavation method. All the layers were divided into smaller units. The stone construction was dug one stone layer after another; an almost 50 cm thick Pre-Roman Iron Age cultural layer and the sand ramp were dug in 10–15 cm units. All the finds and fragments of animal bones were measured *in situ*. One part of the wooden construction and an arrowhead were taken up as a monolith to obtain more precise information about the corner-joint construction at a laboratory (Kajak 2007).

RESULTS OF THE RESEARCH WORK AT HILLFORT IN 2007

Jägala Jõesuu hillfort is a multicultural site, consisting of different phases of human activity beginning from the Neolithic, retaining its functions even today. Altogether three different phases of prehistoric times have been identified at the hillfort: Middle and Late Neolithic, Pre-Roman and Roman Iron Age and Middle Iron Age/period after Early Iron Ages (Fig. 2).

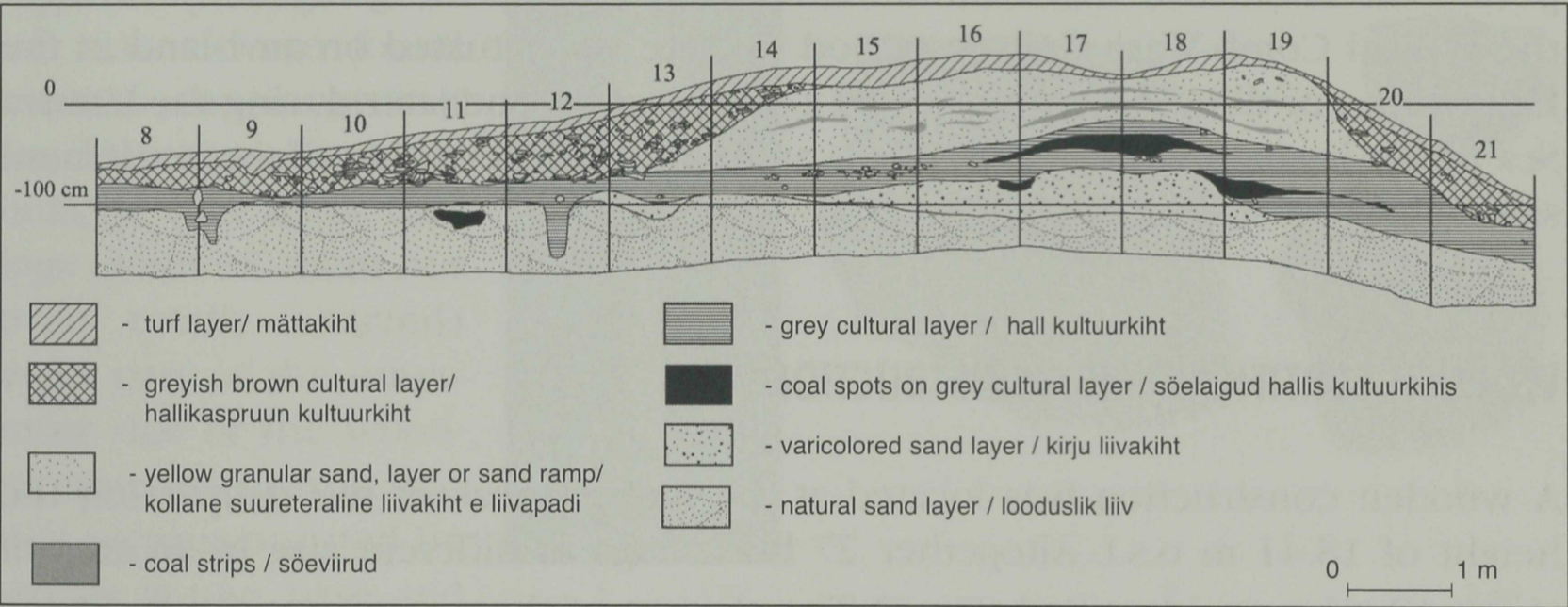


Fig. 2. Western profile of the excavation plot.  
Jn 2. Kaevandi lääneprofiil.

NEOLITHIC SETTLEMENT SITE

Neither features nor cultural layer of the Middle and Late Neolithic were found at the excavation plot in 2007. Only scant finds indicating the presence of Neolithic habitation were gathered both from upper parts of the cultural layer (i.e. from the sand rampart) and from the grey sooty, coaly sandy cultural layer. No artefacts of secondary processing were found. There were altogether 38 fragments of quartz, whereas 13 of them were not gathered from the excavation plot. As most of the

material was quartz (25 finds) and flint debris (2 finds) it is also possible that those finds present the latter prehistoric periods. Only one possible potsherd (TÜ 1444: 631) from Typical Comb Ware Culture was found. One of the flint find was a fragment of a nucleus platform (TÜ 1444: 582). Both bipolar (3 flakes) and platform (2 flakes) technique were present.

During the excavations in 2005 at the southern part of the north-western rampart a plentiful material of Middle and Late Neolithic was gathered (Johanson & Veldi 2006, 34–37). Findings and features (e.g. hearths) presenting Typical and Late Comb Ware culture were found in the 1920s (Spreckelsen 1924/1925) during the rescue excavations that were held because of the erection of a hydro electric power station. As only scant traces of Neolithic material were gathered from the north-eastern part of the hillfort in 2007 the Neolithic habitation seems to be converged to the southern and western part of the future hillfort (see also Spreckelsen 1924/1925, 23). The Middle Neolithic settlement site was situated on the elevation 17–18 m above sea level, which formed according to the shore-displacement chronology somewhere 4000 to 3900 years cal. BC. During the whole period the habitation was located immediately next to the water body: through the Typical Comb Ware Culture period the site was situated on an island in the Litorina Sea or directly on its shore by a small lagoon, and later, during the Limnea Sea phase Jägala River started to flow among the western side of the settlement site (Johanson & Veldi 2006, 35).

## WOODEN FORTIFICATIONS/CONSTRUCTIONS

A wooden construction was located at the highest peak of the rampart on the height of 18.41 m o.s.l. Altogether 27 burnt logs of different size in an area of about 12 m<sup>2</sup> were identified (Fig. 3). The clearest of them was a *tarand*- or chamber-like structure measuring 0.8 × 0.9 m on its southern part. It was established by four more or less fragmented logs with a diameter of 10–20 cm, whereas the logs at the outer i.e. northern part of the construction were clearly more massive. A corner-jointed structure seemed to form in the south-western part and as the iron arrowhead (Fig. 4: 1) was situated under the exact wooden construction a monolith was taken of that part. Still, laboratory analyses did not show any clear indication of a corner-jointed construction, although due to the direction of the fibres of the wood it was clear that there have been two logs crosswise with each other (Kajak 2007). The structure itself contained mainly sandy soil with some smaller burnt limestones and granite stones. The soil inside it was a bit lighter in colour in comparison with the soil outside of the structure and the stones mentioned

were also partly situated on the burnt logs.

Besides the somehow clearer structure there were four larger logs (diameter 13–30 cm, length up to 85 cm) located parallel to the chamber-like construction at the northern side (Fig. 3). These seemed to indicate to the fall of the bigger construction as they were close to each other, following the direction of the rampart slope. Some larger granite stones were found next to the innermost log. This altogether may indicate that these four logs (some of them not even totally charred) were part of the outermost side of the wooden rampart construction that were supported by stones at the base and gave in when construction burned. The same interpretation is also possible about other four logs at the opposite side of the latter ones in the western part of the excavation plot.

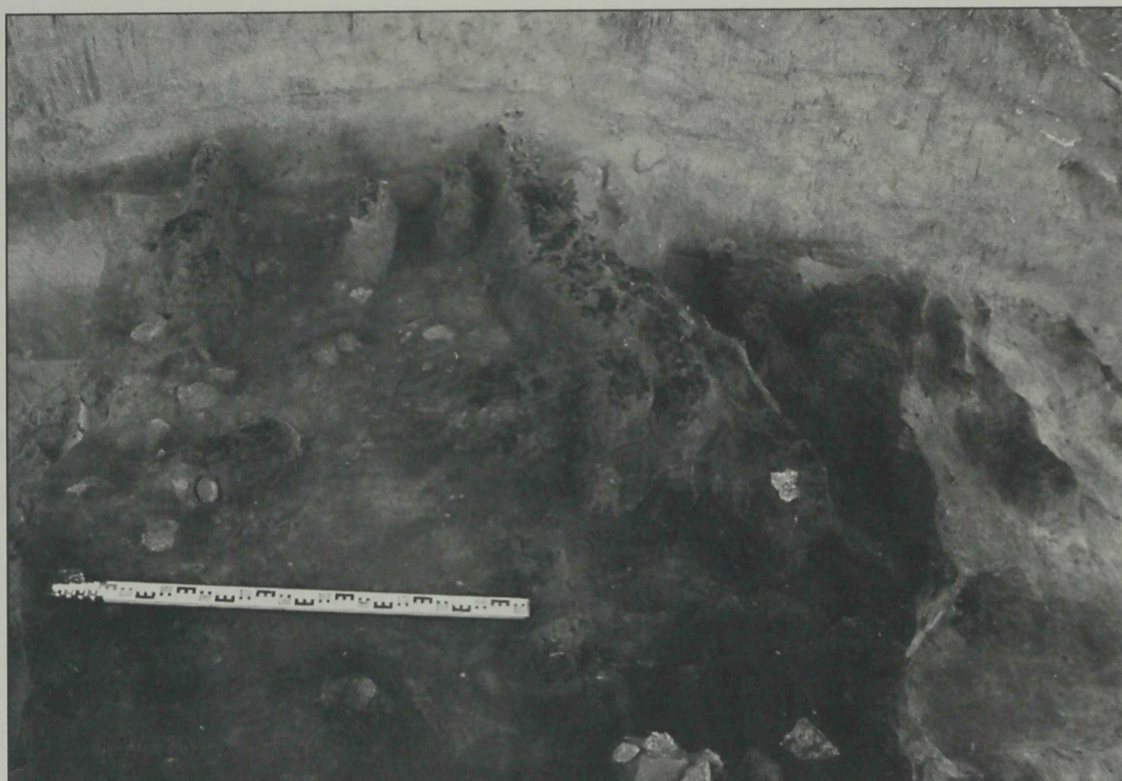


Fig. 3. Wooden logs of the Pre-Roman and Roman Iron Age on the highest peak of the rampart.

Jn 3. Eelrooma ja rooma rauaaegne puitkonstruktsioon valli kõrgemal osal.

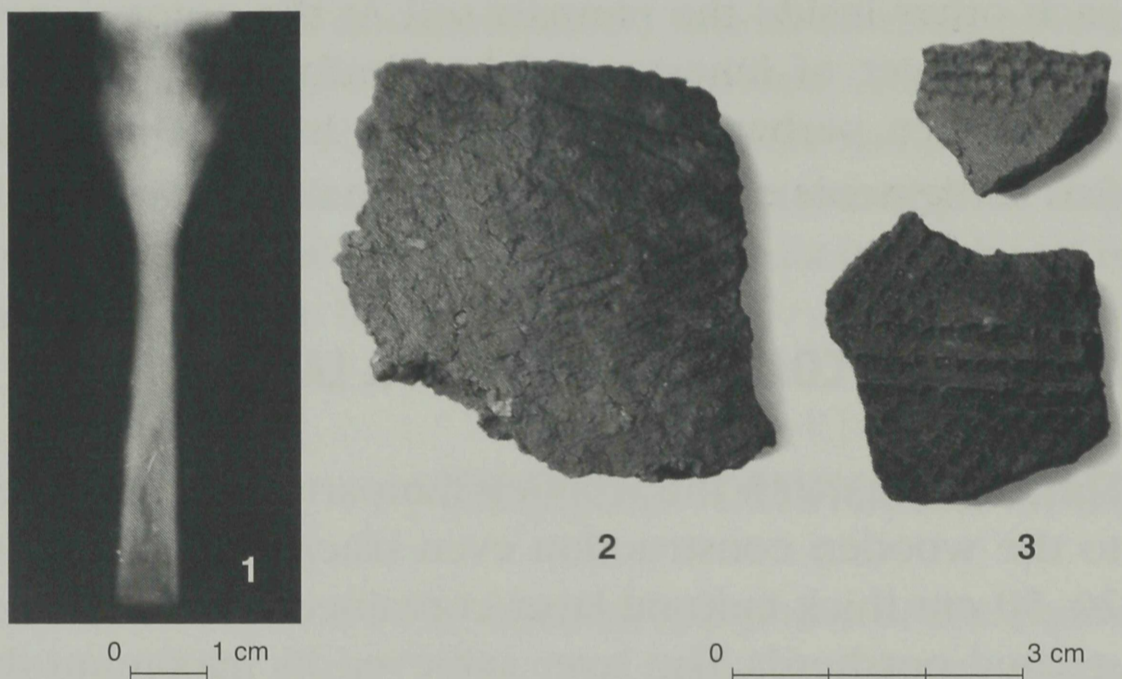


Fig. 4. Finds from Jägala Jõesuu hillfort. 1 - arrowhead (x-ray photo), 2 - striated potsberds from hearth I, 3 - ceramics with comb impressions.

Jn 4. Leiud Jägala Jõesuu linnamäelt. 1 - nooleots (röntgenfoto), 2 - riibitud keraamika I tuleasemest, 3 - kammi-vajutustega keraamika.  
(TÜ 1444: 570, 191, 616, 780.)

It is also worth mentioning that eight smaller charred logs locating parallel to each other were found next to mentioned first four bigger logs. These eight locat-

ed at the outer slope of the rampart crosswise to the outermost bigger log (Fig. 3). The function of them stays a bit vague – they might have been parts of the rampart's inner construction.

There was only one remarkable limestone concentration area at the outer part of the rampart slope. It consisted of stones with a diameter up to 40 cm that were located upon each other at the area about 1.25 × 0.75 m. The stones were located in the dark cultural layer with charred logs beneath and above them. The construction clearly followed the rampart slope. The described situation suggests that these might have been the only originally preserved stones forming a stone layer outside the wooden construction to fortify the outer slope. Other limestones at the slope might have fallen and therefore dislocated.

What was the wooden construction like? It seems possible, that the structure was formed by bigger wooden planks at the outer side of the rampart, supported by stones at the base. The inner of the rampart was at least partly bound together either by full-scale chambers inside the rampart or by logs lying crosswise with each other inside the rampart soil. At the outer slope the rampart was fortified with a layer of limestone slabs. Similar fortifications, generally dating to Late Bronze Age, perhaps even Pre-Roman Iron Age are known from the Latvian fortified settlements of Kivutkalns and Vinakalns (Graudonis 1989, 55 ff, 104–107).

## GREY SOOTY, COALY SANDY CULTURAL LAYER

Simultaneous with the wooden rampart was a dark grey (in some locations close to the wooden construction even black) sooty, coaly sandy cultural layer. About 20–50 cm thick cultural layer contained a lot of charcoal and a large amount of striated potsherds. The layer achieved its maximum thickness at the location of the burnt wooden construction on the top of the rampart (Fig. 2).

Human activity – a cultural layer from Pre-Roman and Roman Iron Age – was located in close vicinity of the rampart (Figs. 2; 5). The inner slope of the rampart can be characterized by sooty sand soil. At the upper part the colour was clearly darkened by the burnt wooden construction. The lower part of the cultural layer was sandy, partly more reddish, partly brownish and orange like soil containing a number of striated potsherds. A clear find concentration area was located in the south-eastern corner of the excavation plot where the soil was somehow more orange and contained a number of burnt animal bones besides the number of striated potsherds.

Two possible partly depressed hearths were found at the plateau next to the rampart, one of which contained a large amount of striated potsherds of probably one vessel (54 pieces) (Fig. 4: 2). The mentioned hearth with a diameter of about 25 cm, was located next to the clear find concentration area with a number of potsherds and burnt animal bones, staying still outside of the clear



Fig. 5. Pre-Roman Iron Age cultural layer on the southern side of the rampart.

Jn 5. Eelrooma rauaaegne kultuurkiht valli lõunaküljel.

orange coloured soil. The other hearth (or domestic hole?) was discovered not far from the first. It was larger in diameter (50–60 cm), but included only two potsherds. Considering this material it seems likely that the orange like soil in the corner of the excavation plot marked a part of a possible house bottom slightly dug into the ground. As both of the hearths or domestic holes stayed a bit higher it is likely that these were located outside the house.

## THE SECOND FORTIFICATION PHASE

The stratigraphy of the rampart reveals a second fortification phase of the Jägala Jõesuu hillfort, which was formed by a sand ramp and limestone construction (Fig. 2). After the burning of the wooden constructions a sand ramp was piled above the burnt structures. The ramp was located only at the peak and two sides of the rampart, so it was clearly heaped up to heighten the fortification. The ramp showed some thin greyish layers in it, which might refer to either soil from the sooty, dark layer partly included while piling up the ramp; on the other hand the ramp might have formed when it was piled in time and a thin humus layer could form between the heaping up periods. The finding material of 2007 does not provide much help to date the sand ramp. Only 31 items were found from the ramp that formed at least  $\frac{1}{4}$  of the total cultural layer of the excavation plot in 2007. These all are small handmade potsherds, some of them even striated just like dur-

ing the excavations of 2005 (Johanson & Veldi 2006, 32). Some quartz flakes and cores also belong to the find material of the sand ramp.

The sand rampart has obviously been connected to small limestone slabs particularly visible at the inner slope of the rampart. Altogether nine stone layers were indicated and the most intensive one covered an area of about 16 m<sup>2</sup>. The stone layers followed clearly the height and location of the sand ramp: as getting deeper the stone layers declined as the area covered by sand ramp increased.

There are two possibilities of interpreting stone layers and the sand ramp. Firstly, there might have been a kind of dry wall of lime stone slabs to bind the inner side of the rampart i.e. a piled sand ramp. The intact limestone wall might have been destroyed or fallen apart during the periods following the desertion of the hill-fort. In time the sand ramp diffused and ruins of a previous wall covered it. The problem seems to be that if the described situation actually took place the sand ramp likely must have covered the stones probably diffusing on top of the wall that bounded it. Therefore the other explanation seems more likely. After heaping up the sand turf to heighten the rampart, lime stone slabs were used to fortify and in a way also keep the sand ramp together without necessarily forming a wall. The latter interpretation does not include the problem, why and how the sand ramp is still beneath the stone layers. Of course the layers might have been thicker and consisted of probably larger slabs, but lots of limestone slabs have been carried away to be reused in buildings during later periods of historic time (Spreckelsen 1924/1925, 17).

The cultural layer close to the rampart at the inner slope was greyish-brown and sandy. It contained some darker areas, but none of them could be interpreted as any features e.g. hearths. The finds contained handmade pottery with just a few examples of striated ones compared to the lower cultural layer. Therefore there is at least some kind of settlement difference considering the finds of the above-described cultural layer. Besides, few quartz finds and items of historic period (such as nails) were discovered at the same height as handmade potsherds. The latter indicates to the possibility of disturbed cultural layer in some parts of the excavation plot.

## **FIND MATERIAL**

Fragments of ceramics are the most dominant among all the finds: there are altogether 850 pieces of pottery sherds. All of them are from handmade vessels,

whereas most comprise of sidepieces, although 40 edge fragments, 20 fragments of vessel bottoms and 6 bottom-edge fragments were present. The surfaces of potsherds have been mostly striated (altogether 541 fragments, Fig. 4: 2): the majority of sherds had one of their surfaces (mostly outer – 84%) striated and the other one smoothed, only 63 fragments (*ca.* 12%) were striated from both sides. There are nine fragments that were smoothed from both sides (1%). From those 63 fragments of striated pottery altogether 54 sherds (TÜ 1444: 191) belong most likely to one vessel, which was found from the hearth I. Besides striated ornamentation there was a side fragment that had comb impressions on its outer side (TÜ 1444: 616) and an edge fragment with small pits (Fig. 4: 3). A similar sherd to the first one has been found from a stone grave<sup>4</sup> at Viimsi (“*Rootsi kuninga haud*”) (Lang 1996, 148, pl. XLIV: 9), which has been dated to the second half of the Pre-Roman Iron Age. Among the sherds of clay vessels there were also 16 clay-jointings and 22 fragments of burnt clay.

In addition to the hand-made pottery sherds fragments of metal and stone items and also animal bones were gathered. The most remarkable metal artefact found during the field season in 2007 is an iron arrowhead (Fig. 4: 1), which is identical to the small socketed arrowhead with rhomb shaped head found in 2005 (Johanson & Veldi 2006, 33, fig. 4). As its conservation is still in process the exact measurements of it are unknown. The context of the find – under the Pre-Roman and Roman Iron Age wooden construction – dates the item to the same period. Those two arrowheads from Jägala Jõesuu hillfort are the oldest of their kind in Estonian material, whereas they are rare around the Baltic Sea.<sup>5</sup> In addition some nails and other unidentified fragments of metal objects and six slag pieces were found. Only one fragment of a bronze item (TÜ 1444: 603) was found, but its purpose and function remained unclear.

Most of the stone finds were of quartz as described above, but among others one possible grinding stone (TÜ 1444: 970), one polished stone (TÜ 1444: 589) and 9 fragments of polished stone tools were gathered on the territory of the excavation plot. The cultural layer contained both burnt and unburnt animal bones, but at the moment the analysis is still in process, so nothing more specific can be said about them.

<sup>4</sup> As the grave itself had been destroyed by ploughing in the 1960's (Lang 1996, 148) the type of the grave cannot be certified.

<sup>5</sup> Personal communication with Dr Hans-Ulrich Voß (Römisch-Germanische Kommission des Deutschen Archäologischen Instituts).

## DATING PROBLEMS OF THE TWO FORTIFICATION PHASES

Jägala Jõesuu hillfort consisted of two fortification phases. First, it included materials from the Pre-Roman and Roman Iron Age, which was already clear from the findings and radiocarbon datings of the excavations in 2005. Altogether four radiocarbon samples (Fig. 6) were taken from the Pre-Roman and Roman Iron Age cultural layer in 2007; to be more exact the samples were taken from three logs (nos. 3, 11 and 16)<sup>6</sup> of the wooden construction and one of the features (hearth I).<sup>7</sup> The average date of the cultural layer and the construction according to the radiocarbon datings is 390–90 cal. BC.<sup>8</sup> It dates the erection of the wood-

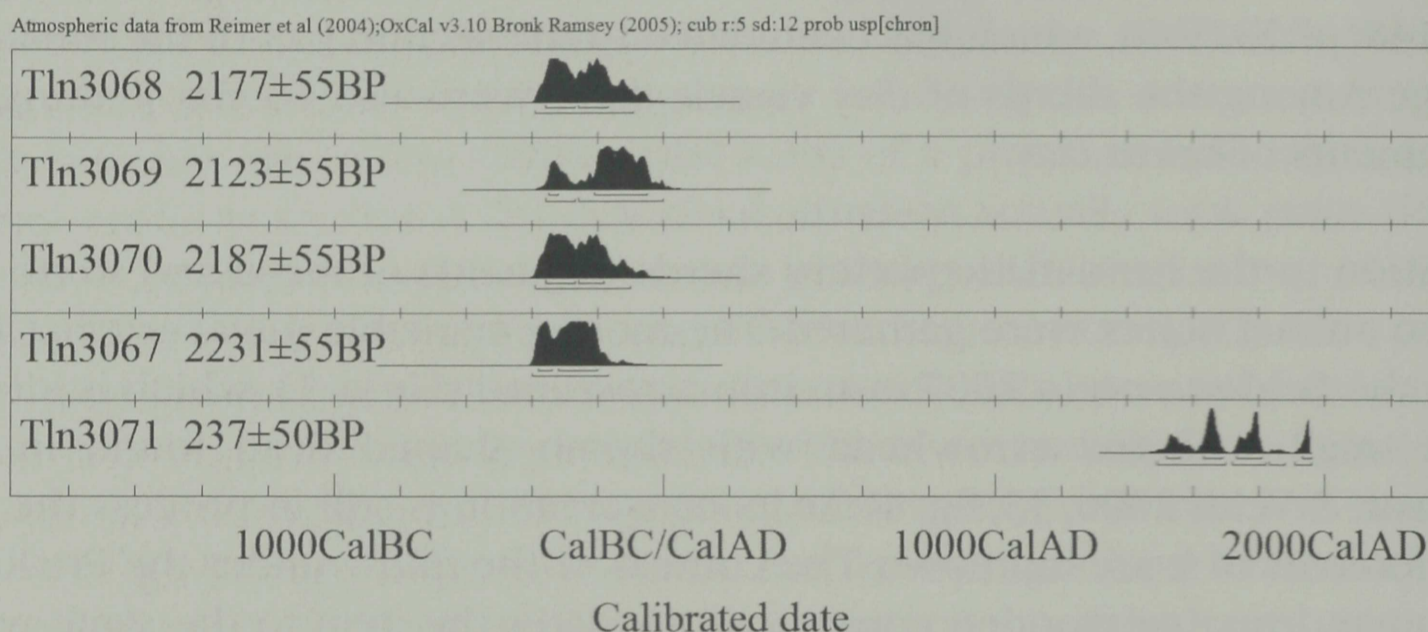


Fig. 6. Radiocarbon datings from the excavations of 2007.  
Jn 6. 2007. aasta kaevamiste radiosüsiniku dateeringud.

en construction two centuries earlier than the results in 2005; nevertheless the values correlate more or less to the datings from excavations in 2005 (Johanson & Veldi 2006, 38). This clearly suggests that the wooden construction was erected during the Pre-Roman Iron Age period and it fenced the whole length of the northern rampart. Also the first hearth was radiocarbon dated and its value is in correspondence with all the results from logs, showing that the place was inhabited at the time. From that we can conclude that the hillfort with the wooden fortification was inhabited during the 4<sup>th</sup> century BC until the 1<sup>st</sup> century AD.

Earlier it has been assumed that the second phase of the fortification belongs to the Late Iron Age (Laid 1923; Spreckelsen 1924/1925, 20) and also the Middle Iron Age habitation phase is presented on the top of the hillfort (see also Lang 2007,

<sup>6</sup> Tln-3067, Tln-3068 and Tln-3069 accordingly.

<sup>7</sup> Tln-3070.

<sup>8</sup> Here and forth all the calibrations are provided with a program Atmospheric data from Reimer *et al.* (2004); OxCal v3.10 Bronk Ramsey (2005); cub r:5 sd:12 prob usp[chron].

95). This assumption is supported by a radiocarbon date from a test pit of 1999 on the plateau (Lavi 1999) and potsherds (AI 5333) found during test excavations in 1985 at the north-eastern corner of the hillfort (Tõnisson *et al.* 2008, 190) and a single find of sheet fibula (AI 3849) (Jaanits *et al.* 1982, fig. 158).

None of the mentioned findings correlate exactly with the datings of a rampart excavated in 2007 and its find material. Also no findings from the Middle or Late Iron Age, just as during the excavation in 2005 (Johanson & Veldi 2006, 38), were found. The excavations of 2005 and 2007 did not provide any precise radiocarbon datings from those periods as well. It is partly because of the paucity of charcoal between the limestone layers that was assumed to be connected to the above mentioned period(s). Although a sample was gathered and dated<sup>9</sup> (Fig. 6) in 2007, its value indicates to be a polluted sample. As said earlier also the find material from that unit indicates a mixed cultural layer. As long as we have no reliable radiocarbon datings or datable find material from the upper part of the rampart we can only talk about a rampart construction that proceeded from the Pre-Roman and Roman Iron Age fortification. This means that it might originate from either Middle or Late Iron Age or even from the second half of the Roman Iron Age. To sum up, any clearly dated settlement indication of prehistoric origin, regarding the second phase of rampart fortification, could not be distinguished at the upper layers, above the dated i.e. Pre-Roman and Roman Iron Age cultural layer.

## THE RESEARCH WORK AT THE SETTLEMENT SITE IN 2007

During the field season in 2007 test pits were dug to the surface of the settlement site immediately on the northern bottom of the hillfort (till the road leading to the water power station) (Fig. 1). To the western part of the protected settlement site a field walk was conducted to ascertain the location and nature of the cultural layer. Scant finds were gathered from the western part of the settlement site: quartz and flint debris and also some animal bones. No traces of cultural layer were identified.

The stratigraphy of the test pits on the northern bottom of the hillfort revealed a cultural layer – a dark and intensive sooty black layer – dated according to the find material to the 20<sup>th</sup> century. The described situation was revealed also during the preliminary excavations in 2001, when no definite traces of prehistoric cultural layer could be identified (Smirnov & Jaanits 2001). Accordingly there has been no settlement site (or it has not preserved) immediately at the foot of the hillfort.

<sup>9</sup> TIn-3071.

## CONCLUSIONS

The archaeological research completed at Jägala Jõesuu hillfort in 2007 mostly assured the results of the excavations in 2005, nevertheless new information was also gathered. It confirmed the settlement on the later hillfort during (1) the Neolithic period, whereas the habitation was concentrated to the western part of the promontory, only scant finds were gathered from the eastern side of the plateau. (2) A Pre-Roman and Roman Iron Age fortification and cultural layer was found: a wooden construction fenced the whole length of the northern rampart of the hillfort and simultaneous habitation was located immediately behind it. Although some light was brought to the construction of the wooden fortification – the structure was formed by bigger wooden blanks at the outer side of the rampart, supported by stones at the base, whereas the inner part of the rampart was at least partly bound together either by full-scale chambers inside the rampart or by logs lying crosswise with each other inside the rampart soil; there are still several options that have to be considered. The erection of the wooden rampart is now dated to 390–90 cal BC. The second phase of the fortification comprised of sand ramp, which was presumably fortified with a limestone structure. The exact time of its erection is still unknown, as the radiocarbon dating between the limestone slabs was polluted and no datable find material could be gathered.

During the research work at the settlement site no traces of a prehistoric cultural layer were found and therefore its connections to the multicultural hillfort were not ascertained.

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## ARHEOLOOGILISED UURINGUD JÄGALA JÕESUU LINNAMÄEL JA SELLE LÄHIÜMBRUSES

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Vaatamata sellele, et 2007. aasta välitööd ei olnud esimesed arheoloogilised uuringud Jägala Jõesuu linnamäel ja selle lähiümbruses, on mitmete vastuste kõrval tekkinud ridamisi uusi küsimusi. Esimesed arheoloogilised uuringud toimusid linnamäel juba 19. sajandi lõpus; 1920. aastatel tegid seal kaevamisi Artur Spreckelsen, Aarne-Michaël Tallgren ning 2005. aastal Tartu Ülikooli arheoloogia magistrandid Kristiina Johanson ning Martti Veldi. Lisaks nimetatule on muistist mitmel korral inspekteeritud ning tehtud ka väiksemaid proovikaevamisi.

2007. aasta välitööd motiveerisid teaduslik huvi, objekti avariilisus ning MTÜ Jägala Linnamäe plaanid linnamäe ja selle lähiümbruse arendamiseks. Keskenduti järgmistele küsimustele: milline on linnuse valli konstruktsioon ja mitut erinevat ehitusjärku see sisaldab? Kas ja millises ulatuses on linnuse platool säilinud kultuurikiht? Millis(t)esse perioodi see (need) kuulub(vad)? Kas ja milline oli linnuse ning selle põhjajalamil paiknenud asulakoha suhe? Samas sooviti täpsustada ka neoliitilise asulakoha kultuurikihi levikut.

Esialgu avati linnamäe põhjavallil 33 m<sup>2</sup> suurune kaevand (jn 1) ja hiljem laiendati seda 3 m<sup>2</sup> platoo poole valli varingu ulatuse selgitamiseks. Ühtlasi tehti mullapuuriga linnamäele ja selle jalamile jäävale oletatavale asulakohale 105 auku ning kaevati šurfe. Samuti viidi linnamäest läände jääval alal läbi maastikuinspeksioon selgitamaks Jägala asulakoha kultuurikihti.

Jägala Jõesuu linnamäel on varasemate uuringutega tehtud kindlaks kolm muinasaegset inimtegevusjärku, mis pärinevad kesk- ja hilisneoliitikumist, eelrooma ja rooma rauaajast ning keskmisest rauaajast. Neoliitiline asustus koondub kõrgendiku lääne- ja lõunaossa, kuna 2007. aasta kaevandist neoliitilist kultuurikihti ei avastatud (leiti vaid üksikuid kiviajale viitavaid kvartsikilde ning üks arvatav tüüpilise kammkeraamika kild). Sarnaselt 2005. aasta uurimistulemustele paljandus linnamäe põhjavalli kirdeosas eelrooma rauaagegne kultuurikiht (jn 2) ning puitkindlustus (jn 3). Viimane oli rajatud looduslikule pinnasele valli kõrgemasse ossa. Kokku avastati u 12 m<sup>2</sup> suuruselt alalt 27 põlenud palgi jäänused (jn 3), millest selgema konstruktsiooni moodustas 0,8 x 0,9 m suurune kambritaoline ehitus. Sellest oli säilinud neli 10–20 cm läbimõõduga palki. Kambri edelanurga ühenduses oletati tappliidet, mille alt leiti putkega rombikujulise peaga nooleots (jn 4: 1). Selgitamaks palkide nurgaühendust võeti see koos nooleotsaga monoliidina üles. Paraku ei selgunud ehitusviis ka laboris. Selge on vaid, et palgid asetsesid risti ja et kamber oli täidetud liiva ning üksikute väikeste pae- ja raudkividega. Lisaks puhastati välja veel neli kuni 85 cm pikkust ja 13–30 cm läbimõõduga põlenud palki, mis paiknesid paralleelselt valliga, kuid kambritaolisest konstruktsioonist põhja pool. Nende pealt leiti suuremaid põlenud raudkive. Mainimist väärivad ka valliga risti asetsenud 8 väiksemat palgijuppi, mille funktsioon jäi selgitamata.

Eelrooma rauaagegne kindlustus ei koosnenud üksnes puidust. Tõenäoliselt oli see vähemalt osaliselt toetatud paekividega, mida kaevandis markeeris 1,25 x 0,75 m suurune kivikonstruktsioon valli välisküljel. Kokkuvõtvalt võib öelda, et puitkindlustus moodustus valli välisküljel suurematest rõhtselt asetsenud palkidest, mida jalamil toestasid paeplaadid. Kindlustuse sisemine osa oli vähemalt osaliselt ehitatud tarandilise palkkonstruktsioonina või ristpalkidest kambritena.

Samaaegselt kirjeldatud kindlustusetapiga oli asustatud ka linnamäe põhjaosa. 20–50 cm paksune tumehall söesegune liivane kultuurikiht asetses vahetult puitkindlustuse taga (jn 5). Kultuurikihi

ülaosa oli põlengu tagajärjel värvunud tumedaks, ent selle alaosa oli punakas-oranži värvi liivane pinnas, mis sisaldas sütt ning riibitud keraamikat. Sealjuures täheldati leiukontsentratsiooni ala kaevandi kaguosas, mille näol võis tegemist olla vahetult kindlustuse taha jäänud elamuasemega. Lisaks sellele leiti kaks osaliselt maasse süvendatud kivideta koldeaset. Esimene sisaldas 54 riibitud savinõu kildu (jn 4: 2), teine vaid kahte. 2005. aasta uuringute põhjal kindlaks tehtud eelrooma ja rooma rauaaegset dateeringut toetavad ka 2007. aasta analüüsides tulemused (jn 6). Keskmistatult saadi kindlustuse ja samaaegse elutegevuskihi dateeringuks 390–90 eKr. Kokkuvõtlikult võib väita, et palkkonstruktsioon on rajatud juba eelrooma rauaajal ning sellega on kindlustatud kogu valli põhjakülg.

Teise kindlustusetapina eristub linnamäel liivast kuhjatud vall, mis oli kas vooderdatud paekiviplaatile või oli ääristatud sideaineta paekivimüüri (jn 2). Pärast eelrooma rauaaegse palkkindlustuse põlemist on tukkidele kuhjatud liiva. Sealjuures esines liivas söelaike, mis ilmselt pärinesid varem põlenud konstruktsioonist. Paraku ei võimalda 2007. aasta leiumaterjal tuua selgust teise kindlustusetapi vanusesse: kuhjatud liivast saadi 31 leidu, millest enamjagu on väga väikesed ja raskesti dateeritavad savinõu- ning kvartsikillud. Suurem osa liivapadjaga seotud paekiviplaate on aegade jooksul linnamäelt minema veetud, kuid nende kunagist olemasolu kinnitavad valli siseküljel u 16 m<sup>2</sup> suurusel alal paljandunud üheksa kivikihti. Kivikihtidega samaaegne asustustase linnamäe platool vahetult kindlustuse taga oli hallikas-pruuni värvusega liivakiht. Vaatamata sellele, et liivas esines üksikuid söelaike, ei olnud nende näol tegemist ehituskonstruktsiooni jäänustega. Esemeline materjal koosnes peamiselt käsikeraamikast, mille seas oli üksikuid riibitud pinnaga kilde. Lisaks koguti kultuurkihist kvartsikilde ning ajaloolisesse aega kuuluvat leiumaterjali. Viimane viitab sellele, et tegemist on segatud kultuurkihiga. Sama kinnitab ka kivide vahelt võetud söeproovi dateering (jn 6). Kinnitust ei leidnud varasemad arvamused sellest, et teise kindlustusetapi puhul on tegemist keskmise või hilisrauaaja konstruktsiooniga. Seni kuni pole saadud dateeritavat leiumaterjali või usutavat radiosüsiniku dateeringut kirjeldatud konstruktsioonist või kultuurkihist, ei saa välistada ega kinnitada, et tegemist võib olla kas rooma rauaaja teise poole, keskmise rauaaja või hilisrauaaja ehitusetapiga.

Kaevandi alalt leiti 850 käsikeraamika kildu, mis oli ühtlasi valitsev leiuliik. Neist enamuse moodustavad küljetükid, kuid saadi ka 40 serva-, 20 põhja- ning kuus põhjaserva tükki. Enamus (kokku 541) on riibitud pindadega: 84% juhtudest oli riibetega kaetud välispind, sisepind silutud; ainult 12%, st 63 killul olid mõlemad pinnad riibitud. Nimetatud 63 killust 54 leiti I koldeasemest ja need pärinevad tõenäoliselt ühest nõust (jn 4: 2). Üheksa kildu olid mõlemalt pool silutud (1%). Leiti ka kaks küljetükki, mis olid mõlemalt pinnalt silutud, kuid ühe välispind oli kaunistatud kammivajutuste ning teisel väikeste lohukestega (jn 4: 3). Saadi veel 16 savitihendit ning 22 põlenud savitükki. Väheste metall-leidude seas oli märkimisväärsim 2005. aasta leiuga sarnane putkega rombikujulise peaga rauast nooleots (jn 4: 1). Lisaks raudnaeltele ning teistele 20. sajandisse kuuluvate metall-esemete katketele saadi ka üks pronkseseme katke, mille funktsiooni ei ole võimalik määrata. Samuti koguti kaevandi alalt nii põlenud kui ka põlemata loomaluid, mille analüüsimine on pooleli.

2007. aastal tehti prooviauke ja šurfe ka linnamäe põhjajalamile jäävale asulakohale (jn 1), et selgitada selle seotust linnamäe eriaegsete asustusetappidega. Linnamäe põhjajalamile kaevatud prooviaukude profiilides paljandunud stratigraafia kinnitab vaid 20. sajandi asustust. Samuti viidi asula lääneosas läbi inspeksioon, mille käigus vaadati läbi eemaldatud pinnasega ala. Sealt koguti üksikuid kvartsi- ja tulekivikilde ning loomaluid. Välitööde käigus linnamäe põhjajalamilt muinasaegset kultuurikihti ei leitud.

2007. aasta välitööde tulemused olid kooskõlas 2005. aasta omadega. Selgitati välja, et neoliitiline asustus koondub neemiku lääne- ja lõunaossa, vahetult toonase veekogu äärde. Teise asustusetapina eristati eelrooma rauaaegne kultuurkiht ning puitkindlustus, mis ilmselt ääristas kogu linnamäe põhjakülge ja mille rajamine jääb tõenäoliselt 4. sajandisse eKr. Kolmandana eristati liivast kuhjatud ning paekiviplaatidest koosnenud kindlustust, mille dateering jäi jätkuvalt lahtiseks.