



## EXCAVATIONS ON THE HILL FORTS OF SOUTH-EAST ESTONIA: KÕIVUKÜLA, MÄRDI, TRUUTA AND AAKRE

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In the summer of 2011 the University of Tartu continued excavations on the hill forts of south-east Estonia with the aim to survey their chronology. The study of hill forts, supported by the Estonian Science Foundation grants nos 6119 and 8510, began in 2005 and is expected to be completed in 2013. In the region four hill forts were studied: Kõivuküla, Truuta, Märdi and Aakre Kivivare (Fig. 1).<sup>1</sup> The soil was sieved by using 4 mm eye meshes.

### KÕIVUKÜLA HILL FORT

The hill fort of Kõivuküla is located 8 km south-east of Tartu city centre, 3 km south of the River Emajõgi, in the north-eastern part of Kambja parish, close to the Aage water mill site. It is situated on the southern bank of the Mõra River (tributary of Emajõgi), and protected from this side by a steep, vertical sandstone outcrop. The fort site, known after the mill as Aagemägi (Eng. Aage Hill), is located on a ca. 70 m long promontory between the valley of the Mõra River and another valley running diagonally into it. On the land side there is a man-made rampart (Fig. 2). The hill fort was discovered by Andres Vindi (TÜ) in 2010. Reference to its existence was provided in a letter from 1977 in the archives of the Institute of History where the site was noted as standing out in the landscape, as a probable hill fort.<sup>2</sup>

Until 2009 there was a moat in front of the rampart, but unfortunately most of it was filled by bulldozer in the course of tidying the area before the hill fort was discovered. Presently, only the northern end of the moat is unfilled and preserved. The relative depth from its bottom to the top of the rampart is ca. 3 m. From the profile of the excavation trench it appeared later that the moat stretched at least 1.3 m deeper

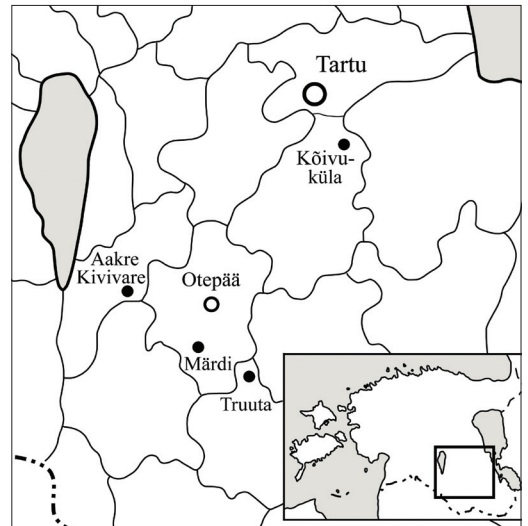


Fig. 1. Hill forts excavated in south-eastern Estonia in 2011.

Jn 1. Kaagu-Eestis 2011. aastal uuritud linnamäed.  
Drawing / Joonis: Maria Smirnova

<sup>1</sup> Excavations on Truuta and Aakre strongholds took place in the framework of MA studies' fieldwork practice, supervise by Pikne Kama and Maarja Olli accordingly.

<sup>2</sup> Letter of Lemming Rootsmäe to Vello Lõugas and Jüri Selirand from 09.08.1977 (AD).



Fig. 2. The rampart of Kõivuküla hill fort. View from the east.

Jn 2. Kõivuküla linnamäe vall. Vaade idast.

Photo / Foto: Heiki Valk



Fig. 3. Kõivuküla hill fort. Profile of the rampart with grey Bronze Age cultural layer under it.

Jn 3. Kõivuküla linnamägi. Valli profiil pronksi-aegse vallialuse halli kultuurkihiga.

Photo / Foto: Heiki Valk

than the plateau outside the hill fort. The rampart was originally about 25 m long, but its southern end has been severely destroyed: it has been flattened to facilitate access to the hill fort, probably due to ploughing.

In 2011 a trench (10 × 1 m)<sup>3</sup> was made in the central, widest part of the rampart, beside a small Soviet time gravel pit (Figs 3, 5). As the rampart had totally been removed from there, the trench had only one, northern profile in its central part. The flat top of the rampart beside the trench was 4 m wide (Figs 4, 5). The dark, almost black top layer that could be studied *in situ* only in the profile contained numerous stones with the diameter of 15–25 cm, both granite and limestone. These stones may have belonged to a building on top of the rampart in the broad flat area. The dark layer on top of the rampart contained some shards of hand-made vessels, one with textile impressions and another with ‘fingernail’ impressions (Fig. 6: 1). On the outer side of the rampart its original shape with a considerably steep slope falling into the moat could be observed in the profile of the trench (Fig. 5).



Fig. 4. Kõivuküla hill fort. The flat top of the rampart with stones in the dark cultural layer.

Jn 4. Kõivuküla linnamägi. Valli tasane ülaosa ja kivid tumedas kultuurkihis.

Photo / Foto: Heiki Valk

<sup>3</sup> The finds: TÜ 1915.

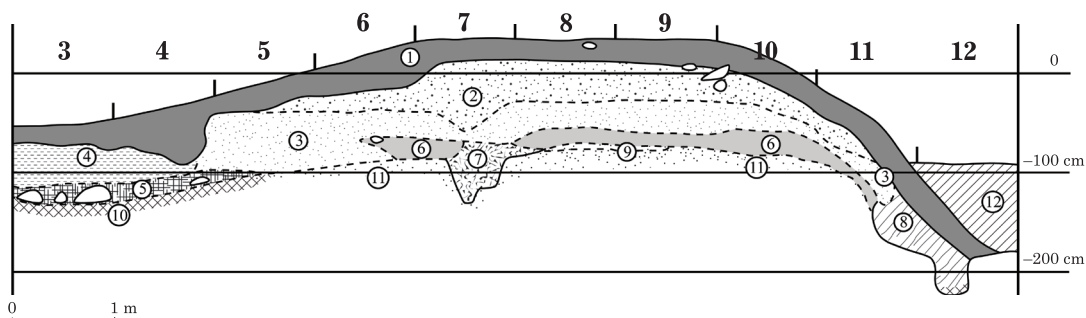


Fig. 5. Kõivuküla hill fort. Profile of the trench. 1 – dark cultural layer, 2 – fine gravel, 3 – reddish loam, 4 – brownish loam, 5 – reddish loam, supposed in situ cultural layer, 6 – Late Bronze Age cultural layer, 7 – pit, 8 – soil eroded into the moat, 9 – white podzol sand, 10 – intact natural red clay, 11 – intact natural yellow sand, 12 – red clay, fill of 2009 from the moat.

Jn 5. Kõivuküla linnamägi. Kaevandi profiil. 1 – tume kultuurkiht, 2 – peen kruus, 3 – punakas saviliiv, 4 – pruunikas saviliiv, 5 – punakas saviliiv, eeldatavasti elutegevuse käigus ladestunud kultuurkiht, 6 – hilispronksiaegne kultuurkiht, 7 – sissekaeve, 8 – vallikraavi ladestunud erosioonipinnas, 9 – valge leeteliiv, 10 – looduslik puutumatu punane savi, 11 – looduslik puutumatu kollane liiv, 12 – punane savi, vallikraavi täide 2009. a.

Drawing / Joonis: Maria Smirnova

Judging by the profile of the trench (Fig. 5), the rampart was heaped up in one stage. The upper part of its body consisted of fine gravel, the lower part of sandy loam. Inside the rampart, on the hill fort plateau the 70–75 cm thick layer of ground, mostly disturbed, contained several pottery fragments. This ground stretched until intact natural loam, without any layer of original soil between them. A  $^{14}\text{C}$  date from dispersed charcoal particles from the bottom layers of the soil in the yard area gave the result 234–576 AD<sup>4</sup> (Table 1: 1). Transition from the rampart body to the flat yard of the hill fort revealed no definite border.

The disturbed soil, both in the plateau area and in the body of the rampart, contained fragments of hand-made pottery from vessels with a coarse surface, a striated surface and with textile impressions. One shard had dots at the edge (Fig. 7: 1). Also a small iron artefact (Fig. 7: 11) was found from the body of the rampart.

A greyish, 5–10 cm thick cultural layer (Figs 3, 5: 6), containing ashes, charcoal particles, numerous fish bones and small fragments of animal bones, some of them

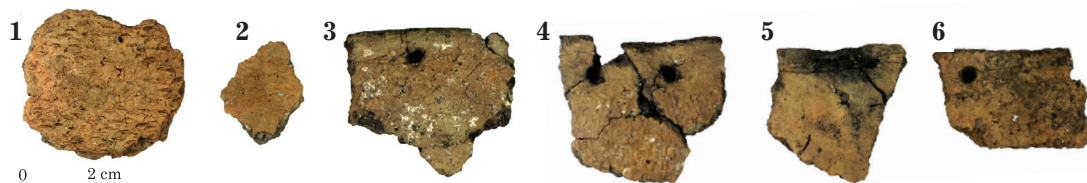


Fig. 6. Pottery from Kõivuküla hill fort. 1 – from dark layer on top of the rampart, 2–6 – Late Bronze Age pottery, 2–4 – from in situ cultural layer, 5–6 – from the body of the rampart. 1 – with 'fingernail' impressions, 2, 4 – with textile impressions, 3, 5, 6 – with groove at the edge, 3, 4, 6 – with penetrating holes at the edge.

Jn 6. Savinõukilde Kõivuküla linnamäelt. 1 – tumedast kultuurkihist valli peal, 2–6 – hilispronksiaegsed leiud, 2–4 – ladestunud kultuurkihist, 5, 6 – vallikehandist. 1 – „sõrmeküüne“ jäljenditega, 2, 4 – tekstiilkeramikaga, 3, 5, 6 – servasoonega, 3, 4, 6 – servaääreste augukestega.

(TÜ 1915: 88, 234, 232, 187, 175, 43.)

Photo / Foto: Heiki Valk

<sup>4</sup> All dates in the text are calibrated (95.4% probability) into calendar years, using OxCal 4.1 programme and IntCal 09 calibration curve (Bronk Ramsey 2009). Dates in radiocarbon years with possible ranges of calibration are presented in Table 1.

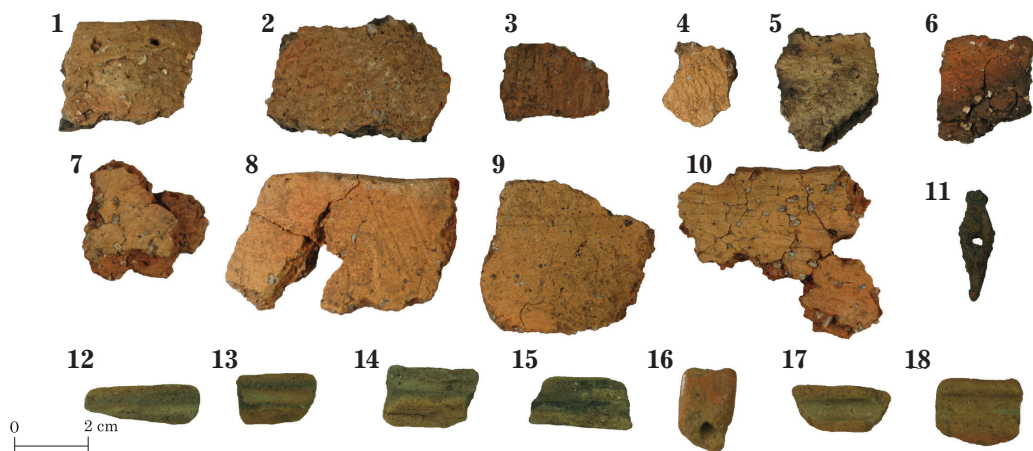


Fig. 7. Finds from Kõivuküla hill fort. 1 – fragment of vessel with dotted edge, 2–5 – fragments with textile impressions, 6 – fragment of ordinary hand-made pottery, 7–10 – striated pottery, 11 – iron artefact, 12–18 – mould fragments.

Jn 7. Leide Kõivuküla linnamäelt. 1 – servalohkudega nõu katke, 2–5 – tekstiilkeraamika, 6 – tavaline käsikeraamikakild, 7–10 – riibitud keraamika, 11 – raudese, 12–18 – valuvormide katked.

(TÜ 1915: 176, 209, 60, 119, 153, 127a, 160, 158, 123, 157.)

Photo / Foto: Heiki Valk

cremated, lay under the body of the rampart. This layer was not preserved in the yard area, but was probably heaped up from there into the rampart. A  $^{14}\text{C}$  dating from charcoal particles in the grey cultural layer gave the result 922–551 BC (Table 1: 2), indicating Late Bronze Age activities. From this cultural layer a small bone awl, a shard with fine textile impressions (Fig. 6: 2) and some fragments of coarse dark grey, partly black pottery originate. Some of these shards had penetrating holes at the edge; one of them also had a groove at the edge (Fig. 6: 3) and another had a surface with textile impressions (Fig. 6: 4). Fragments of similar dark vessels (Fig. 6: 5, 6) occurred also in the body of the rampart, giving evidence of taking soil for it from the hill fort plateau. From the rampart also several shards with textile impressions (Fig. 7: 2), with striated (Fig. 7: 7) or simple coarse surface were found. The colour of the shards varied from light pinkish brown to dark brown or almost black.

Shards with textile impressions (Fig. 7: 3–5), with coarse surfaces (Fig. 7: 6) and with striated surfaces, one of them also with a penetrating hole at the rim (Fig. 7: 8–10), were found from the lowest part of the cultural layer in the yard area, probably preserved *in situ*. The original soil and grey Bronze Age soil had been removed from here. The shards contained quite large pieces of stone rubble. Dark brown and grey shards were documented, but light, pinkish vessel fragments, characteristic also to the Roman Iron Age *tarand*-graves of south-eastern Estonia, were more numerous. Also a  $^{14}\text{C}$  analysis, gained from this area, refers to the 3rd–6th centuries (Table 1: 1). From the bottom layers also some pieces of slag and fragments of clay moulds for making rings (Fig. 7: 12–18) were found. Some fragments of similar moulds were gained from the body of the rampart. As the fragments of clay moulds have parallels in the Late Bronze Age fortified settlements of coastal Estonia (Asva, Iru, Ridala, Narva) (Lang

2007, 115–116), and as similar finds have not been found from Roman Iron Age hill forts<sup>5</sup>, the mould fragments might originate from the Late Bronze Age.

The bone assemblage (432 items) was most fragmentary, mainly obtained by sieving; *ca.* 30% of the fragments were burnt. The grey Bronze Age cultural layer contained bone fragments of big and small cattle and supposed fragments of pig and canine. Also bone fragments of pig, wild boar (?) and cervine from the disturbed layers with several mould fragments might belong to the same period. From the body of the rampart and soil eroded down from there also a beaver bone and a cock spur were identified. As the finds cannot be later than the Migration Period, the spur is identified as the oldest find of domestic fowl in Estonia. Fish bones formed 47.2% of the assemblage; in the grey Bronze Age layer their proportion was even 58.6%.

According to <sup>14</sup>C dates, the settlement unit on Aagemägi hill represents two different time periods. Although from the earliest, Late Bronze Age stage, no traces of a fortification were found, it seems likely, judging by the location of settlement traces in the beginning of a naturally well protected promontory, that the site was somehow fortified already at that time. The finds of similar mould fragments are up to now known also only from the fortified settlements of that period. Thus, Kõivuküla Aagemägi can be regarded as the first known fortified Late Bronze Age fortified settlement in southern Estonia.

The next period includes the Roman Iron Age and the Migration Period. The rampart was heaped up when the Roman Iron Age settlement had existed for some time already, for its body contained pottery originating both from the Bronze Age and typical for the Roman Iron Age. The black cultural layer on the top of the rampart represents the latest phase of the hill fort. The lack of typical Viking Age pottery and the presence of textile-impressed ware in the black top layer shows that the rampart with a building on it was constructed not later than in the Late Roman Iron Age or in the Migration Period.

### **MÄRDI HILL FORT**

Märdi hill fort is located in the southern part of Otepää uplands in Märdi village in the Otepää parish, 300–400 m north-west of Väike-Trommi farm, west of the River Väike-Emajõgi. The hill is called Kõrgemägi (Eng. High hill). From the west, north and east it is well protected by high and steep slopes. Only its southern side is less steep, offering better access. The size of the slightly oval plateau can be estimated to *ca.* 2500 m<sup>2</sup>. No memories of the fort were preserved in folklore or toponyms. Data referring to ancient fortifications were gained occasionally when pieces of charcoal were found while digging a post hole to designate a hiking track. Local people informed Andres Vindi in 2009 about this find. One of the trial pits of 2010 that yielded some fragments of clay daubs gave reason for further investigations.

In 2011 an excavation plot (12 m<sup>2</sup>) was made at the southern edge of the hill top, at the border of the plateau and the sloping area. In both ends of the southern side of the hill plateau the slopes were rather steep, maybe artificially steepened, but the central part of the southern edge had the weakest natural preconditions for defence. Work was started in the place where coring gave evidence of a layer of charcoal in the depth of 50–60 cm.

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<sup>5</sup> Oral comment by Prof. Valter Lang (TÜ).



Fig. 8. Brands on Märdi hill fort.

Jn 8. Tukid Märdi linnamäel.

Photo / Foto: Heiki Valk

The uppermost 30 cm under the weak and thin turf consisted of disturbed, eroded sand. The first areas of dark sooty soil appeared in the depth of *ca.* 30 cm. In the depth of 35–55 cm a dark layer of sooty sand and brands, covered by fist-size burnt stones was revealed. The brands with the preserved diameter of up to 15–20 cm, located mostly parallel to the edge of the hill, lay in a 1.2–1.6 m wide zone (Fig. 8). From the opened area 19 brand fragments were found. One of the brands originated from the higher part of a pine tree (diameter up to 8 cm), the branches of which had been cut off most carelessly, in the distance of about 10 cm from the trunk. In all three <sup>14</sup>C samples taken from the charred logs (Table 1: 3–5) were analyzed. Brand A gave the result 126–399 AD, birch bark from brand B was dated to 245–534 AD and charcoal taken from brand H, from the outermost tree rings under the bark, gave the result 75–526 AD. Just under the layer of brands, from the burnt sand charred tree roots were found. As the roots had not decayed in the ground, the tree(s) had been cut rather shortly before constructing and burning the defence wall. A <sup>14</sup>C analyses from the roots (Table 1: 6) gave the result 262–278 AD or 330–574 AD.

The stones above the brands and on the inner side of the burnt defence wall bore traces of fire. Most likely they had been stored as ‘ammunition’ on top of the timber wall and had become strongly burnt in the fire that destroyed it. The stones, fallen from the top of the fortification to its inner side, stretched until 1.5 m from the brands. Judging by the stones, the fortifications did not consist only of a defence wall, made of horizontal logs, but included also a platform on its inner side, wide enough to have

space both for the defenders and the stones. As the sand above the stones was burnt, it seems likely that the inner and outer side of the defence wall were made of horizontal logs with sand fill between them.

When excavations had enabled to establish the presence of the burnt defence wall, its further run could easily be followed by coring. The burnt fortifications could be observed on a 25–28 m long line – in all distance between the higher ends of the southern side of the hill plateau where the slope did not offer sufficient natural protection. Although all the soil was sieved during the excavations not a single pottery fragment or animal bone was found. Evidently, the hill fort was in short-time use, probably constructed in a rush in a situation of crisis. Judging by the overlapping part of the  $^{14}\text{C}$  analyses, we can consider the period of 262–278 AD or 330–434 AD. If the samples come from the later part of the last-mentioned time span, the construction and destruction of the fort coincides with the end of the Roman Iron Age *tarand*-grave tradition in south-eastern Estonia in the 5th century AD.

### **TRUUTA HILL FORT**

The hill fort of Truuta is situated in the south-eastern part of Otepää uplands, in the north-western periphery of the Urvaste parish, ca. 1.2 km south-east of the Truuta manor, 300–400 m east/south-east of the Liinu farmstead, on the high bank of Lake Liinujärv (Eng. Lake of Forts).<sup>6</sup> The lake is part of an important ancient water route: the Võhandu River (called in its upper course Pühajõgi) that flows through several lakes leads to Lake Pihkva (Pskov). The monument was discovered by Andres Vindi in 2004. The hill fort plateau with a good view over the lake (Fig. 9) is 23 m above water level (Valk 2008, 313) and its area is estimated to ca. 1 ha. Although the fort area is protected by a high bank of the lake valley in the south and by a deep valley of a little runnel in the east and north, its western border is unclear. Between the deep lake valley and a small wetland area, considering the general process of drying and closing up of small inland water bodies in southern Estonia, presumably more wet in the past, the fort area has no natural border for ca. 30 m in the west. It seems likely that once a timber fortification stood somewhere there.

In the centre of the fort area, in the bottom of a natural depression there is a spring that served as the source of water. In high water time in April and early May its diameter may stretch up to 10 m (Valk 2008, 314), but during the excavations in hot midsummer the water totally dried. The sides of the well were embanked by stones with a diameter of 20–30 cm. In the post-war time, probably also earlier, the fort area was used as cattle pasture and the stones may have been laid there to protect the well from the cattle, but also earlier origin of the embankment cannot be excluded.



Fig. 9. View from Truuta hill fort to Lake Liinujärv.  
Jn 9. Vaade Truuta linnamäelt Liinujärvele.  
Photo / Foto: Heiki Valk

<sup>6</sup> *Liin* (gen. pl. *Liinu*) means in the south Estonian dialect both 'town' and 'fort'. In the context of hill forts the ancient meaning of the word, referring to a fortified area, should be preferred.

Truuta hill fort was discovered in 2004 when some fragments of hand-made pottery<sup>7</sup> were found from around the spring (Vindi 2004, 1). The name of the lake gave the main hint for the existence of this fort, but the former fort is reflected also in oral tradition. One of the legends sounds as follows:

*Close to Truuta manor of Urvaste parish Nahaliin (Eng. Fur Fort<sup>8</sup>) is told to have been in old times. One suggestion was, that it was in the same place as the manor, the other – that it was located on Sirkli hill, where lots of ruins could be found. This town was told to be large and nice, even posts at the road were made of iron. A war destroyed Nahaliin. Later Nahaküla (Eng. Fur village) was built there. The landlord excavated in Nahaliin 40 years ago and found some things there.<sup>9</sup>*



Fig. 10. Truuta hill fort. Trenches I and II with spring on the foreground. View from the south-east.

Jn 10. Truuta linnamägi. Kaevandid I ja II allikakohaga esiplaanil. Vaade kagust.

Photo / Foto: Heiki Valk

Even in the summer of 2011 Arvo Mölder (age 74), the old farmer from Liinu farmstead told a legend heard from his father. Nahaliin was considered to be a place where once fur tanners lived. A trade route, used by ships, went on the lakes and river from here to the present-day town of Võru, and onwards to Lake Pihkva (Pskov). Although Nahaliin was identified by him as a place on the other, i.e. southern side of the lake valley close to the manor, the field survey there revealed no traces of fortifications or other human activities. Another local inhabitant of the same village, Karl Sisask (age 85) told that there had once been a fort (Est. *liin*) on the shore of Lake Liinu.

During the archaeological excavations four excavation plots were made on the hill.<sup>10</sup> As there were no visible traces of defence structures, the first three plots were made near the spring (Fig. 10) where pottery had been previously found.

Plot I was a 1 × 6 m trench situated 15–20 m north-west of the spring, on sloping ground. Natural soil was revealed in the depth of ca. 30 cm. The only find

from the trench was a charred board, unearthed in the depth of 20 cm in its southern, lower part. The <sup>14</sup>C sample from it indicates different possible ranges between 1490 and 1955 AD, with higher likeliness in the 17th and late 18th centuries (Table 1: 7). Another sample made of sieved charcoal particles gave the range 1436–1638 AD (Table 1: 8).

Plot II (1 × 2 m) was also situated on the north-western side of the spring, close to the waterline. Although it was hoped that the vicinity of water may have attracted human activities and moist soil may have preserved organic material, in the depth of ca. 30 cm natural clay appeared. The only finds were two pieces of hand-made pottery.

<sup>7</sup> TÜ 1345.

<sup>8</sup> The word *nahk* (gen. *naha*) means both 'fur' and 'leather'.

34 <sup>9</sup> EKM, Estonian Folklore Archives: E I 25 (163) – M. J. Eisen < Alice Naelapea.

<sup>10</sup> The finds: TÜ 1927.



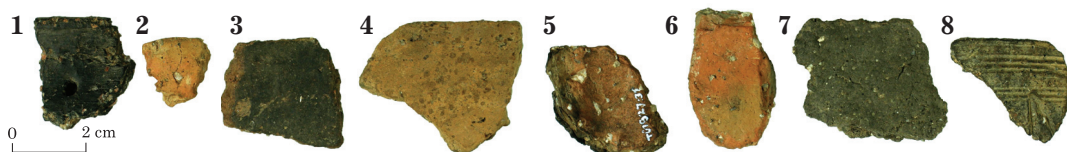


Fig. 11. Pottery fragments from Truuta hill fort. 1–2 – with penetrating holes, 3–4 – fragments of fine vessels, 5–6 – ordinary hand-made pottery, 7 – fragment swelled in fire, 8 – wheel-thrown pottery.

Jn 11. Savinõukilde Truuta linnamäelt. 1–2 – läbivate augukestega, 3–4 – peenkeramaliste nõude killud, 5–6 – lihtne käsikeraamika, 7 – porsunud kild, 8 – kedranõukatke.

(TÜ 1927: 91, 93, 35, 104, 31, 102, 84, 65.)

Photo / Foto: Pikne Kama

Plot III (3 × 4 m) was situated 8–12 m south-east of the spring. Most of the 92 pottery pieces were rather robust and small, originating from hand-made vessels (Fig. 11: 5, 6). Some fragments were from fine vessels (Fig. 11: 4), in rare cases with a smoothed surface (Fig. 11: 3), and one fragment was swelled in fire (Fig. 11: 7). In plot III the light brown sandy soil that contained finds stretched until the depth of 40–45 cm. The most interesting piece of pottery, a wheel-thrown fragment ornamented with straight lines and waves (Fig. 11: 8), was found just above intact natural loam. This kind of pottery was imported from Pihkva and dates from the 11th until mid-12th century (Tvauri 2005, 145–146). Finding this latest shard from the bottom layer shows that the cultural layer has been mostly or totally disturbed as a result of erosion. Two <sup>14</sup>C samples (Table 1: 9, 10) made from dispersed charcoal particles in the soil gave the possible ranges of 1447–1953 and 1645–1954 AD.

Plot IV (2 × 2 m) was situated ca. 30 m south-east from the spring, on flat ground on top of the natural ridge that cuts the hill fort area into two parts. 34 pieces of pottery were found there, two of these with penetrating holes (Fig. 11: 1, 2). This kind of pottery is dated to the (8th) 9th–11th century (Lillak 2009, 42). Also, some pieces of flint were collected from all excavations plots.

The thickness of the soil that contained pottery pieces varied from 20 to 45 cm in different excavation plots. The soil on the sloping area close to the spring seemed to be fully disturbed by ploughing and erosion. The dispersed tiny charcoal particles in the disturbed soil, with <sup>14</sup>C dates ranging from the mid-15th up to mid-20th century might indicate to slash-and-burn cultivation which was widely practised in south-eastern Estonia up to the 19th century. Also the small size of the pottery fragments refers to long-time ploughing of the hill fort area. As the colour of soil was light brown, and it contained no other traces of human activities such as animal bones, hearths or burned stones, the fort was used occasionally or seasonally and not permanently inhabited.

The potshards found from the hill fort are characteristic of the Viking Age ceramics. During that time fur trading was common in south-eastern Estonia (Leimus & Kiudsoo 2004, 43). Truuta hill fort that controlled the water trade route to Lake Pihkva (Pskov) could also have been a place of collecting and processing fur whereby the spring water may have been used for fur tanning. The spring pit may also have been deepened or even dug for tanning purposes. The only fragment of wheel-thrown pottery, i.e. the ornamented shard mentioned above, comes from the final stage of the hill fort. Considering the general historical context, the use of the fort may have been ended by the military raid of Kievan Rus prince Yaroslav against the Chud around 1030.

The results of archaeological excavation refer to a site of seasonal use and not of intensive inhabitation, it may have been deserted in the end of the Viking Age. This fits well with local lore and the toponym referring to an ancient centre of fur tanning and fur trading.

### AAKRE KIVIVARE HILL FORT

Aakre Kivivare hill fort is located in the south-western part of Otepää uplands, in the Rõngu parish and Palamuste village, beside the Kivivare farm. The maximal measures of the hill fort plateau are  $77 \times 64$  m and the fort does not have any visible rampart. A terrace can be seen in some parts of the slope and there was a Viking Age settlement on the lower plateau of the hill, immediately south of the hill fort. The stronghold was first described in the end of the 19th century.<sup>11</sup> With trial excavations in 1951, undertaken by Harri Moora, an intensive 50–60 cm thick cultural layer was discovered and some Viking Age pottery was found (Moora 1951). The Viking Age settlement was largely excavated in 1972 and 1973 (Aun 1975; 1992, 25). About 150 m south-west from the hill fort is a Roman Iron Age *tarand*-grave that was fully excavated in the late 19th century by a student Johann Sitzka (Sitzka 1897; Laul 2001, 58–59).

During the excavations in 2011 two trenches were made at opposite edges of the hill fort plateau on the same line (Fig. 12).<sup>12</sup> Trench I ( $16 \times 1$  m) (Figs 13, 14) began on the higher edge of the slope and continued for 13 m on the flat plateau. In its higher part (9–16 m from the beginning) the thin cultural layer that mostly contained small

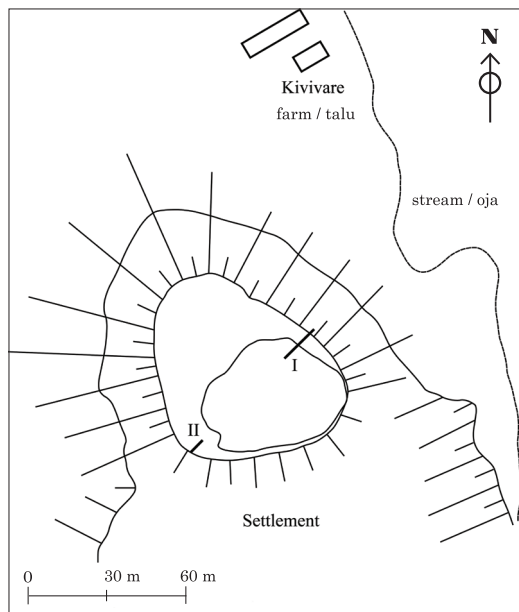


Fig. 12. Plan of Aakre Kivivare hill fort (after Uno Hermann) with the location of trenches.

Jn 12. Aakre Kivivare linnamägi (Uno Hermann) järgi kaevandite asukohtadega.

Drawing / Joonis: Maria Smirnova



Fig. 13. Trench I on Aakre Kivivare hill fort. View from the south-west.

Jn 13. Aakre Kivivare linnamägi I kaevand. Vaade edelast.

Photo / Foto: Heiki Valk

<sup>11</sup> Mss. 132, 138, 162.

<sup>12</sup> The finds: TÜ 1928.

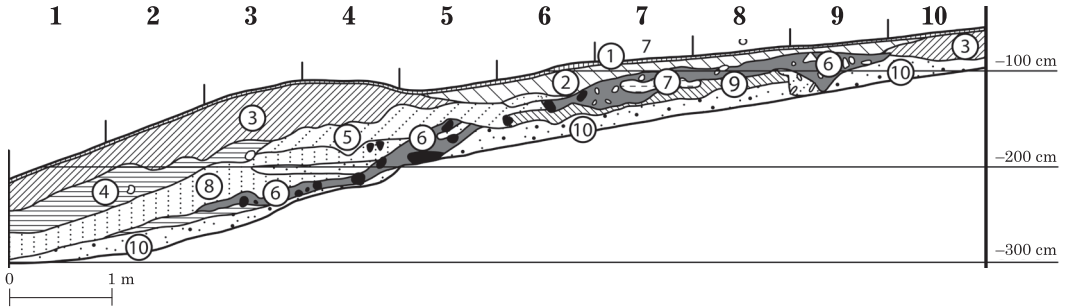


Fig. 14. Aakre Kivivare hill fort. Profile of trench I. 1 – turf, 2 – brownish sandy disturbed soil, 3 – dark grey disturbed/eroded soil, 4 – greyish Pre-Viking Age or Early Viking Age cultural layer, 5 – disturbed brown cultural layer, 6 – Early Iron Age cultural layer: a – dark cultural layer with burnt stones, b – sooty sand with brands, 7 – burnt red clayish loam, 8 – orange sand, 9 – grey original soil, 10 – intact yellow sand.

Jn 14. Aakre kivivare linnamägi. I kaevandi profiilijoonis. 1 – kamar, 2 – pruunikas liivane segatud pinnas, 3 – tumehall segatud/erodeerinud pinnas, 4 – hallikas eelviikingiaja või varase viikingiaja kultuurkiht, 5 – segatud pruun kultuurkiht, 6 – varase rauaaja kultuurkiht: a – tume, põlenud kividega kultuurkiht, b – tukkidega nõgeliiv, 7 – põlenud liivsavi, 8 – oranž liiv, 9 – hall looduslik pinnas, 10 – puutumata kollane liiv.

Drawing / Joonis: Riina Vesi



Fig. 15. Aakre Kivivare hill fort, trench I. Sooty Pre-Roman Iron Age cultural layer with stones and ditch for a log in trench I.

Jn 15. Aakre Kivivare linnamägi, kaevand I. Nõgine kividega eelrooma rauaaja kultuurkiht kivide ja palgipesaga. Photo / Foto: Maarja Olli

pottery shards, animal bones and iron slag was totally disturbed by ploughing. In the distance of 2.5–6.5 m from the edge of the present-day hill plateau there was a 4 m long area where intensively black and sooty cultural layer contained small strongly burnt stones (diameter 5–10 cm) (Figs 13, 14: 6b; 15). Two heavily worn-out grinding stones probably belong into that context. <sup>14</sup>C dates from the black layer gave the results suggesting the range between 4th and 1st century BC (Table 1: 11, 12). The outer edge of the sooty area with burnt stones was bordered by an oblong depression that was cut into intact original soil and seemed to have served as a 'bed' for a log of 15–20 cm diameter. Probably the dark layer with burnt stones designates a house area. In the black sooty layer fragments of coarse pottery that contained big pieces of stone rubble were found. However, no fragments of textile-impressed or striated pottery occurred.



Fig. 16. Finds from Aakre Kivivare hill fort. 1 – fragment of Arabic coin, 2 – fragment of comb pendant with bird motifs, 3, 4 – fang pendants, 5, 6 – clay beads.

Jn 16. Leide Aakre Kivivare linnamäelt. 1 – Araabia hõbemündi katke, 2 – linnukujutistega kammripatsi katke, 3, 4 – kihvripatsid, 5, 6 – savihelmed.

(TÜ 1928: 441, 983, 1332, 1331, 887, 82.)

Photo / Foto: Riina Rammo, Anti Lillak

The layer of sooty soil, now with some remains of brands in it but without stones, continued after a break of ca. 0.5 m towards the edge of the hill (Fig. 14: 6b). Here the original ground level was already sloping. In the outer end of the trench the layer of charcoal lay in the depth of ca. 1 m, being covered by a fill of disturbed sand (Fig. 14: 8). The <sup>14</sup>C dates from the dark layer of charcoal (Table 1: 13, 14) are also from the 4th century BC – 1st century AD, i.e. the Pre-Roman Iron Age, referring to the formation of the lowest burnt layer in trench I in the same fire. The overlapping part of the samples from the burning layer is 352–60 BC.

After the fire the edge of the hill fort plateau has been expanded by adding a layer of sand (Fig. 14: 8) on its sloping edge. Datable finds from the upper layers of the first trench come from the second stage of

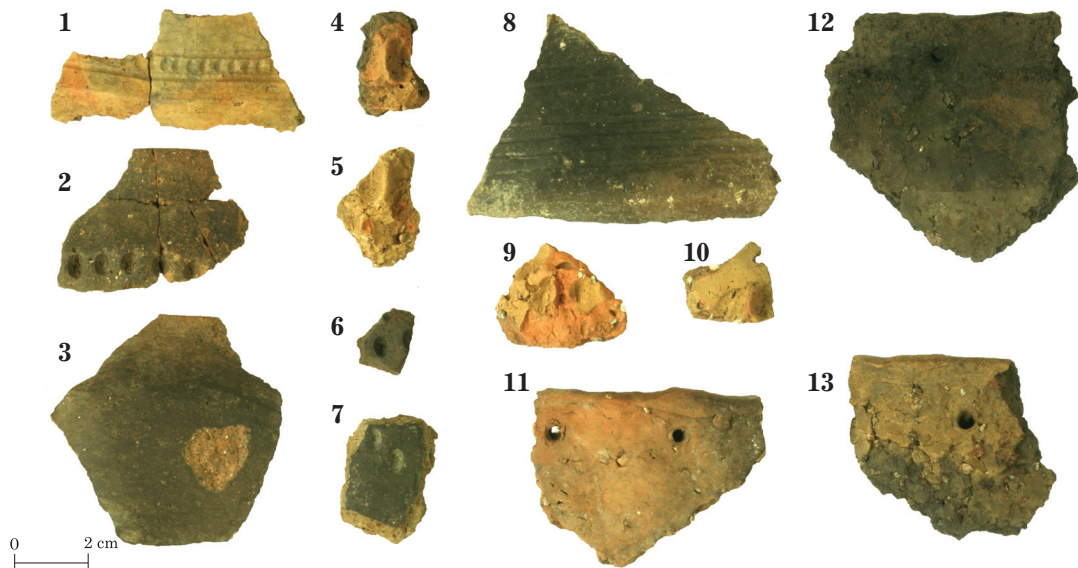


Fig. 17. Pottery from Aakre Kivivare hill fort. 1–3, 6–8 – fine ware, 4, 5, 9, 10 – coarse ware decorated with fingerprint ornamentation, 11–13 – Rõuge-type ware.

Jn 17. Keraamika Aakre Kivivare linnamäelt. 1–3, 6–8 – peenkeraamika, 4, 5, 9, 10 – näpiornamendiga jämekeraamika, 11–13 – Rõuge-tüüpi keraamika.

(TÜ 1928: 629+271, 408, 1161, 398, 240, 816, 1319, 1291, 658, 485, 1267, 1163, 1162.)

Photo / Foto: Anti Lillak

use and are from the Viking Age. Here, a half of an Arabic coin from the turn of the 8th and 9th century AD, the Abbasides dynasty<sup>13</sup> (Fig. 16: 1) should be noted. Two Arabic coins that had been found from the settlement at the foot of the stronghold are from the same period (Aun 1992, 169, table 1). Most rich in finds was a greyish layer (Fig. 14: 4) on the sloping part of the hill. Here a large number of Viking Age pottery was found: mostly hand-made coarse ware, many of them from Rõuge-type vessels (Fig. 17: 11–13), some decorated with fingerprint ornamentation (Fig. 17: 4, 5, 9, 10), one of them (Fig. 17: 10) with a penetrating hole, almost half of a coarse ware vessel (Fig. 18: B) and shards of fine ware. Some of them were decorated with dot ornamentation (Fig. 17: 1, 2, 6, 7) and some had a rim (Figs 17: 1, 2, 3, 8; 18: A). Both ways of decoration are typical for the Viking Age fine ware of south-eastern Estonia. Fragments of dot-ornamented and rimmed vessels existed among the settlement's fine ware, too (Aun 1975, 81). A fragment of an antler comb pendant (Fig. 16: 2) was found from the grey layer. It has direct parallels from the Rõuge hill fort and settlement (Aun 1975, plate XXX, 1, 10). Similar pendants from Kivivare settlement (Aun 1975, plate IX: 2, 12) were a bit different in shape. Several fish bones, three fishing hooks and a harpoon (Fig. 19: 1–4) found close to each other in the grey layer indicate fishing activities of the inhabitants of the hill fort. Similar fishing hooks have been also found from Rõuge and Kivivare settlements (Aun 1975, 58, plate XXII: 2, 3, 5–7, 9, 10). The grey layer was also most rich in animal and fish bones: 55.5% of the bone material gained during the excavations originated from here. The large concentration of finds and animal bones indicates to a probable waste disposal site, located at the edge of the hill plateau. Charcoal particles collected from the grey layer gave the possible range of 567–808 AD (Table 1: 15).

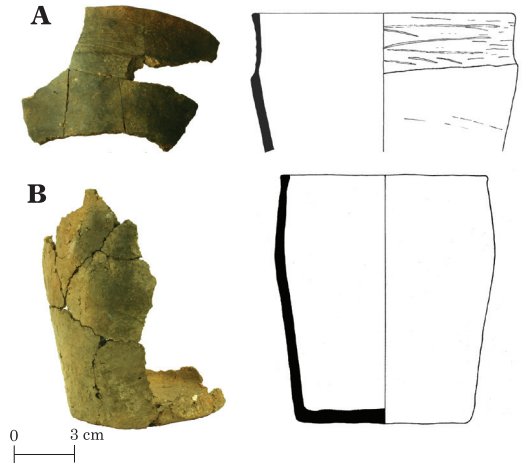


Fig. 18. Pottery from Aakre Kivivare hill fort. Reconstructions of fine (A) and coarse ware (B) vessels.

Jn 18. Keraamikat Aakre Kivivare linnamäelt. Peen- (A) ja jämekeraamilise (B) nõu rekonstruktsioon.

(A: TÜ 1928: 1189, 1305, 1306, 1310; B: TÜ 1928: 1129, 1149, 1150, 1152.)

Photo and drawing / Foto ja joonis: Anti Lillak



Fig. 19. Finds from Aakre Kivivare hill fort. 1–3 – fishing hooks, 4 – harpoon, 5 – strike-a-light stone, 6 – fragment of bone arrowhead, 7 – tenon axe.

Jn 19. Leide Aakre Kivivare linnamäelt. 1–3 – õngekonksud, 4 – ahing, 5 – ovaalne tuluskivi, 6 – luust nooleotsa katke, 7 – kaeluskirves.

(TÜ 1928: 632, 633, 1215, 1182, 1434, 1266a, 1549.)

Photo / Foto: Anti Lillak

<sup>13</sup> Determined by Mauri Kiudsoo (AI) and Ivar Leimus (AM).



Fig. 20. Aakre Kivivare hill fort. Remains of burnt defence wall in trench II.

Jn 20. Aakre Kivivare linnamägi. Põlenud kaitsetara jäänused II kaevandis.

Photo / Foto: Heiki Valk

A fragment of a partly charred bone arrowhead from Kivivare hill fort (Fig. 19: 6) is more elaborated than similar finds from other hill forts and settlements of south-eastern Estonia (Aun 1992, 70–71). The cultural layers contained also numerous fragments of moulds (mainly from the top layer), a bronze spiral, a knife fragment and two closely situated fang pendants (Fig. 16: 3, 4). The clay beads (Fig. 16: 5, 6) have parallels from Kivivare settlement (Aun 1975, plate IX: 4–6; 1992, 62). The similarity of finds from the hill fort and settlement shows clearly that they functioned simultaneously.

From Trench II (7 × 1 m) burnt logs of a defence wall were found at the edge of the plateau (Fig. 20). Two <sup>14</sup>C analyses (Table 1: 16, 17) gave similar results: 393–57 BC and 402–265 or 128–122 BC, with the overlapping part of the samples 393–265 BC or 128–122 BC. From this trench hand-made pottery, including typical Viking Age finds, an oval strike-a-light stone (Fig. 19: 5), animal bones and iron slag, but also a tenon (or necked) axe (Fig. 19: 7) were found. Such

axes were used during the Late Pre-Roman and Early Roman Iron Age (Lang 2007, 141).

The bone assemblage from the hill fort<sup>14</sup> (Fig. 21) consisted of 613 specimens and was very fragmented. Therefore almost a third of it (29%) remained unidentified (i.e. could be identified only as mammal bones) and for some specimens (27.7%) only the approximate size of an animal could be told (large as a size of cattle or medium as a size of sheep). Mammal bones formed the majority, but there were also relatively many fish remains (20.1%), among them pike (*Esox lucius*) and perch (*Perca fluviatilis*) and a few bird bones (0.9%). Most numerous species among the assemblage were domestic stock: sheep/goats (*Ovis ammon* f. *aries* / *Capra ibex* f. *hircus*; 8.5%) and cattle (*Bos primigenius* f. *taurus*; 8.3%). Horse (*Equus ferus* f. *caballus*) was represented with eight specimens; two pelvis fragments of them had cut marks on them. Four fragments of domestic fowl (*Gallus gallus* f. *domesticus*) were also found. Since pigs (*Sus scrofa* f. *domestica*) and wild boars (*Sus scrofa*) are difficult to distinguish, it was hard to specify whether six found suid bones belonged to one or another. Wild animals were represented with eight species. The most common was beaver (*Castor fiber*) with 10 specimens – mostly limb bones from young individual(s) probably skinned for fur. Brown bear (*Ursus arctos*) was represented with five bone fragments, although two of those somewhat uncertain. A bear's scapula carried cut marks and its possible cranium fragment had been cut through. Other game were represented with a single specimen: a humerus of an otter (*Lutra lutra*) which carried cut marks, a burnt

<sup>14</sup> Percentages indicate the share from the total number of fragments, i.e. from 613 specimen.

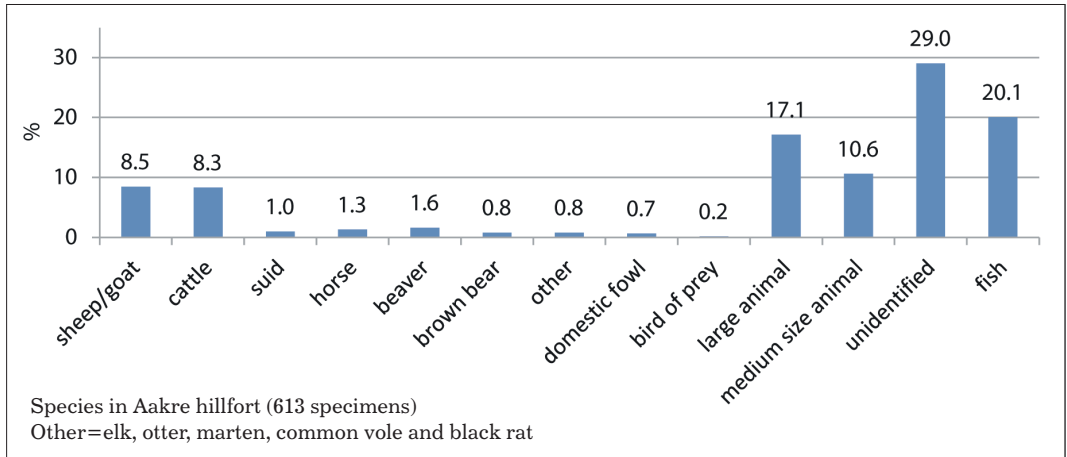


Fig. 21. Bone assemblage from Aakre Kivivare hill fort.

Jn 21. Luud Aakre Kivivare linnamäelt.

Drawing / Joonis: Eve Rannamäe

mandible of a marten (*Martes sp.*) and a small fragment of elk's (*Alces alces*) second or fifth metatarsus that carried several sharp cut marks, most probably resulted from skinning. A remarkable find was a distal phalanx (claw) of a bird of prey, however without any man-made marks. There were also two arbitrary bones from rodents – probably a common vole (*Microtus arvalis*) and black rat (*Rattus rattus*).

In addition to utilizing animals for meat and skin/fur, their bones had been processed, leaving about ten processing remains in the soil. Many processing remains originate from the grey Pre-Viking Age or Early Viking Age deposits (Fig. 14: 4). Almost one third (30.8%) of bones were burned, being one possible reason for extensive fragmentation. Other taphonomical features recorded were gnawing marks (11.1%) and cut/chop marks (5.2%).

Bones surely originating from the Pre-Roman Iron Age formed a very small amount from the assemblage (2.9%), including cattle, a possible brown bear and few fish bones. In the grey layer that can be regarded as a closed complex from the Pre-Viking Age or the early Viking Age (Fig. 14: 4) all mammal species mentioned above, except elk, were represented. The distribution of species corresponds to the distribution of the whole assemblage from the hill fort. Fish seems to have been a considerable nutriment during this period, forming almost one third (30.3%) of the bone assemblage.

The excavation results give evidence of two main periods of use of Kivivare hill fort. In the Pre-Roman Iron Age, later than in the middle of the 4th century BC, the hill seems to have been surrounded by a wooden fence. Judging by <sup>14</sup>C dates, the constructions found from both trenches might be of simultaneous origin and were probably destroyed in the same fire. In the Pre-Viking and Viking Age the hill fort existed in parallel with the settlement right south of it. It is usual for that time in south-eastern Estonia that a hill fort and a settlement, involved in beaver fur trade and handicraft, are situated next to each other (Leimus & Kiudsoo 2004; Tvauri 2012, 56). Indications of involvement in the fur trading system are shown by finds of Arabic coins mentioned

above, and eight finds of beaver astragalus pendants from the settlement. For long-distance communication evidently the Purtsi River, passing the hill fort in the distance of ca. 1 km north of it and running into Lake Võrtsjärv, was used. From there onwards, water ways went both to the Baltic Sea, to the River Emajõgi and Lake Peipsi. Finds also indicate Viking Age handicraft activities on the Aakre Kivivare hill fort – blacksmithing, bronze casting and bone working. As from both trenches no remains of Viking Age fortifications were found at the edge of the plateau, the question of defence wall of that time remains somewhat open.

### **CONCLUSIONS**

The excavations of 2011 gave considerable new information on the earliest stage of hill forts in south-eastern Estonia. Three monuments were dated to the Late Bronze Age or Pre-Roman Iron Age. Kõivuküla Aagemägi is the earliest known, probably fortified Late Bronze Age settlement in southern Estonia. The timber fortifications of Aakre Kivivare and Märdi hill forts gave also unexpectedly early dates whereby the large plateau of Aakre hill fort should especially be noted. The Viking Age use of Aakre Kivivare and Truuta hill forts was already suggested earlier, but the early <sup>14</sup>C date from the layer with finds that have traditionally been considered typical for the Viking Age in Kivivare hill fort, likewise the early dates of Arabic coins, indicate the formation of a new centre already in the Pre-Viking Age, i.e. not later than in the 8th century. Local lore bound to Truuta Nahaliin gives evidence of the long-term persistence of place-related oral tradition.

*Acknowledgements: This research was supported by Estonian Science Foundation grant No. 8510, by the European Union through the European Regional Development Fund (Centre of Excellence CECT) and by the targeted financed research theme 2557 'Social, Economic and Cultural Processes in Estonia in Prehistoric, Medieval and Modern Times'. The authors highly appreciate the contribution of Anti Lillak for working with finds from Aakre hill fort.*



Table 1. <sup>14</sup>C dates from the excavations on the hill forts of south-eastern Estonia in 2011. Analyzes made in the Radiocarbon lab of Tallinn Technological University.

Tabel 1. Kagu-Eesti linnamägede 2011. aasta kaevamiste radiosüsiniku dateeringud. Analüüsid tehtud Tallinna Tehnikaülikooli radiosüsiniku laboris.

Compiled by / Koostanud: Heiki Valk

No. / Nr	Site / Muistis	BP / Radiosüsinikuaastad	Sample no. / Proovi number	Cal. / Kal	Calibration ranges / Kalibreerimisvahemikud	Remarks / Märkused
1	Kõivuküla	1645±75	Tln-3360	234–576AD		Yard, bottom layers
2	Kõivuküla	2632±60	Tln-3359	922–551BC	922–745BC (82.5%) 689–646BC (4.4%) 664–551BC (8.5%)	Grey layer under the rampart
3	Märdi	1670±55	Tln-3362	245–534AD	245–468AD (85.2%) 479–534AD (10.2%)	Defence wall, brand B, birch bark
4	Märdi	1773±55	Tln-3363	126–399AD		Defence wall, brand A
5	Märdi	1752±80	Tln-3364	75–526AD	75–434AD (94.6%) 494–506AD (0.6%) 522–526AD (0.2%)	Defence wall, brand H, outermost tree rings
6	Märdi	1608±55	Tln-3361	263–575AD	263–278AD (1.4%) 330–575AD (94.0%)	Charred roots under brands
7	Truuta I	230±60	Tln-3366	1490–1955AD	1490–1603 (18.4%) 1611–1706 (28.7%) 1720–1819 (32.0%) 1832–1882 (5.1%) 1915–1955 (11.3%)	Charred board
8	Truuta I	388±55	Tln-3365	1436–1638AD		Disturbed soil, 10–20 cm below the ground
9	Truuta III	301±60	Tln-3367	1447–1953AD	1447–1674 (90.7%) 1778–1800 (3.6%) 1942–1953 (1.1%)	Disturbed soil, 20–30 cm below the ground
10	Truuta III	176±60	Tln-3368	1645–1954AD	1645–1895 (78.9%) 1904–1954 (16.5%)	Disturbed soil, 30–40 cm below the ground
11	Aakre I	2124±60	Tln-3369	361–1BC	361–271 BC (19.5%) 264–36BC (73.6%) 31–20BC (1.1%) 13–1BC (1.2%)	Black layer with stones: probable house remains
12	Aakre I	2178±60	Tln-3370	386–60BC	386–91BC (94.0%) 71–60BC (1.4%)	Black layer with stones: probable house remains
13	Aakre I	2089±55	Tln-3371	352BC–48AD	352–296BC (6.6%) 229–221BC (0.6%) 211BC–27AD 87.9%) 42–48 AD (0.4%)	Layer of burning on intact soil
14	Aakre I	2184±70	Tln-3372	391–56BC	391–88 BC (92.6%) 77–56 BC (2.8%)	Layer of burning on intact soil
15	Aakre I	1351±60	Tln-3373	567–808AD	567–781 AD (92.4%) 791–808 AD (1.2%)	Grey layer with Viking Age finds
16	Aakre II	2171±60	Tln-3374	393–57BC	393–89 BC (92.6%) 76–57 BC (2.8%)	Defence wall, brand A
17	Aakre II	2232±60	Tln-3375	402–122BC	402–265BC (95.0%) 128–122 BC (0.4%)	Defence wall, brand G

## REFERENCES

- Aun, M. 1975** = Аун М. 1975. Селище Кививаре в Валгаском районе. – ТАТÜ, 24: 1, 81–84.
- Aun, M. 1992** = Аун, М. 1992. Археологические памятники второй половины 1-го тысячелетия н.э. в Юго-Восточной Эстонии. Таллинн.
- Bronk Ramsey, C. 2009.** Bayesian analysis of radiocarbon dates. – Radiocarbon, 51: 1, 337–360.
- Lang, V. 2007.** The Bronze and Early Iron Ages in Estonia. *Estonian Archaeology*, 3. Tartu.
- Laul, S. 2001.** Rauaaja kultuuri kujunemine Eesti kaguosas (500 e.Kr. – 500 p.Kr.). *Muinasaja teadus, 9 / Õpetatud Eesti Seltsi Kirjad*, 7. Tallinn.
- Leimus, I. & Kiudsoo, M. 2004.** Koprads ja hõbe. – Tuna, 4, 31–47.
- Lillak, A. 2009.** Kagu-Eesti asustuse muster rahvasterännuajast viikingiajani (u. 450–1050 pKr). Magistritöö. Tartu. (*Manuscript in TÜAK*.)
- Moora, H. 1951** = Моора Х. 1951. Отчет о результатах экспедиционных работ по обследованию городищ юго-восточных районов Эстонской ССР и западной части Псковской области РСФСР 11, 13, 14, 20 и 21 августа 1951 г. (*Manuscript in AI*.)
- Mss.** = Collection of letters sent to Jaan Jung and Estonian Literary Society. (*Manuscript in AI*.)
- Sitzka, J. 1897.** Die Steinsetzung von Ayakar. – Sitzungsberichte der Gelehrten Estnischen Gesellschaft 1896, 136–144.
- Tvauri, A. 2005.** Eesti hilisrauaaja savinõud (11. sajandist 13. sajandi keskpaigani). *Muinasaja teadus*, 16. Tartu-Tallinn.
- Tvauri, A. 2012.** The Migration Period, Pre-Viking Age, and Viking Age in Estonia. *Estonian Archaeology*, 4. Tartu.
- Valk, H. 2008.** Truuta linnamägi. – Tõnisson, E. Eesti muinaslinnad. Ed. by A. Mäesalu, H. Valk. *Muinasaja teadus*, 20. Tartu-Tallinn, 313–314.
- Vindi, A. 2004.** Ühest sõidust Urvaste kihelkonda 7. oktoobril 2004. aastal. (*Manuscript in TÜAK*.)

## **KAEVAMISED KAGU-EESTI LINNAMÄGEDEL: KÕIVUKÜLA, MÄRDI, TRUUTA JA AAKRE**

*Heiki Valk, Pikne Kama, Maarja Olli ja Eve Rannamäe*

2011. aastal tegi Tartu Ülikooli arheoloogia kabinet Kagu-Eesti linnamägede uurimise ja dateerimise projekti (ETF grant 8510) raames proovikaevamisi Kõivuküla (Kambja kihk), Truuta (Urvaste khk), Märdi (Otepää khk) ja Aakre Kivivare (Rõngu khk) linnamäel (jn 1). Kolm esimest muistist avastas TÜ arheoloogia kabineti töötaja Andres Vindi vastavalt 2010., 2004. ja 2010. aastal.

Kõivuküla Aagemägi paikneb Aage veskikoha juures Mõraoja oru ja sellesse suubuva oru vahelisel neemikul ning on maapoolsest küljest eraldatud valliga (jn 2). Linnuse ees asunud sügav, silmapaistvalt järsu nõlva-ga vallikraav oli vahetult enne muistise avastamist jõutud heakorrastustööde raames täita savika pinnasega. Et saada vallist lõige suhteliselt väikese töömahuga, tehti kaevand (10 × 1 m) valli keskele, pinnasevõtmisega lõhutud kohta (jn 3, 5). Valli 4 m laiune tasane pealispind koosneb tumedast, rohkelt kive sisaldavast pinnasest (jn 4), kust leiti vajutusjälgenditega savinõukild (jn 6: 1) ja tekstiilkeraamika katke. Tõenäoliselt on valli lael asunud mingi hoone. Valli ülaosa koosnes kruusast, alaosa saviliivast. Valli siseküljel, linnuse õuealal oli 70–75 cm paksune leide sisaldav pinnas, mille üleosa oli tekkinud täitmise või erosiooni tagajärjel, alaosa oli aga nähtavasti segamata. Selget piiri valli ja selle taguse õueala täitepinnase vahel ei leitud. Valli all oli säilinud hallikas, rohkelt söetükikesi ja kalaluid sisaldav kultuurkiht (jn 5: 6), millest võetud süsinikuproov tulemuseks 922–551 eKr (tabel 1: 1) viitab hilispronksiajale. See kiht sisaldas tekstiilkeraamikat, sh nõuservas olevate augukestega ja serva lähedal oleva soonega kilde (jn 6: 2–4). Samalaadseid leide (jn 6: 5, 6) saadi ka vallikehandist, kuhu need on ilmselt sattunud õueala kultuurkihiga. Vallikehandist leiti väike auguga raudese (jn 7: 11) ja tekstiil- ning riibitud keraamikat (jn 7: 2, 7). Märkimist väärib ka punakaspruun servalohkudega kild segatud pinnasest (jn 7: 1). Õueala alumistest korristest leiti riibitud ja tekstiilkeraamikat (jn 7: 3–6, 8–10) ning savist valuvormide tükke (jn 7: 12–18). Siit sõelatud hajusatest söetükidest võetud süsinikuproov andis tulemuseks (234–576 pKr; tabel 1: 2), mis viitab valli kuhjamisele hilisel rooma rauaajal või rahvasterännaajal. Samas võivad savist valuvormide tükid olla märksa varasemad ja seostuda hilispronksiajaga: samalaadseid leide on Baltikumis, sh Eesti rannikualadel mitmetelt kindlustatud asulatelt, kuid rooma rauaajast neid teada ei ole. Arvestades nii valuvormide olemasolu kui paiknemist soodsaid kaitsevõimalusi pakuval neemikul, võiks Kõivuküla Aagemäe puhul tegemist olla esimese teadaoleva noorema pronksiaja kindlustatud asulaga Lõuna-Eestis. Pronksiaegses hallikirjus kultuurkihis tuvastati veise-, lamba-kitse ning oletatavasti sea- ja koerlase luid; valuvormitükkidega, oletatavasti samaaegses ladestuses olid esindatud ka hirvlane, kodusiga ja oletatav mets siga. Segatud pinnasest leiti veel kopraluu ja kukekannus. Kalaluud moodustasid 432-ühikulisest luukogumist 47,2%, pronksiaegses hallikirjus kihis aga 58,6%.

Kunagise linnusekoha võimalusele Märdi külas Väike-Trommi talust 300–400 m loodes Väike-Emajõe lääne-kaldal Kõrgemäe-nimelisel künkal viitab matkaraja tähisposti kaevamisel juhuslikult leitud süsi. 2011. aasta proovikaevand (12 m<sup>2</sup>) rajati mäeplatoo lõunaserva keskele, kus mäenõlv oli lauge ja looduslikud kaitse-eeldused kõige väiksemad. Maapinnast 35–55 cm sügavusel paljandus mäeserva suunda järgivate, kuni 15–20 cm paksuselt säilinud tukkide lasu, mis pärines põlenud kaitseehitistest (jn 8). Tukilasu peal ja õuepoolsel küljel leidus rohkesti rusikasuurusi, tugevalt põlenud kive. Seega pidi kaitserajatise ülaosas, eeldatavasti puust tara taga olema laiem platvorm, kus leidus ruumi nii kaitsjatele kui ka heitekividele. Et varisenud heitekive kattev liiv oli põlenud, on nähtavasti tegemist olnud kahelt poolt rõhtpalkseinaga piiratud ja seest liivaga täidetud seinaga. Tukkide seast leitud sõestunud, kuni 8 cm läbimõõduga männitüve ladvaosa, mis oli okstest puhtaks laasitud lohakalt ja ligi 10 cm pikkuste oksatüügastega, viitab kiirustades tehtud ehitustöödele. Tukkidest ja nende all olnud sõestunud puujuurtest võetud radiosüsiniku analüüsid (Tabel 1: 3–6) jäävad 2.–6. saj pKr. Eri proovide kattuv osa andis tulemuseks ajavahemikud 262–278 pKr või 330–434 pKr. Tukkide paiknemissuunast lähtuvad mullapuuriga tehtud uuringud võimaldasid määrata põlenud kaitserajatiste kulgemissuuna ja ulatuse. Põlenud kaitsetara jäänuseid leidub 25–28 m pikkusel laugjamaal alal mäe lõunakülje keskosas. Vaatamata kogu liivapinnase läbisõelamisele ei saadud ainsatki savinõukildu, loomaluud ega muud leidu. Seega on linnus olnud kasutusel väga lühiajaliselt ja hävinud varsti pärast rajamist. Võimalik, et hävinu põhjuseks olid need ühiskonnas toimunud suured muutused, mis põhjustasid Kagu-Eestis tarandkalmete kasutamise lõppemise 5. sajandil.

Kooraste järvistuga liituva Liinujärve kõrgel kaldal asuv Truuta Nahaliin (jn 9) on Pühajõe-Võhandu ajaloolise veetee ääres. Pärimuse järgi on Nahaliinas olnud nahaparkalite elupaik, kust laevad käisid mööda jõge kuni Pihkva järveni. Linnamäel oleva allikakoha läheduses avati kokku neli kaevandit (1 × 6, 1 × 2, 3 × 4 ja 2 × 2 m) (jn 10). Kuna linnusel ei olnud nähtavaid kaitseehitiste jälgi, tehti kaevandid õuel paikneva veesilma läheduses.

Esimeses, leidudeta kaevandis paljastunud söestunud plangujäänus (tabel 1: 7) pärineb hiliskeskajast, varauus- või uusajast (dateering: 1495–1955 pKr). Teistest kaevanditest leiti keraamikat, millest tähelepanuväärsem on vahetult loodusliku puutumatu pinnase pealt leitud kedrakeraamilise nõu katke – joon- ja laineornamendiga, Pihkva päritolu, 11. saj – 12. saj keskpaigast (jn 11: 8). Üldiselt oli tegemist lihtsate väikeste käsitsi valmistatud savinõude kildudega (jn 11: 3–7). IV kaevandist leiti kaks läbiva auguga Rõuge-tüüpi keraamika kildu (jn 11: 1, 2). Helepruun, ilmselt pikaajalise kündmise ja erosiooni toimel segatud pinnas ei sisaldanud loomaliid, koldeasemeid ega põlenud kive, mis viitaks püsivale asustusele. Keraamika põhjal võib linnuse dateerida viikingiaega; mainitud kedrakeraamiline nõukild võiks pärineda selle kasutusaja lõpust. Näib, et nahaparkalite elupaigaks olnud Nahalinast rääkimus võib tõepoolest tagasi ulatuda viikingiaega, mil Kagu-Eestis tegeleti laialdaselt nahakaubandusega. Küllap kontrollis linnus mööda Võhandut / Pühajõe minevat kaubateed ja võis olla ka nahkade kogumis- ja töötlemispunktiks. Võimalik, et linnusel olnud looduslikku veesilma on sügavamaks kaevatud, et seda kasutada nahkade parkimiseks. I ja III kaevandi pinnases hajusalt leidunud sötükikestest võetud süsinikuproovid (tabel 1: 7, 9, 10) pärinevad 15.–20. sajandi vahemikust ja võiksid seostuda alepõllundusega.

Aakre Kivivare linnamäel oli 1951. aastal Harri Moora juhatud proovikaevamistel avastatud intensiivne, 50–60 cm paksune viikingiaegse keraamikaga kultuurkiht. Linnusekoha kõrval asuval viikingiaegsel asulakohal juhendas 1972.–1973. aastal kaevamisi Mare Aun. Linnamäel (platoo mõõtmed 77 × 64 m) ei ole nähtavat valli ning nõlval on mõnes kohas täheldatav astang mäe järsendamiseks. Mäe vastasservadele tehti 2011. aastal samale jõeale kaks proovikaevandit (16 × 1 ja 7 × 1 m) (jn 12).

I kaevandi mäepoolses otsas oli õhuke ja leiuvaene kultuurkiht läbi küntud. Kaevandi keskosas oli ligi 4 m laiune nõgine, rohkelt põlenud kive sisaldav pinnas (jn 13, 14: 6a, 15), mille mäeserva poolses otsas oli hooneseina aluspalgi jaoks looduslikku alusmulda süvendatud palgijalg. Tõenäoliselt on kivilademe alal paiknenud tules hävinud hoone. Sama põlenguviirg jätkus pärast väikest katkestust, nüüd kive sisaldamata, mäeserva suunas, paiknedes siin ligikaudu meetri sügavusel (jn 14: 6b). Selles piirkonnas oli põleng mäeplatoo hilisema laiendamise käigus kaetud liivast täitekihiga (jn 14: 8). Süsinikuproovid (tabel 1: 11–14) dateerisid nii põlengu kui ka tumeda, rohkelt kive sisaldanud kultuurkihi eelrooma rauaaega (4. saj I pool eKr – 1. saj I pool pKr), kusjuures proovide ühisosa jääb ajavahemikku 352–60 eKr. Lähedaste dateeringute ja stratigraafia põhjal võib väita, et tegemist on sama põlenguga. Kividega hooneala kultuurkihist leitud savinõukillud olid silmapaistvalt robustsed, jämeda kivipurruga; tekstiil- ega riibitud keraamikat ei esinenud.

I kaevandi mäeserva poolse osa pealmiste kihtide leiud viitavad eelviikingi- ja viikingiajale. Poolik araabia hõbemünt (Abassiidid) (jn 16: 1) pärineb 8.–9. saj vahetusest ning samast perioodist on ka Kivivare asulast varem leitud mündid. Mäenõlval paiknenud, rohkesti suuri viikingiaegse ilmega nõutükke ning väga arvukalt looma- ja kalaluid sisaldavast hallikast kihist (jn 14: 4) võetud süsinikuproov (tabel 1: 15) langeb valdavalt eelviikingiaega (6. saj II pool – 9. saj algus). Linnamäelt saadud keraamika (jn 16–18) seas oli palju Rõuge-tüüpi nõude (jn 17: 11–13) ning peenkeramilliste nõude kilde (jn 17: 1–3, 6–8), viimastest olid mõned nivendiga (jn 17: 1, 2, 3, 8; 18: A), mõned kaunistatud viikingiajale omase lohkornamendiga (jn 17: 1, 2, 6, 7). Oli ka näpiornamendiga kilde (jn 17: 4, 5, 9, 10). Ühe peen- ja ühe jämekeraamilise nõu kuju oli rekonstrueeritav (jn 18). Leiti ka linnukujutistega sarvest kammripatsi katke (jn 16: 2), millele on vasteid Rõuge linnamäelt ja asulast, kaks kihvrpatsit (jn 17: 3, 4), ja luust nooleotsa põlenud katke (jn 19: 6). Kalastusega seostuvad üksteise juurest leitud ahing ning kolm õngekonksu (jn 19: 1–4), samuti rohked kalaluud. Linnamäelt saadi ka kaks savist helmest (jn 17: 5, 6), noakatke ning sulatustiiglite katkeid. Sarnane leiumaterjal viitab Kivivare linnamäe ja asulakoha üheaegsusele.

II kaevandist leiti mäeserval põlenud kaitseehitistest jäänud palgilasu (jn 20), mille radiosüsiniku proovid (tabel 1: 16, 17) andsid tulemuseks samuti eelrooma rauaaaja (4. saj algus – 2. saj lõpp eKr). Võib arvata, et eri kaevandite põlengujäänused pärinevad samast tulekahjust. Samast kaevandist leitud kaeluskirve (jn 19: 7) kasutusaeg ulatub esemekronoloogia alusel eelrooma rauaaaja lõpust kuni rooma rauaaaja alguseni. Kaevandist leiti ka ovaalne tuluskivi (jn 19: 5).

Aakre linnamäe luuaines (613 ühikut; jn 21) oli väga fragmenteerunud, ligi kolmandik materjalist oli põlenud. Loomaluudest moodustavad valdava enamuse koduloomade, peamiselt suur- (8,3%) ja väikekariloomade (8,5%) luud; kalaluid (sh haug ja ahven) oli 20,1%. Hobuseluid olid esindatud 8, kanaluid 4 leiguga. 6 sealuu puhul polnud võimalik eristada, kas tegemist oli kodu- või metsloomaga. Metsloomadest olid esindatud kobras (10 luud), karu (5), saarmas (1), põder (1) ja nugis (1), täpsemalt määratlemata röövlind (1) ja pisinärliline (2). 15 luul leidis töötlemisjärgi.

Seega oli Aakre Kivivare linnamägi kasutusel kahel perioodil. Juba eelrooma rauaaajal oli mäeserv piiratud puidust kaitserajatisega. Eelviikingi- ja viikingiajal moodustas linnus koos künka alumisel platool paikneva asulaga ühtse linnus-asula kompleksi, kust saadud leiud viitavad seotusele selleaegse karusnahakaubanduse süsteemiga. On siiski märkimisväärne, et kummastki kaevandist ei leitud viikingiaegsete kaitseehitiste jäänuseid.