Reviving an old shade of red: dyeing with rotted alder buckthorn bark

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Abstract

*Alder buckthorn (*Frangula alnus *Mill.,* paakspuu *in Estonian) is known as a traditional textile dye source in many European countries. Primarily, berries and leaves were used for dyeing, as was the bark. Several Estonian archival sources mention that alder buckthorn bark was used to dye woolen yarn red. The descriptions usually state that to get red the bark was left to rot outside over winter before dyeing. Although fermenting alder buckthorn bark in wood ash lye to achieve red has been described in historical and contemporary literary sources, no experiments with combining rotting the bark and using boiling method have been reported.*

This article gives an overview of alder buckthorn bark dyeing, focusing on printed and archival Estonian sources that describe methods to dye woolen yarn red with alder buckthorn bark. A six-month-long practical experiment was conducted to test the influence of rotting on colours achievable with alder buckthorn bark. Two methods of rotting – on the ground and underground – were tested. The results show that rotted alder buckthorn bark gives a warm orange-to-red colour that can be turned violet by soaking the dyed yarns in wood ash lye. The lightfastness of the achieved colours was in line with the typical light fastness of natural dyes, displaying a greyscale rating of 2-3, on a scale of 1-5.

These results unveil Estonian historical methods of dyeing red with rotted alder buckthorn bark, a local dye source used in Estonia in the 19th century and earlier. The dyed yarns can be used as visual references when searching for alder buckthorn bark dyed textiles in the museum collections and can help interpret dye analysis results of historical and archeological textiles.

Keywords: alder buckthorn, bark, natural dyes, dyeing traditions, 19th century, rotting

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Alder buckthorn tree

Alder buckthorn (*Frangula alnus* Mill.) is a shrub or a small tree that grows up to 6 m tall. The tree's natural range is Europe, North Africa, and North-West Asia (Schweppe 1993: 227). At the beginning of the 19th century, alder buckthorn was introduced to North America with the intention of using it as a windbreak. It is now considered an invasive species there (Nininahazwe et al. 2023: 31).

Alder buckthorn thrives in different environments, both very wet and very dry. It is common in meadows and deciduous forests in Estonia, especially in the western part of the country (Kukk 2018: 58). The leaves of alder buckthorn are shiny on the surface, have smooth edges, and are alternately arranged on the stem. The tree blooms in June, and the flowers grow into pea-sized berries that are green at first, then ripen to red and finally black. The berries are slightly poisonous.

In the Estonian literature describing the traditions of natural dyeing, alder buckthorn is sometimes confused with common buckthorn (*Rhamnus cathartica*) (see Fribek 1900: 9; Vilbaste 1938: 18). The reason may stem from the fact that local names for alder buckthorn are one of the most diverse among Estonian tree names (Vilbaste 1993: 323). Confusion can also be caused because in German, as well as in Baltic German, the name for alder buckthorn – *Faulbaum* – was also a synonym for bird cherry (*Prunus padus*) (Leuchs 1825: 470, 558, sub Pflaume, *sub* Wegdorn; Gutzeit 1864: 273, *sub* Faulberbaum). Therefore, it is not always certain which tree, alder buckthorn or bird cherry, is referred to in the reports collected

Photo 1. Alder buckthorn trees in May. *Photo by Liis Luhamaa.*

Photo 2. Alder buckthorn leaves and berries in July. *Photo by Liis Luhamaa.*

by the Baltic Germans from the local population (e.g., see Rigasche Zeitung 1810). However, based on the descriptions found in archival texts, there is no doubt that Estonians recognized alder buckthorn well.[1]

The wood and branches of the alder buckthorn have found some use in traditional Estonian carpentry. The wood has been used to make small items such as pipe heads. The branches have been exploited as shaft bows of horse harnesses and as straps for staved ale tankards and buckets (KW[2] paakspuu; Viires 1960: 20).

The leaves, berries, and bark of alder buckthorn have historically been used for dyeing textiles in Estonia and elsewhere in Europe. Alder buckthorn leaves dye alum-mordanted yarn yellow and have been one of the important sources of yellow colour, for example, on Kihnu Island (Ärma 2013: 96). Berries can be used to dye yellow, purple, and green depending on their degree of ripeness, the mordants used, and the pre-and post-dyeing treatment (Leuchs 1825: 558; Cardon 2007: 96). The focus of this article is on the colours obtained from alder buckthorn bark, especially red.

Alder buckthorn bark dye chemistry

The chemical composition of alder buckthorn bark has been relatively extensively studied because it has been widely used for the medical purposes as a laxative (Thomson 1971: 194). It is known that anthraquinones are the main colouring compounds of alder buckthorn bark. Three aglycones – chrysophanol, emodin, and pshyscion, often occurring together – are present in the bark (Schweppe 1993: 211; Cardon 2007: 95, 674). However, anthraquinones are not readily available, but are found mostly in the combination with sugars as glycosides (e.g., frangulins A and B, glycofrangulins A and B) in the fresh bark (Cardon 2007: 95; Schweppe 1993: 227). The amount of anthraquinones increases when the dried bark is stored. For example, it has been stated that after one year of keeping enzymatic processes transform above mentioned glycosides to emodin, a source for red colour (Thomson 1971: 194). This above referred knoweledge is well in accord with experimental results – the emodin and chrysophanol were detected as the main dye compounds in the reference samples dyed by Krista Wright (former Vajanto) using the fermentation method (Vajanto 2015, 44, Appendix 5: 37, 57). The common dye

1 Paakspuu on nisukke puol põesa muodi puu. Väga suureks ei kasva. Lähäb nõnna käevarre jämeduseks. Lehed on teisel üsku kirsil või kriegil. Kevade on ikke vekked valged õiled kua ia siis suvebuole kasvavad punased mariad külge ia siis pärastbuole nied punased mariad lähvad mustaks nagu tuominga mariad. Aga neid mariu ei või süüia sedasi nagu tuominga mariu. Nemad on kihtised. KW paakspuu, Ambla 1934

2 KW – keywords on the slips of the Archive of the Estonian Dialects and Finno-Ugric Languages at the Institute of the Estonian Language.

analysis methods using high performance liquid chromatography (HPLC), and ultra high performance liquid chromatography (UHPLC) coupled with photo diode array detection (PDA) (e.g. van Bommel 2005) can be used to detect the dye compounds of alder buckthorn bark in textiles in the future.

Review of literature on dyeing red with alder buckthorn bark

The earliest book related to Estonia that mentions alder buckthorn bark as a dye source, is Wilhelm C. Friebe's "Oekonomisch-technische Flora für Liefland, Ehstland und Kurland", published in 1805. He writes: "The unripe berries can be used to dye the wool green, just as the bark can be used to dye red when boiled in thin beer and mordanted with alum."[3] (Friebe 1805: 48)

In the case of Friebe's descriptions, it must be taken into account that it is not always clear whether this is a genuine list of dye plants and dyeing techniques used by local residents or are these just recommendations by the author, how the plants growing in the region could be used for economic purposes. Also, since his book deals with the territory of Livonia, which covers the southern part of modern-day Estonia as well as the northern part of Latvia, we cannot say with absolute certainty that this text was about Estonia.

However, another Friebe's description about dyeing with the bark of common buckthorn (*Rhamnus cathartica)*, a shrub-like tree quite similar to alder buckthorn, is noteworthy, as it mentions fermentation of the bark before dyeing. There is a clearly-stated reference to the local traditional techniques of processing the bark used by Finnish women, which resulted in a red-coloured yarn: "The Finnish women dyed with the bark and alum a permanent yellow by covering them [the bark] with fresh grass, which created a type of fermentation. If you put stuff that is dyed with it in a strong wood ash lye, it turns red."[4] (1805: 47)

The earliest mention of yarns dyed red with alder buckthorn bark in the Estonian language appears in a newspaper story in Perno Postimees, published on August 10, 1872. It is part of a sequel of interviews with a fictional character, a poor Estonian peasant called Mäeküla Jakob, who describes his life and thoughts. In this particular story he mentions collecting alder buckthorn bark and using it to dye red: "We [he and his wife] went to the mire to

3 Faulbaum, Pulverholz. Rhamnus frangula. ehst Paaks pu, auch Paaksma pu. russ. Kruschina. (Fischer 157. Grindel 75.) […] Mit den unreifen Beeren kann die Wolle grün, so wie mit der Rinde in dünnen Bier gekocht und mit Alaun versetzt, roth gefärbt werden.

4 Kreuzdorn, Purgierwegdorn, Schwarzdorn. Rhamnus catharticus. Lett Pabehrse. ehst. Tirna- oder Kitse pu. russ. Prodoroschnaja Igolka. (Fischer 156, Grindel 75). Mit der Rinde und Alaun färbten die Finnischen Weiber dauerhaft Gelb, indem sie solche mit frischem Grase bedeckten, vodurch eine art von Fermentation entstecht. Legt man dies so gefärbte Zeug in eine starke Aschenlauge, so wird es roth.

pull the bark of alder buckthorn to make some red for the skirt again in the winter, and maybe I could get myself some striped waistcoat fabric if there is enough yarn left, the old waistcoat is – as you can see – already quite shabby, because old poor people like us cannot afford to buy the dyes from the city any more like the young people do nowadays."[5]

He goes on to complain that natural colours have gone out of fashion, and that they have been replaced by 'manils' – aniline dyes: "Before, it was considered a big deal if someone wore a red skirt dyed with bedstraw roots, but where are you going to go with it now? Now you need the 'manils', or whatever they [the new dyes] are called. There is no more alder buckthorn red, nor birch leaf yellow, nor pot blue [indigo blue dyed in a urine vat], nor anything else like that."[6]

One has to take into account that the interview is fictional and might, to a greater or lesser account, include the imagination of the writer. Nevertheless, it is reasonable to assume that dye plants that were actually in use were described there, based on the information provided about alder buckthorn bark dyeing as well as about Estonian natural dyeing and textile crafts in general in later sources (Vilbaste 1939). To the authors knowledge, this is the earliest written source that with certainty refers to the traditions of the Estonian rural people to dye red with alder buckthorn bark. Unfortunately, no technological details related to dyeing are mentioned.

The first natural dye recipe book written by an Estonian author, Alma Johannson's "Taimewärwid kodukäsitöös" (Plant Dyes used in Home Crafts) was published only in 1916. Book's recipe No. 3 instructs dyeing yellowish brown with alder buckthorn bark using the boiling method and dyeing yarn pre-mordanted with alum (Johannson 1916: 5). The following recipe No. 4 teaches how to dye brick red – for this, one has to soak the yarn dyed yellowish brown with alder buckthorn in cold wood ash lye for one hour (ibid.: 6). However, dye recipes in this book may not be based on Estonian dyeing traditions. In the introduction to the book, Johannson writes that since there is little information about dyeing with plants in the Estonian National Museum, natural dye recipes used in Norway, Sweden, and Finland have been collected in the book (ibid.: 3). Johannson's recipe for dyeing with alder buckthorn

5 […] käisime rabbas paakspu kori kiskumas, et talwe jälle nattuke kördi punnast tehha ja ehk saaks mulle ennesele ka nattuke tribulist westi-riet, kui lõngad jätkuwad, wanna west on – kuida sa näed – jubba üsna narmikune, sest egga meie suggused wannad nuddid jõua ennam nisuggust linna wärwisi osta, kui nüüd nore põlwe rahwas sedda teewad.

6 Enne peti sedda jubba sureks asjaks, kui kellegil maddara punnasega kört selgas olli, agga kuhhu sa nüüd nihhukesega lähhäd? Nüüd olgo agga üsna manilid, voi mina tea, mis nende nimmed kõik o. Nüüd ei olle ennam paakspu punnast, ega kasse lehhe kollast, ei potti sinnist, egga muud selle sarnast.

bark is similar to the recipe No. 56 of Kristiane Frilak's "Norwegian Dye Book" published in the Estonian translation in 1900. The title of the recipe was "Inbetween-colour – reddish-yellow with alder buckthorn bark (Ramnus [sic] frangula)"[7] (Frilak 1900: 30).

There is very little historical information about dyeing red with alder buckthorn bark from elsewhere in Europe. Most noteworthy is the Dutch tradition described in Dominique Cardon's book "Natural Dyes" (2007: 96). Cardon references the french translation of the book "Complete Knowledge of Colours and Dyeing, or Descriptions and Instructions for the Preparation and Use of all Colouring and Coloured Bodies" by Johann C. Leuchs, where he writes:

> *The decoction of the fresh [alder buckthorn] bark dyes yellow, that of the dry bark dyes brown; alkali turn yellow colour brown. With alum, a darker yellow is obtained through prolonged boiling, which later turns red. In the south of Holland, it is said that madder red on wool is obtained by soaking a year-old dry bark for nine days in a lye of beech wood ashes and then soaking the yarn for a few days in the liquor that is kept hot.* (1825: 562.)[8]

It is not entirely clear what Leuchs is meaning, stating that the dark yellow colour achieved by longer boiling "later turns red". Maybe he means that the yarn has to be boiled even longer to become red or that some further steps are needed.

The doctoral dissertation "Dyes and Dyeing Methods in Late Iron Age Finland" by Finnish archaeologist Krista Wright (2015) is the most important current work about red dyed with alder buckthorn bark. The corresponding method is the fermentation of alder buckthorn bark in wood ash lye, followed by dyeing woolen yarn red. She mentions that the dye methods used for the fermentation dye baths were fully experimental as no accurate recipes were available (ibid.: 39). In these experiments alder buckthorn bark was covered with wood ash lye and was left to ferment for four weeks until pH of the dyebath turned acidic. Then unmordanted wool yarns were placed in the dye bath and left to soak for two weeks (Vajanto 2014). It is possible to draw parallels with the Dutch method from the 19th century described by Leuchs, although there are differences as well.

7 Wahewärw – punakas-kollane paksipuu koorega (*Ramnus frangula*).

8 Die frische Rinde färbt mit Wasser abgesotten gelb, die trokne braun. Kalien machen die gelbe Farbe braun. Mit Alaun erhält man durch langes Kochen dunkler gelb und später roth. In Südholland soll man Krapproth auf Wolle erhalten, indem man die trokne, ein Jahr alte Rinde, 9 Tage in Lauge von Buchenholzasche weichen läßt, und dann das Garn einige Tage in der warm gehaltenen Flüssigkeit weichen läßt.

To sum up the information found in published literature, it can be said that although there are reports of dyeing red with alder buckthorn bark both from Estonia and elsewhere in Europe, none of them mentions the information from Estonian archive sources described below, in which the rotting of alder buckthorn bark and the boiling method were combined to produce red. The method attributed to Finnish women by Friebe is the closest to this, in which bark pretreatment by fermenting occurred (1805: 47). However, there are several differences – the bark of common buckthorn was used, not the bark of alder buckthorn, and only yellow was obtained during the initial dyeing, which was changed to red only by post-treatment with wood ash lye.

Rotting alder buckthorn bark to dye red. Descriptions from Estonian archives.

In this chapter, information found in Estonian archives about dyeing red with alder buckthorn bark is described and analysed, including information about the collecting of bark. Although Gustav Vilbaste has previously referenced these materials in his article on Estonian dye plants (1939: 17–18), he did not compile a thorough comparative analysis of the different rotting methods there.

Collecting alder buckthorn bark

Alder buckthorn bark was collected in late spring and summer. It was a time when the tree sap was running under the bark, and the bark was loose, i.e., easily removed from the trunk. There are specific corresponding terms in Estonian – *mähk, mähane, mähal olema*. *Mähk* was the name of the tissue under the tree bark when the tree sap was running. A tree that had the sap flowing was described as *mähal* or *mähane*, and the corresponding time was called "the time of the sap" – *mäha aeg* or *mahla aeg.*

Two archival sources mention details about the alder buckthorn bark collecting. Both suggest that the bark was collected while the sap was running:

> *"[Alder buckthorn] bark was taken from the trunk of the tree in summer during the time of the sap […]" (H IV 9: 173.)*[9]
> *"In the spring, during the time of the sap, when the bark of the trees is loose, the alder buckthorn bark is collected […]" (H III 30: 580.)*[10]

The word *kiskuma*, 'to pull' is used to describe the action of stripping the alder buckthorn bark from the tree trunk (Perno Postimees 1872). This word aptly describes the bark peeling action. If the tree sap is running under the bark,

9 [Paakspuu] koored wõeti suvel mäha ajal ära puu küllest […].

10 Kewade, mahla ajal, kui puude koor lahti on, korjatakse kitse türnapuu (paakspuu) koori […]

PARISH	AUTHOR	YEAR	TEXT	REFERENCE
JÜRI	Jaan Saalverk	1893	Punast värviti paakspuu koortega. Koored wõeti suvel mäha ajal ära puu küllest, ja pandi mädanema, teisel kewadel wärwiti.	H IV 9: 172
ÄKSI	Dr. Paldrock	1903	Punane: Kewade, mahla ajal, kui puude koor lahti on, korjatakse kitse türnapuu (paakspuu) koori ja pannakse niiske kohta (aija veerde, nõgestesse) paari nädali päele mädanema. Siis kuiwatakse ja tambitakse nemad veikseteks tükkideks. On ned tükkid umbes werand (1/4) tundi hästi wee sees keenud, siis pandakse maaritud lõng sisse ja keedetakse edasi, seni kui lõngal „pruunikas punane“ wärw on. Ilus ei pea see wärw olema, kõlbab aga kudumisel teistele jooneks kõrwale lüija.	H III 30: 580
KOSE	Aleksander Mitt	1923	Lilla. Paakspuu (koh. n. puakspuu) koor andis ka lilla värvi. Selle puu koor pidi talv otsa maas vedelema, kevadel kuivatati see ära ja keedeti värvides seebialuses (päras). Villase värv.	ERM EA 4: 291
VIGALA	Aleksander Tiitsmaa	1923	Mõned määndand ka paksipuu koori ja saand sellest punast värvi. Seelik. Värve tarvitati väga mitmesuguseid, pääasjalikult punast, mida saadi varemalt paksipuu koortest ja pärastpoole puupunane.	ERM EA 5: 159, 201
VARBLA	Herbert Tampere	1931	Paakspuud kooriti ära ja pandi koored talveks mulla alla, siis sai punast värvi. (Mari Puskar, u 85 a.)	ERA II, 39: 293

Table 1. Estonian archival texts mentioning dyeing red with rotted alder buckthorn bark. *Table by Liis Luhamaa.*

one can loosen a strip of the bark higher up on the tree with a knife, grab the end of the strip with one hand and, holding the knife against the trunk, slide the knife down, while pulling the strip of the bark with the other hand away from the trunk. In this way, stripping the bark off the trunk is quick and easy.

Although there is no detailed description on the collection of alder buckthorn bark specifically, the usual way when collecting bark from fast-growing small trees was to strip the bark from a growing tree on the spot, for example in the case of alder (KW park). Likely, the bark of the alder buckthorn was also collected in this way. The tree branches or trunks were not brought home; the bark was pulled from the tree in the bush, and only strips of bark were brought back:

> *If you go to the bush, take a bag with you, as it would be troublesome to bring the trees home; you just peel the [alder] bark. (KW park, Kodavere.)*[11]

11 Kui lähed vessu, vetta kott ühen, vai sa jeedad puid kodo tueda, kuärid [lepa] ärä.

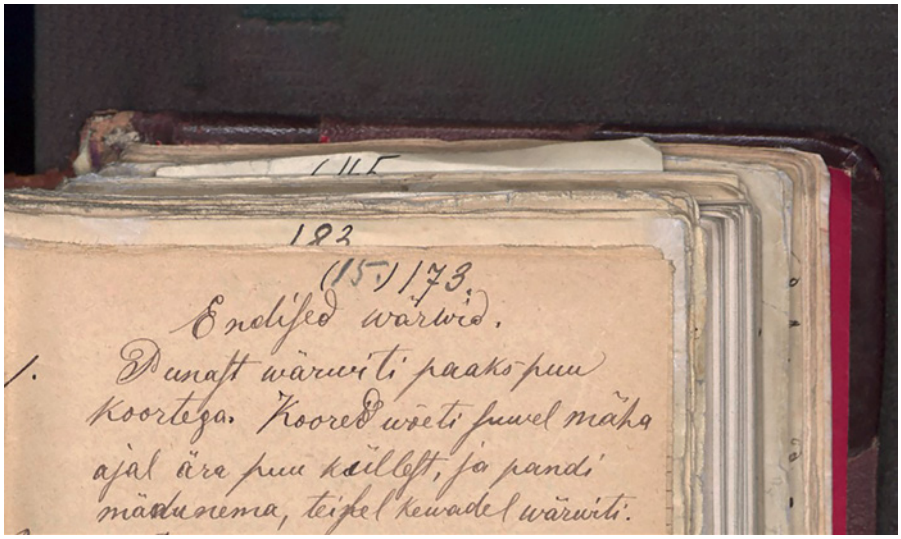

Photo 3. Report by Jaan Saalverk about dyeing red with rotted alder buckthorn bark. Sent to Jakob Hurt in 1893 from Jüri parish (H IV 9: 173). *Photo by Estonian Literary Museum, Estonian Folklore Archives.*

Archival descriptions of rotting alder buckthorn bark

The color shades that various Estonian archival sources mention as achievable when dyeing with the alder buckthorn bark are yellow, brown and red (Vilbaste 1938: 17; KW paakspuu). This article focuses on how the dyeing of red with alder buckthorn bark is described in the Estonian archival materials (Table 1).

The earliest report mentioning alder buckthorn bark red achieved by rotting the bark was collected at the end of the 19th century, in 1893 (H IV 9: 173), and the latest in 1931 (ERA II, 39: 293). However, several of these sources enable dating the alder buckthorn red dyeing tradition as being from the middle of the 19th century or earlier. In 1903, in the message sent by Dr. Paldrock to Jakob Hurt, he wrote that the dyes and methods of dyeing described by him, including alder buckthorn red, were in use 60 years ago, i.e., in the 1840s (H III 30: 584). Mari Puskar from Varbla parish, who reported about alder buckthorn bark red, was born around 1846 and, therefore, would have probably remembered dyeing traditions from the 1860s. In the description collected from Vigala in 1923, it is mentioned that alder buckthorn bark as a source of red was later replaced by imported brazilwood (ERM EA 5: 271). We know, based on newspaper advertisements, that synthetic dyes were introduced in Estonia no later than 1863 (Perno Postimees 1863), and natural dyes, including alder buckthorn red, had already gone out of fashion in 1872

(Perno Postimees 1872). Taking that into account, these reports place the Estonian tradition of dyeing alder buckthorn red in the first half of the 19th century, and, from this, an even earlier use can be assumed.

All the sources say that to dye the yarn red with alder buckthorn bark, a pre-processing of the bark was necessary. In Estonian, the processing of the bark was called *mädandama* or *määndama*, the direct translation of which would be *to rot*. One of the meanings of the verb *rot* is "to undergo decomposition from the action of bacteria or fungi" (Merriam-Webster, *sub* rot), which is a suitable description of the process happening to the alder buckthorn bark.

The shortest suggested duration for rotting was only a few weeks (H III 30, 580). The rest of the sources indicated a much more extended period of several months. They stated that the rotting should take place over the winter, writing that the barks were left to rot "from summer to spring" (ERM EA 4: 291), "during the whole winter" (ERA II 39: 293), or that the dyeing was carried out "in the second spring" (H IV 9: 172).

Two ways of processing the bark were described: burying the bark under ground or leaving the bark lying on the ground outdoors. The description about burying was collected in 1931 from Varbla:

> *"Alder buckthorns were peeled and the barks were put under the soil for the winter, then you got red colour." (ERA II, 39, 293.)*

Keeping the bark on the ground is described by Dr. Paldrock in 1903 from Äksi:

> *[…] the bark of the buckthorn tree is collected and put in a damp place (next to the barnyard, in the nettles) to rot for a couple of weeks. (H III 30, 580.)*

Aleksander Mitt also collected a description from Kose in 1923: "The bark of this tree [alder buckthorn] had to lie on the ground all winter; in the spring, it was dried and boiled for dyeing in the lye." In two sources, "rotting" is mentioned, but the method is not specified. "The [alder buckthorn] bark was […] put to rot; next spring, it was used for dyeing." (H IV 9, 172). "Some also rot the bark of alder buckthorn and get a red dye from it." (ERM EA 5: 159.)

Unfortunately, the descriptions about the processing of the bark lack details. There is no information whether a bag or some type of cover was used when placing the bark underground, nor is it indicated what quantities of bark were put to rot. Vilbaste writes about this subject:

> *[…] tree barks are dug in the ground loose or stuffed in an old bag, mostly into soft soil near wooden fences, where stinging nettles grow, and which are relatively rich in nitrogen; the sides of walls of barns and sheds were also places used for rotting. […] However, the bark, especially the alder buckthorn bark, was often left to stand in a pile under the snow all winter." (Vilbaste 1939: 6.)*

Thus, the bark could have been dug underground either loosely or inside an old bag, and in addition to the fences, the bark could have rotted next to the wall of the outbuildings. Although Vilbaste uses the general term "tree bark" there is no information that the bark of any other tree species in Estonia was rotted in the same way as the bark of the alder buckthorn. Therefore, his generalization at this point is probably not justified. Regrettably, it is not possible to reexamine all the information and specific details referred by Vilbaste. He was a great ethnobotany enthusiast and did himself numerous field work to collect data (Õunapuu 2011: 7), but no original fieldwork notes or reports about this subject are available.

Dyeing with rotted alder buckthorn bark

Before dyeing, the rotted bark was dried and pounded into smaller pieces (H III 30: 580; ERM EA 4: 291). The bark was then boiled either in water (H III 30: 580) or in an alkaline liquid left over from soap making (ERM EA 4: 291). For the duration of boiling in water, a surprisingly short time is given in one source – only a quarter of an hour (H III 30: 580). This is also the only source mentioning that yarn pre-mordanted with alum was dyed (ibid.). However, it cannot be concluded that mordanting did not occur in the case of other sources. Alum mordanting was often a default part of plant dyeing, which may not have been considered worth mentioning. Then again, as the experiment results described in the next chapter show, rotted alder buckthorn dyed unmordanted yarn as well. Thus, there is too little data to say whether or not mordanting was always used when dyeing with rotted alder buckthorn bark.

Historical use of red yarn dyed with rotted alder buckthorn bark

Several written sources give us insight into which type of textiles the yarn dyed red with alder buckthorn bark was used in Estonia. Also, the Estonian National Museum has two historic textiles from the 19th century in their collection, whose legends mention the use of alder buckthorn bark as a dye source for red yarns.

In the fictional story of Old Jakob of Mäeküla, he says that he and his wife went to collect the alder buckthorn bark in order to dye red yarn for the woman's skirt, and to use the leftover yarn to weave red stripes into fabric meant for his waistcoat (Perno Postimees 1872). Thus, it's possible that the alder buckthorn red yarns were found in both women's and men's clothing.

Even more interesting is the information collected by Tiitsmaa in Vigala parish. In 1923, he wrote about the colours used in traditional striped skirts:

> *A great variety of colors were used, mainly red, which was previously obtained from the bark of the alder buckthorn, and later brazilwood. (ERM EA 5: 271.)*

This indicates that the red obtained from alder buckthorn bark was at a point in time one of the main colours of striped skirts in Vigala. But it also turns out that some time later the red dye material obtained from local bark was replaced by brazilwood (*Caesalpinia* sp.), imported from South America. As no striped skirts dyed with natural dyes have survived from Vigala parish, it is difficult to determine when this switch from local dye source to imported dye source could have taken place. Also, the question rises if this could have happened elsewhere in Estonia as well.

Photo 4. Skirt from Peetri parish. The legend mentions that dark red stripes are dyed with alder buckthorn bark. ERM 13475. *Photo by Estonian National Museum.*

Estonian National Museum has several skirts and pick-up woven belts, the legend of which mentions the use of brazilwood (for example, skirt ERM 5023, Mihkli parish; skirt fabric ERM 7467/ab, Tartu-Maarja parish; belt ERM 4185, Karksi parish). However, the alder buckthorn red is only mentioned in the legends of one skirt and one pick-up woven belt.

The legend of the skirt from Peetri parish ERM 13475, collected in 1913, reads:

> *It was still being worn about 40 years ago [1873]. On Sundays only colourful skirts were worn. […] Skirt colours: light red (tree-coloured red), dark red (alder buckthorn red), black, green, moss green, yellow, white, pot blue, bedstraw green, saxon blue.*[12]

12 Kanti veel 40. a. eest. Pühapäeviti kanti ainult värvilisi seelikuid. […] Seeliku värvid: helepunane (puuvärvi punane), tunkel punane (paakspuu punane), must, roheline, samblaroheline, kollane, valge, potisinine, madararoheline, neiblusinine.

Photo 5. Detail of the stripes in Peetri parish skirt. ERM 13475.
Photo by Estonian National Museum.

Although the item's legend speaks of two red stripes described as light red and dark red, four different shades of red stripes can be visually detected on the skirt (photo 5). There are two brownish red stripes, one of which is darker and the other lighter (photo 5; stripe 1 and 4). Also, two stripes, one darker and the other lighter, with a purplish shade can be observed (photo 5; stripe 2 and 3), Both the lighter and darker purplish reds have faded very little, while the brownish reds show signs of fading, and have a visibly redder tone in areas protected from the light, for example, between the skirt folds near the waistband.

Another textile whose legend indicates that alder buckthorn bark was used to dye red yarns is piece of a pick-up woven belt ERM 10057 collected from Martna parish in West Estonia. The legend belonging to this belt reads: "Colours: pot blue and alder buckthorn red (from alder buckthorn bark)."[13] The belt was collected in 1913, and the date of making is recorded as 1823. The red threads are visibly faded on one side of the belt but are better preserved on the other side, and in places sheltered from sunlight.

For these historical textiles, only chemical dye analysis can give a definite answer to whether any of the red threads were dyed with alder buckthorn bark. If the analysis would show that alder buckthorn bark was used to dye these red yarns, it would be an important finding. Namely, there are no reports in published literature of historical textiles where dye analysis shows the presence of yarns dyed with alder buckthorn bark (Cardon 2007: 96).

13 Värvid: potisinine ja paksipuu punane (paksipuu koortest).

Photo 6. Pick-up woven belt from Martna parish, shown from both sides. The legend states that red yarns were dyed with alder buckthorn bark. ERM 10057. *Photo by Estonian National Museum.*

Alder buckthorn bark rotting experiment

To test the effect of rotting on colours achievable with alder buckthorn bark, a 6-month long rotting experiment was carried out from summer 2023 to spring 2024.

Collecting the bark

Alder buckthorn bark used in the experiment was collected in July and August 2023 from Seliste and Mereäärse villages in South West Estonia. Alder buckthorn trees that were 2–4 cm in diameter near the ground were cut down with Fiskars loppers. The small branches were removed, and the trunks of trees were transported to the yard of Männiku farm in Seliste village. A short-bladed knife was used for peeling the bark. The bark was removed in the form of a tube, where possible (Sõmermaa 1942: 27). For this, a strip of bark was first removed with the knife. Then, the remainder of the bark along the length of the strip was loosened by inserting the blade tip between the bark and the wood. Last, the loosened bark was pulled off the wood in one, in the shape of a tube (see photos 7–8). The bark that didn't come off as a tube was removed as strips.

According to the literature, it is best to collect bark in spring and during the first half of summer, when the bark of all trees is easily removable thanks to the running sap (ibid, 26). It is interesting to note that according to literature the spring is also the period of maximum content of anthraquinone derivates (Cardon 2007: 95). Our practical experience during this experiment

Photo 7. Alder buckthorn trees cut and pruned for transport.
Photo by Liis Luhamaa.

showed that it is possible to collect alder buckthorn bark as late as the first half of September. Although the bark was already stuck to the tree with about half of the trees that were tested, the bark was still loose on the rest.

After peeling, the bark was left to dry indoors on perforated racks in thin layers. The drying lasted until the bark pieces broked easily when bent. This indicated a moisture level of less than 15% (Sõmermaa 1942: 72). The weight of the bark decreased by about 45% during the drying.

Rotting of the bark

The experiment on rotting alder buckthorn bark lasted six months, from September 2023 to March 2024. The rotting was conducted both on the ground and underground. In addition, dried unrotted bark was saved for control dyeings and kept at room temperature.

The barks were put to rot in 250 g batches in dense mesh polyester bags (photo 9). The bags with bark kept on the ground were stored behind an

Photo 8 a, b. Peeling of alder buckthorn bark. Where possible, the bark was removed in the shape of a tube. *Photo by Liis Luhamaa.*

outbuilding along a tree-shaded wall. The bags were covered with a wide mesh net to prevent them from being scattered by animals (photo 10).

The bags with bark meant to rot underground were dug into the ground in an area previously used as a chicken yard, with a fertile, humus-rich soil indicated by a flourishing growth of stinging nettles. The pH of the soil was 7,6, slightly alkaline. The bags were placed in a shallow, 10–15 cm deep hole and covered with soil from the same hole (photo 11). The corners of the hole were marked with stakes so the location could be easily found.

After six months the bags were collected (photo 12). The bottom side of the bag, which had been lying on the ground, was visibly brownish-red in colour. Also, traces of animal activity could be seen, as some small holes had been chewed into the bag (photo 13). Both of the barks, kept above ground and underground, were covered with mold. The greenish mold on underground-rotted barks was especially visible (photos 14 a, b).

Photo 9. Alder buckthorn bark was packaged into mesh bag for rotting. *Photo by Liis Luhamaa.*

Photo 10. Alder buckthorn bark rotting on the ground. Photo taken in November 2023, 2 months after the start of the experiment. *Photo by Liis Luhamaa.*

Photo 11. Preparations for rotting underground. Bags with alder buckthorn bark were placed in a shallow hole and covered with soil. *Photo by Liis Luhamaa.*

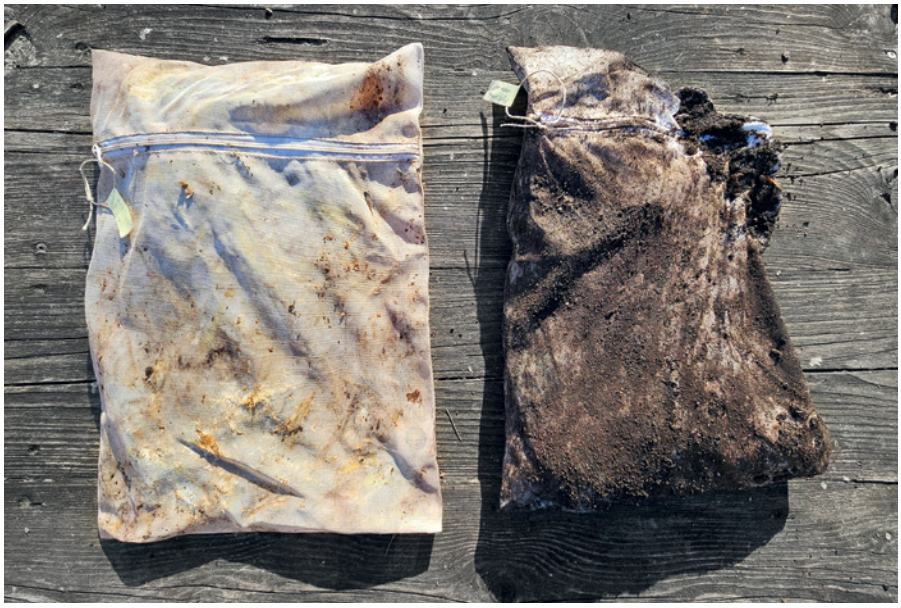

Photo 12. Bags with rotted bark from the ground (left) and underground (right) collected in March 2024, after six-month-long rotting. *Photo by Liis Luhamaa.*

The barks were spread on dehydrator grates and dried at 40° C for 4 hours. After drying, the weight loss of the rotted bark compared to unrotted bark was determined. The weight loss of the bark rotted on the ground was 38%, and of the bark rotted under ground 16%, respectively. The more extensive weight loss of bark rotted on the ground was expected due to aerobic storage conditions that were less protected from environmental influences.

In terms of structure, the rotted barks were papery and fibrous. The color of the bark was blackish-brown, and visibly dark purplish in places (photo 15). There was no unpleasant smell.

Photo 13. Bottom side of the bag rotted on the ground was visibly reddish in colour. *Photo by Liis Luhamaa.*

Photo 14. Barks photographed immediately after removal before drying.
14a. rotted on the ground; 14b. rotted underground. *Photo by Liis Luhamaa.*

Photo 15. Rotted alder buckthorn barks after drying. Left – bark rotted on the ground, right – bark rotted underground. *Photo by Liis Luhamaa.*

Dyeing

For dyeing, four dye baths were prepared. Of these, two dyebaths were control dyeings with dried, unrotted barks. The first control dyeing was carried out in September 2023, at the start of the bark rotting experiment. A second control dyeing was carried out with dried, unrotted bark that had been aging for six months at room temperature, simultaneously with dyeings of rotted bark.

The third dyebath was made with bark rotted on the ground for six months. The fourth dye bath was made with bark rotted underground for six months.

The same protocol of extracting the dye was used for all dye baths. The required amount of bark was calculated, the ratio of dyed material to bark was 1:2. The weighed out bark was broken into smaller, approximately 2 cm long pieces. Tap water with general hardness of 12 dH, which indicates a moderate water hardness, was used for the dye baths. The bark was covered with water and soaked at room temperature for 14 hours (photo 16). The dye bath was then slowly heated to 85° C and the temperature was maintained for 45 minutes. The dye bath was allowed to cool until the next day. Then it was strained and the bark was discarded.

Pre-soaked dye material was added to the dye bath: 20 grams of white unmordanted wool yarn, 20 grams of white alum-mordanted white wool yarn and 20 g of white thin alum-mordanted wool fabric.

Photo 16. Dyebaths soaking with unrotted (left), on-the-ground rotted (middle) and underground rotted (right) alder buckthorn bark. Colour of the dyebaths was visibly different as soon as the water was poured on the barks. *Photo by Liis Luhamaa.*

The dye bath was slowly heated to 85 degrees and the temperature was maintained for 45 minutes. The dyed materials were left to cool in the dye bath. The dyed materials were removed from the dye bath, rinsed and dried.

Aftertreatment with wood ash lye

Wood ash lye was prepared with hardwood ashes. 1 kg of ashes taken from a wood-fired oven was covered with 10 litres of boiling water and left to settle for two days in room temperature. After that, the clear lye liquid was poured off the ashes. The pH of the wood ash lye was 13.

A sample from each dye bath was used to test the effect of wood ash lye. The dyed materials were covered with the lye and left to soak at room temperature for 15 minutes. After that, the materials were removed from the lye bath, rinsed thoroughly, and dried.

Testing for fastness of light

Dyed yarns before and after aftertreatment with wood ash lye were tested for light fastness.

Light fastness describes the ability of a colorant to resist fading when exposed to light. Light fastness testing is used for assessing the viability of a dyestuff by testing the dyed fibres to light, against a known standard. These standards have been created since the advent of synthetic dyes and the methods of testing developed over a number of years. Historically the dyes being used would have been rated by eye and their durability established over years of wearing and use. Now we test them against modern calculated standards and using specialised equipment.

The standard used for these tests was BS EN ISO 105-BO2:2014. Samples of the dyed yarns were wrapped around non optically brightened white card. Part of the specimens were masked and the remaining part exposed to a Xenon arc light of known intensity using a James Heal Trufade light fastness tester. The Xenon arc light has an emission profile closely matching the D65 standard (natural daylight) and therefore mimics well exposure to natural light. Temperature and humidity were also controlled. The samples were removed after specific periods of time (8, 16, 32, 64 hours) and colour measurement data CIEL*a*b* readings taken on a Verivide Digieye using Digi Production software. Delta E (ΔE76) was then calculated using the equation

$$\Delta E^*_{ab} = \sqrt{\Delta L^{*2} + \Delta a^{*2} + \Delta b^{*2}}$$

The greyscale rating was calculated by the software based on the visual difference in the usual physical grey scales, and was given as a number (rating 5: no fade; 1: highly noticeable fading).

Results

Dyeing

The dyeing results show that rotting, both above and below ground, of the alder buckthorn bark has a strong effect on colours achievable with the boiling method. Also, that both unmordanted and alum-mordanted yarns can be dyed different shades of red (photo 17).

The yarns obtained from both control dyeings, i.e., dyed with unrotten bark, were a dull brownish-yellow color. The difference in tone obtained between unmordanted and mordanted yarns was barely noticeable. Bark that had dried for six months gave a slightly brighter shade.

Dyeing with rotted bark resulted in red shades, with above as well as below ground rotted bark. Dyeing with bark rotted on the ground resulted in a light brownish-red shade. The bark rotted under ground also dyed red, but the colour was noticeably darker and brighter. As with dried bark, there was no significant difference in the colour achieved on unmordanted and alum-mordanted yarns.

Wood ash lye aftertreatment

Soaking in wood ash lye changed the colour of all yarns. In the case of yarns dyed with dried bark, the color became more brownish. The warm orange-red hues dyed with rotted barks turned purplish-red when soaked in wood ash lye.

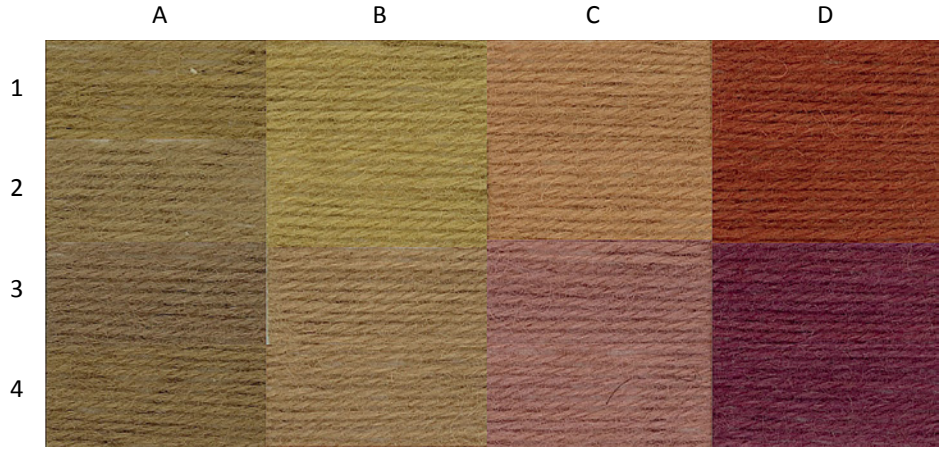

Photo 17. Dyeing and wood ash lye aftertreatment results:
Row 1 – unmordanted yarn; Row 2 – alum-mordanted yarn; Row 3 – unmordanted yarn, aftertreated in wood ash lye; Row 4 – alum-mordanted yarn, aftertreated in wood ash lye.
Column A – dried bark (control 1); Column B – six-month-old dried bark (control 2); Column C – bark rotted on the ground for six months; Column D – bark rotted underground for 6 months.
Photo by Deb Bamford.

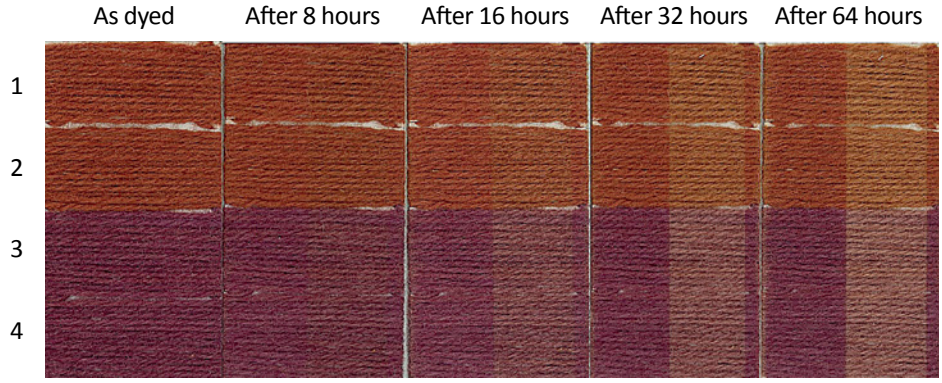

Photo 18. Colour change due to fading of underground-rotted yarns after 8, 16, 32, and 64 hours during lightfastness testing. Explanation for row numbers, see photo 17. *Photo by Deb Bamford.*

Light fastness

The light fastness of all samples was lower than would normally be expected for modern synthetic dyes but, is in line with the typical light fastness of natural dyes. The greyscale rating of all the yarns before wood ash lye treatment was 2-3, and it decreased somewhat to 2 post-treatment. In fact while it was clear that different colorants were present depending on the processing conditions (e.g., on yarns dyed with rotted barks) these colorants exhibited similar fading rates when exposed to light. Contrary to expectation, the alum mordant and wood ash lye post-treatments did not improve light fastness significantly.

No	Alder buckthorn bark treatment	Alum-mordanting (- no / + yes)	Aftertreatment in wood ash lye (- no / + yes)	Greyscale rating
1	Dried	-	-	2 - 3
2		+	-	2 – 3
3		-	+	2
4		+	+	2
5	Dried for 6 months	-	-	3
6		+	-	2 – 3
7		-	+	2 - 3
8		+	+	2
9	Rotted on the ground for 6 months	-	-	2 – 3
10		+	-	2 – 3
11		-	+	2
12		+	+	2
13	Rotted under ground for 6 months	-	-	2 – 3
14		+	-	2 – 3
15		-	+	2
16		+	+	2

Table 2. Greyscale ratings of yarns dyed during the experiment. *Table by Liis Luhamaa.*

Photo 19. Colour change due to fading after 64 hours. Explanation for row numbers and column letters, see photo 17. *Photo by Deb Bamford.*

Discussion and summary

Millennia-long traditions of dyeing with natural dyestuffs disappeared rather abruptly in the second half of the 19th century with the advent of synthetic dyes. Just like all around the world, it happened also within the Estonian peasantry. Already at the end of the 19th century, it was perceived that dyeing with natural dyes was no longer in everyday use and was sinking into oblivion. As part of the concious gathering of all kinds of folklore, fragments of the traditional plant dyeing also reached the archives. Nevertheless, there was no systematic collection of information about the use of natural dyes in Estonia. The descriptions we can research today are random and incomplete in terms of technical details.

Therefore, having information about the rotting of the alder buckthorn bark from five different sources is significant. Also, this tradition seems to have spread all over Estonia, as reports were collected from Western, Southern and Northern Estonia (figure 1).

Even though, as far as we know, Estonia is currently the only country from which written archival sources mentioning rotting alder buckthorn bark are

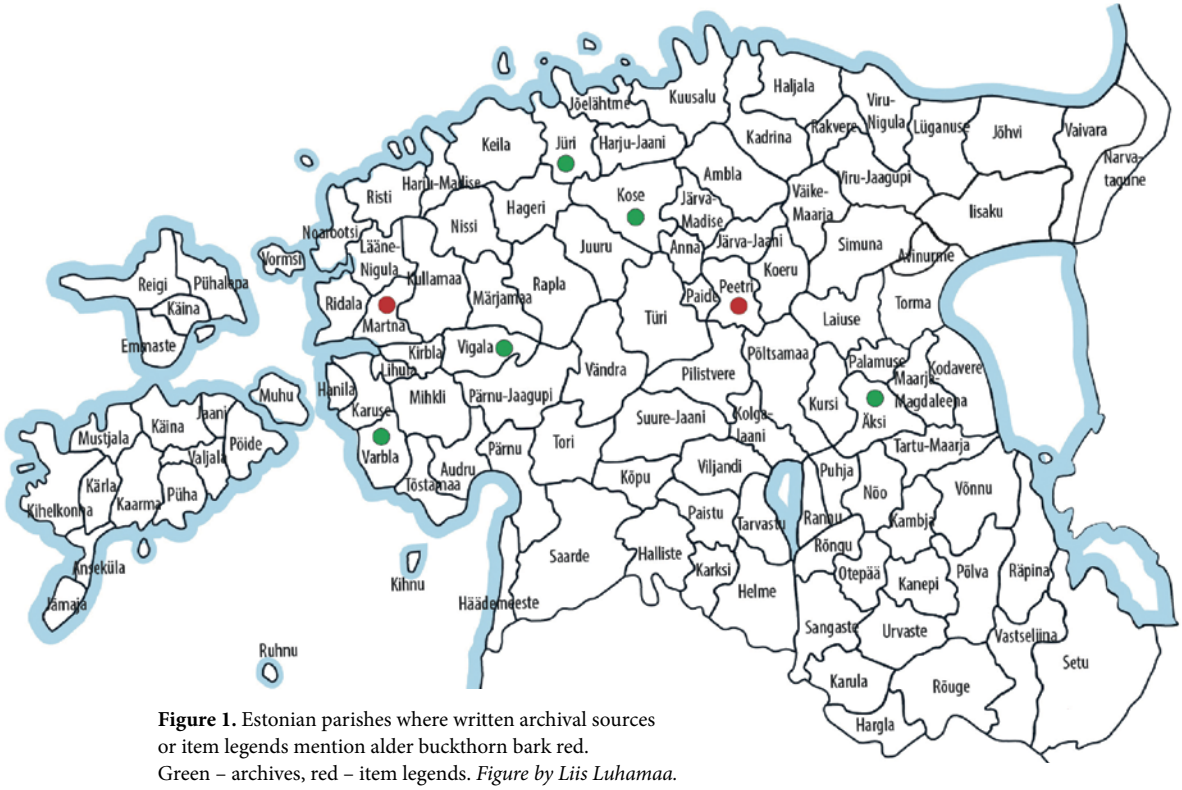

Figure 1. Estonian parishes where written archival sources or item legends mention alder buckthorn bark red. Green – archives, red – item legends. *Figure by Liis Luhamaa.*

found, it is difficult to say whether or not our immediate neighbors also used this technique or if it is something unique to Estonia. A broader use of this technique certainly cannot be ruled out since the alder buckthorn's natural range is extensive, and it is a fast-spreading tree that can be considered a nuisance. Although the light fastness of the alder buckthorn bark red is inferior to the best red colours from natural dye materials, such as the one from northern bedstraw (*Galium boreale*) roots, this shortcoming could be compensated by the availability and cheap relative cost of collecting the dye material.

It is not easy to determine the time period when red yarns dyed with alder buckthorn bark were used in Estonian textiles. Based on written sources, the use of this dye can be dated to the first half of the 19th century. The earlier materials, written mainly by Baltic Germans, do not speak of the alder buckthorn bark red. Moreover, we know that this dyestuff fell out of use already during the time when only natural dyes were used, as it was replaced by imported brazilwood. Considering the slower pace of life in the past and the persistence of traditions in the rural populations, this technique was already known in the 18th century. It could have been used to dye red for the striped skirts that appeared in the local women's clothing in the second half of the

18th century, or in pick-up woven belts that were made and worn even earlier. However, since there are very few Estonian textile items in the museum collections from before 19th century, and the legends of these items, collected in the beginning of the 20th century, are often unreliable, it yet needs to be proven. Wright suggests that alder buckthorn bark could have been used already in the region's prehistory (Vajanto 2015: 44).

Concluding this paper, there are still unanswered questions and several avenues of research await related to this topic. First, chemical dye analysis of the red threads of the Peetri parish skirt and Martna parish pick-up woven belt is necessary to determine whether alder buckthorn bark is the source of one or several of the reds. If the results show that alder buckthorn bark was indeed the dye source it would be an unique example, since the use of alder buckthorn bark in historical textiles has not been identified before.

Secondly, chemical analysis of the dye molecules in alder buckthorn bark would give us more insight into changes happening during the rotting process. For example, mould can influence the enzymatic processes increasing the anthraquinone content in the bark. Further experiments on rotting can show at what point the rotting starts to affect the colour, fluctuating outside temperatures and humidity being certainly major influencing factors. In the experiment described here, only small amounts of bark were rotted, but it can be assumed that these used to be larger historically.

Having been proven experimentally, the Estonian tradition of rotting alder buckthorn bark to obtain red is an important finding that sheds light on the Estonian historical dyeing traditions. Considering the vividness of the colour shades obtained and the availability of the dye material, this red colour dyed with rotted alder buckthorn bark could become an exciting new historical dye material for natural colour enthusiasts.

Acknowlegements

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Views and opinions expressed are however those of the authors only and do not necessarily reflect those of the European Union or the Agency. Neither the European Union nor the granting authority can be held responsible for them.

References

Cardon, Dominique 2007. *Natural Dyes. Sources, Tradition, Technology and Science.* London: Archetype Publications Ltd.

Friebe, Wilhelm Christian 1805. *Oekonomisch-technische Flora für Liefland, Ehstland und Kurland* [*Economic-technical Flora for Livonia, Estonia and Courland*]. Riga: Hartmannsche Buchhandlung.

Frisak, Kristiane 1900. *Kristiane Frisack'i Norra wärwiraamat, ühes 100 wärvi-walmistamise eeskirja ja üks wärwitabel* [*Norwegian Dye Book by Kristiane Frisack with 100 Dye Recipes and One Dye Chart*]. Tartu: Liivimaa Selts naisterahva töö edenemiseks.

Gutzeit, Woldemar von 1864. *Wörterschatz der deutschen Sprache Livlands [Vocabulary of the German Language of Livonia]*. Riga: N. Kymmel.

Johannson, Alma 1916. *Taimewärwid kodu-käsitööS [Plant Dyes used in Home Crafts]*. Tartu: Postimees.

Kukk, Toomas 2018. *Eesti taimede kukeaabits [The Textbook on Estonian Plants]*. Tallinn: Varrak.

Leuchs, Johann Carl 1825. *Vollständige Farben- und Färbenkunde, oder Beschreibung und Anleitung zur Bereitung und zum Gebrauche aller färbenden und farbigen Körper* [Complete Knowledge of Colours and Dyeing, or Descriptions and Instructions for the Preparation and Use of all Colouring and Coloured Bodies]. Nürnberg: Contor der Allgemeinen Handlungs-Zeitung.

Nininahazwe, Fiston, Varin, Mathieu, Théau Jérôme 2023. Mapping common and glossy buckthorns (*Frangula alnus* and *Rhamnus cathartica*) using multi-date satellite imagery WorldView-3, GeoEye-1 and SPOT-7. – *International Journal of Digital Earth*, 16 (1): 31–42.

Schweppe, Helmuth 1993. *Handbuch der Naturfarbstoffe [The Handbook of Natural Colorants]*. Hamburg: Nikol Verlagsgesellschaft mbH & Co.

Sõmermaa, Kaarel 1942. *Puukoor ja taimpark-ained [Tree Bark and Vegetable Tannins]*. Tallinn: Agronoom.

Thomson, Ronald Hunter 1971. *Naturally Occurring Quinones.* London, New York: Academic Press.

Vajanto, Krista 2014. Textile standards in experimental archaeology. – *Focus on Archaeological Textiles: Multidisciplinary Approaches. Monographs of the Archaeological Society in Finland. Ed. Sanna Lipkin and Krista Vajanto.* Archaeological Society of Finland, 3: 62–75.

Vajanto, Krista 2015. *Dyes and Dyeing Methods in Late Iron Age Finland*. Helsinki: Kopio Niini Oy.

Van Bommel, Maarten R. 2005. The Analysis of Dyes with HPLC coupled to Photodiode Array and Fluorescence Detection. – *Dyes in History and Archaeology, 20.* Archetype Publications, Ed. Jo Kirby, 30–38.

Vilbaste, Gustav 1939. *Taimedega värvimisi Eestis [Plant Dyeing in Estonia]*. Tartu: Eesti Rahva Muuseum.

Vilbaste, Gustav 1993. *Eesti taimenimetused [Estonian Plant Names]*. Tallinn: Eesti Teaduste Akadeemia.

Viires, Ants 1960. *Eesti rahvapärane puutööndus [Traditional Estonian Woodwork]*. Tallinn: Eesti Riiklik Kirjastus.

Õunapuu, Piret 2011. *Foreword for the book „Gustav Vilbaste. Vanavara kogumisretkedelt 8. [Gustav Vilbaste. From the Collection Expeditions of Artifacts 8.]". Tartu: Eesti Rahva Muuseum.*

Ärma, Roosi 2009. *Elumõnu [Enjoyment of Life]*. Pärnu: Kihnu Kultuuri Instituut.

Periodicals

Perno Postimees 1863 = advertisement for aniline dyes sold by R. Jacoby & Co in Pärnu. –Perno Postimees ehk Näddalileht, 07.08.1863. digar.ee

Perno Postimees 1872 = Wanna Mäeküla Jakobi külla jut [The Village Tale of Old Jakob of Mäeküla]. – I. Perno Postimees ehk Näddalileht, 10.08.1872. digar.ee

Rigasche Zeitung 1810 = Reval, den 2ten August. – Rigasche Zeitung, 27.08.1810, 69. periodika.lv

Archival materials

KW = keywords in the Archive of the Estonian Dialects and Finno-Ugric Languages at the Institute of the Estonian Language.

H IV 9, 173. Saalwerk, Jaan 1896. Jüri parish.

H III 30, 580. Dr. Paldwerk 1903. Äksi parish.

ERM EA 4. Mitt, Aleksander 1923. Teatmematerjal Koselt [Report from Kose].

ERM EA 5. Tiitsmaa, Aleksander 1923. Teatmematerjal Vigalast [Report from Vigala].

ERA II 39, 293. Tampere, Herbert 1931. Varbla parish.

Internet

Merriam-Webster Dictionary. https://www.merriam-webster.com

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Liis Luhamaa. *Photo by Berta Jänes.*

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Riina Rammo. *Photo by Kristiina Paavel.*

Deb Bamford (b. 1956) established her brand The Mulberry Dyer in the mid 1990's, receiving a "Green Achiever" award for her practices. As a consultant to industry she has spearheaded research into natural dye application for carpets and high end knitwear. 30 years of research, experimentation and practical experience have resulted in the award of Associate of the Society of Dyers and Colourists for natural dyes. She is currently a post-graduate researcher at the University of Leeds studying the environmental impacts of natural dyes and mordants.

Deb Bamford. *Photo by John Stoker.*

Taastades üht vana punase värvi tooni: värvimine mädandatud paakspuukoortega

Resümee

*Paakspuu (*Frangula alnus *Mill.) on traditsioonilise tekstiilivärvi materjalina tuntud paljudes Euroopa maades. Eelkõige kasutati värvimiseks paakspuu marju ja lehti, ent samuti värviti paakspuu koorega. Mitmed Eesti arhiiviallikad mainivad, et paakspuukoorega värviti villast lõnga punaseks. Tavaliselt on paralleelselt ära toodud, et punase värvi saamiseks oli vaja paakspuukoored eelnevalt jätta ületalve mädanema. Ehkki nii ajaloolistes kui tänapäevastes allikates on kirjeldatud paakspuukoore kääritamist tuhaleelises lõngade punaseks värvimiseks, ei ole teadaolevalt paakspuukoore mädandamise katseid varasemalt läbi viidud.*

Käesolev artikkel annab ülevaate paakspuukoorega värvimisest, keskendudes Eesti arhiiviallikatele ja trükis ilmunud teadetele, mis kirjeldavad paakspuukoorega punase lõnga värvimist. Hindamaks mädandamise mõju paakspuukoorest saadavatele värvitoonidele, viidi läbi kuue kuu pikkune praktiline eksperiment. Katsetati kahte erinevat mädandamise viisi – koorte hoidmist maa peal ja maa all. Tulemused näitasid, et paakspuukoorte mädandamise tulemusel saab värvida oranže ja punaseid toone, mis värvimise järgselt aluselises tuhaleelises leotamise mõjul muutuvad lillaks. Määrati saadud värvitoonide pleekimiskindlus. See jäi halliskaala vahemikku 2–3 (minimaalne 1, maksimaalne 5), mis on tavapärane pleekimiskindlus paljude loodusvärvide puhul.

Läbiviidud katsed ja saavutatud tulemused heidavad valgust Eestis 19. sajandil ja varem kasutusel olnud kohaliku loodusvärvi allika – paakspuukoore – omapärasele eeltöötlemise viisile. Mädandatud paakspuukoorega värvitud lõngu saab edaspidi kasutada visuaalsete näidistena, mille abil otsida paakspuukoorega punaseks värvitud tekstiile muuseumikogudest. Samuti on selliselt värvitud lõngad abiks ajalooliste ja arheoloogiliste tekstiilide värvianalüüside tõlgendamisel.

Võtmesõnad: paakspuu, puukoor, looduslikud värvained, lõngavärvimine, mädandamine, pärandoskused