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Published in:

Sources to the history of gardening

2014

Document Version:

Publisher's PDF, also known as Version of record

[Link to publication](#)

Citation for published version (APA):

Persson, E., Ansebo, L., & Solberg, S. Ø. (2014). Cultural Relict Plants in the Nordic Region. In A. Andréasson, E. Gräslund Berg, J. Heimdahl, A. Jakobsson, I. Larsson, & E. Persson (Eds.), *Sources to the history of gardening: Four interdisciplinary seminars 2010-2013 arranged by the Nordic Network for the Archaeology and Archaeobotany of Gardening* (pp. 299-312). (Landskapsarkitektur trädgård växtproduktionsvetenskap; Vol. 2014, No. 25). Sveriges Lantbruksuniversitet.

Total number of authors:

3

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Cultural Relict Plants in the Nordic Region

Erik Persson, Lena Ansebo & Svein Øivind Solberg

Background

The Nordic Cultural Relict Plant Project

During 2011-2012, the Nordic Genetic Resource Center (NordGen) has worked with a project financed by the Nordic Council of Ministers' Arctic Cooperation Programme, aimed at improved understanding and conservation of Nordic *Cultural Relict Plants* (CRPs).

NordGen, the institution behind the project

NordGen is a Nordic gene bank and knowledge centre for genetic resources, owned by the Nordic Council of Ministers. NordGen's mission is to preserve the genetic diversity of cultivated plants, trees and farm animals in the Nordic countries.

The plant section, including the active seed collection, of NordGen is located in Alnarp, in the south of Sweden. The base collection is located in Årslev, Denmark, and a backup collection is located at the Svalbard Global Seed Vault in Svalbard. The latter works as a safety storage for most of the world's gene banks, and is run by three partners – the Norwegian government, the Global Crop Diversity Trust and NordGen.

NordGen's webpage <http://www.nordgen.org> contains more information about its organisation. From there it is also possible to access the webpage of the Svalbard Global Seed Vault, and NordGen's database SESTO. SESTO contains the documentation of NordGen's collections. Through SESTO, plant material can be ordered from the gene bank. Plant material of old Nordic varieties and landraces can, for example, be of interest in research or reconstruction projects.

Project aims

The precise aims of the project were to:

- Find an informative and practical name and definition for the category of Cultural Relict Plants (CRPs) we are working with in the project.
- Start mapping the state of knowledge regarding CRPs in the Nordic region, primarily in the Arctic area.
- Define conservation strategies for CRPs in the Nordic region.
- Create awareness about CRPs among decision makers, managers and caretakers of areas with CRPs, as well as among the general public.
- Create a network of people interested in CRPs in the Nordic region.

The state of knowledge mentioned in the second aim applies more or less to all aspects of CRPs, but in particular to the following:

- Name and definition of the category.
- Occurrence and distribution of plants.
- Historical use.
- Conservation status and strategies.

As mentioned above, the goal of the project was not primarily to produce any new answers to these questions, but to map the existing state of knowledge. The first and the last points above are different in this respect. Finding a useful name and definition turned out to be very important for the rest of the work. We were therefore forced to take this question one step further. The results from this work are described separately by Erik Persson in this volume.

Conservation of genetic resources is NordGen's core mission. Improved conservation strategies are very relevant to its daily work. We have therefore taken on the responsibility of taking this question one step further as well.

Methods

In order to achieve the aims of the project, we used the following methods:

- Questionnaire survey
- Interviews
- Literature studies
- Meetings and workshop
- Experiments to develop *ex situ* conservation (This will be described in a separate publication.)

Questionnaire survey

The survey was performed as an online questionnaire using Google docs. An invitation explaining the survey and its purpose, including a link to the questionnaire, was sent to 172 people, of which 70 answered the questions that were relevant to their area of interest.

The seemingly low response rate was not considered a cause of alarm since the aim of the survey was not to create a representative picture of the average state of knowledge in the population. The aim of the survey was instead to find any pieces of the knowledge puzzle we could get our hands on. This was reflected in the choice of respondents. We did not choose respondents randomly, and we did not aim to get a representative sample of any population. Instead, we looked for people whom we had reason to believe possessed knowledge in the area. We threw the net quite widely hoping to get as much existing knowledge as possible.

To find the respondents we chose a snowball selection method. Accordingly, we started by examining our own circle of contacts for people we knew to possess knowledge of CRPs. We then asked them (through the questionnaire) for information about whom they knew to possess such knowledge, and so forth. Because CRPs is a relatively small field of research (even though it is wide in the sense that it spans over many different disciplines), we are quite confident that this was the right method for

catching the majority of people with knowledge on this subject in the Nordic countries.



Figure 1. Alkanet (*Anchusa officinalis*). (Photo: Svein Ø. Solberg)

Interviews

The main aim of the interviews was to get more in-depth information about CRPs in the Arctic region.

The choice of interviewees was based partly on the meetings with key persons and partly on the results from the questionnaire survey. Out of seven suggested informants, three could be interviewed within the scope of this project: one with knowledge of Inuit traditions, one with knowledge of Sami traditions, and one studying the historical plants of northern Norway. It would have been valuable to interview more people but that was not possible within the scope of this project. We therefore recommend additional interviews in future projects concerning CRPs. The first priority should be to contact experts on CRPs and/or ethno botany in Finland, Iceland, the Faeroe Islands and Åland.

We performed semi-structured telephone interviews, with a few key questions to guide the conversation. We focussed on the history, use and protection status of the plants that were the specialties of the experts we interviewed. The time perspective that we were interested in was not precisely defined. It could be traditions going back 50 to 100 years or much older. The guiding questions we were interested in were:

- What species of plants were used?
- When they were cultivated/used?
- How they were used: for what purpose, what parts of the plant, how they were harvested and prepared and if there were any special traditions and stories associated with them

- Occurrence: geographical distribution, characteristics of location and population size
- Any known conservation measures?
- Suggestions about relevant publications, old as well as new
- Suggestions of additional people to contact.

Performing the interviews over the telephone was cost-effective because we did not have to travel. However, it was much more difficult than meeting the face to face, since each interview had to be made in two languages or in English on, in two cases, bad telephone connections. Face to face meetings would have made the conversations much smoother.

Literature studies

Literature studies were performed as a complement to the other studies. They were especially helpful to map the occurrence and distribution of some species, and for shedding light on the question of definition and criteria.

For mapping the distribution of CRPs, a Danish list of 270 CRP species (Løjtnant, unpublished) was used to extract lists for the other Nordic regions, with occurrence references to respectively; *Flora of Iceland* (2012-12-20 www.floraislands.is), *Íslenzkar jurtir* (Löve, 1945), *Grønlands flora* (Böcher et.al., 1978), *Nya nordiska floran* (Mossberg & Stenberg, 2003), *Den virtuella floran* (online), “Færøernes ældste kulturplanter” (Christensen & Fosaa, 2009), and *Planter og tradisjon* (Høeg 1976).

Meetings and a workshop

One of the first measures we took within the project was to meet with two key persons within the area in the spring of 2011: Kjell Lundquist (just a few months before his passing) and Anna Andréasson. Later we also held a telephone meeting with Per Arvid Åsen.

In July 26-27, 2012, we arranged a conference in Egilsstaðir, Iceland, where we listened to presentations by some of the most distinguished people in the area. We also presented some of the results from the project. The presentations were followed by discussions where we received valuable feedback and additional information.

Results and discussion

In the following section, we present and discuss some of the most interesting results from the project.

Occurrence and distribution

CRPs are closely linked to the history of the places where they grow, hence knowledge of both the plants and the history of the growing places is needed to fully understand and map the occurrence of CRPs.



Figure 2. In connection with the "Nordic Relict Plant Meeting" in Egilsstaðir, Iceland, arranged in connection with the project, the participants also made a study visit at the excavation site of Skriðuklaustur. (Photo: Lena Ansebo)

NordGen has over the past five years worked with the Danish botanist Bernt Løjtnant, to get a better understanding of the occurrence of CRPs. Bernt Løjtnant deals with two categories of CRPs; (A) CRPs from species introduced (to Denmark from abroad), and (B) CRPs from species indigenous to the country but also cultivated. Based on inventories of more than 2600 medieval sites in Denmark he has listed as CRPs approximately 270 species (Løjtnant, 2007a; Løjtnant, 2007b). Of these species, 170 were introduced to Denmark, while the rest are species indigenous to Denmark. Some species can be found in large populations and even behave invasively, while others occur in small numbers and are threatened by extinction.

We have compared Bernt Løjtnant's species list with botanical observations in other Nordic regions. It is clear that the number of observations of these species decreases significantly the further north we look. Bernt Løjtnant listed CRPs from populations of approx. 270 species in Denmark (Løjtnant, 2007a). Lower numbers are observed in the Arctic region (Solberg et al. 2013). We also find that a species can be naturally occurring in one region, whereas in another region the same species was introduced by humans and should be classified as a CRP. Hence, a listing of CRPs according to species is more accurate if it is connected more to a region than to a country or group of countries.

Further studies are recommended to be made locally, based on a trans-disciplinary approach (such as combining agricultural history, archaeology and botany) and including relevant expertise.



Figure 3. Bernt Løjtnant walking in a population of butterbur (*Petasites hybridus*) at Ørslevkloster, Jylland, Denmark. (Photo Svein Ø. Solberg)

The history and use of Cultural Relict Plants in the Arctic region

In the following section, we present the three experts on historical plant utilization in the Arctic region who were interviewed as part of the project, and we summarize the conversations we had about CRPs.

Greenland - Anne Sofie Hardenberg

Anne Sofie Hardenberg from Greenland was appointed Nordic Food Ambassador in 2007. She is working with resuming and renewing traditional uses of Greenlandic plants, spices, and wild animals in cooking and in the production of other products. She also works on a broad international level to increase the interest for Greenlandic food and ingredients. She has, for example, published the well-regarded and award-winning cookbook *Igaassat opskrifter* (Hardenberg 2007) and was involved in the making of *Mamaq - den grønlandske kulturkøgebog* (Gordon Lee 2012).

Working with plants, she focuses on traditional foods and medicines in new and updated recipes. Hardenberg identified one important plant species, angelica (*Angelica archangelica*), of which different parts have been used for many generations, fresh or cooked. She also mentioned thyme (*Thymus* sp.) as an important species, used, for example, for tea. Another plant she knew was used historically is Labrador tea (*Rhododendron groenlandicum*), a species that has now experienced a renaissance in cooking. Hardenberg works with many other plants, from sea weeds to flowering plants.

Hardenberg did not know of any cultivation of plants by Inuits. They harvested wild populations, mainly in the inner fjords of southern Greenland. She did not know of any protection measures for plant populations or of any threatened populations.

Hardenberg shares her knowledge about the historical uses of plants on Greenland in her cookbook (Hardenberg, 2007). She also spreads knowledge via TV-programs,

several articles that feature her, and workshops and courses about cooking arctic food that she arranges.

Sweden - Greta Huuva

The restaurant 'Viddernas hus' in Jokkmokk, in Sápmi, the Sami cultural region in Sweden, is run by Greta Huuva and her family. They make traditional Sami food from local ingredients. Huuva is also teaching Sami food culture at the Sami Education Centre. She comes from a reindeer-keeping family and is using her knowledge about wild herbs as a food in her present work. In 2010, she was appointed Food Ambassador of Sápmi by the Swedish government.

According to Huuva, plants have been important for the Sami people for food, medicine etc. They used what nature offered, such as angelica (*Angelica archangelica*), common sorrel (*Rumex acetosa* ssp. *lapponicus*), mountain sorrel (*Oxyria digyna*), alpine lady's-mantle (*Alchemilla alpina*), rosebay willow herb (*Epilobium angustifolium*), yarrow (*Achillea millefolium*) and berries of different species. The inner bark of pines (*Pinus sylvestris*) has also been a very important food source. There is a special traditional dish, 'gâmpan', on which the Sami people have relied to a large extent. It consists of fermented herbs such as angelica, common sorrel, and rosebay willow herb.

Huuva informed us that the Sami tradition of using the plants in their surroundings as a food source was maintained until two generations ago. These plants were not cultivated but harvested in the wild. Wild populations of valuable species were protected by the Sami, as it was important not to use up everything. Huuva has unconfirmed information that during the 1800s, turnips (*Brassica rapa* ssp. *rapa*) were cultivated on the reindeer grazing-ground, possibly by the Forest Sami. She also mentioned that Sami possibly spread angelica (*Angelica archangelica*) to southern regions by bringing seeds to their camps. We believe it would be worthwhile to investigate these things in future projects.

Huuva related that when Sami people and non-Sami settlers met, there were conflicts between them, but also some integration and exchange of cultures and traditions. The settlers cultivated various plants on small scale, for example potato (*Solanum tuberosum*), onions (*Allium* spp.), turnips, and grains for the animals. Wild sedge (*Carex* spp.) and marsh meadows were cut for hay. Sometimes Sami women married settlers, and brought their use of wild herbs with them into their new families.

On the question about literature on Sami and settler traditions, Huuva referred to the library of Ájtte Museum in Jokkmokk. As an example, she mentioned Lilian Ryd who has written about the settlers, the Sami women and the food (Ryd, 2005), and Yngve Ryd who has written about the culture (reference not found; authors rem.). Huuva also mentioned an essay made recently about plants used by Sami (probably *Samiska växter i Laponia* by K. Kuoljok, 2012; authors rem.). Huuva refers to the librarian of Ájtte museum as a key resource person for finding literature and contact persons on Sami culture.

Norway - Brynhild Mørkved

A person who knows much about old gardens, manors, parks and the horticultural history of northern Norway is Brynhild Mørkved, Associate Professor and First Curator of the horticultural herbarium and botanical garden at Tromsø University Museum. Mørkved also makes inventories for the Norwegian national program and collects perennial plants with a documented history before 1940 for conservation. After 1940, a great inflow of new varieties and species began and much old plant material in the gardens was replaced. To some extent Mørkved is also working with inventories and

collection of naturalized plants in old abandoned gardens as well as other places. The oldest plant specimen that Mørkved has found was already documented in 1821 and is growing in a garden in Tromsø. Mørkved works with mostly with written sources and photos. She also conducts interviews. No archaeological studies of historical locations have yet been made.

Mørkved works with 150-200 species with a documented history. The collected information includes use, traditions, stories, local names etc. The types of locations are farm gardens, manors, and vicarages. Gardens close to or with relations with larger gardens are also very interesting, as plants were often moved from large gardens to neighbouring gardens or were brought home by employees.

The collected plants are conserved in field gene banks, also called clonal archives. In northern Norway, this is Tradisjonshagen in Tromsø with backups in local folk museums. *In situ* conservation is very difficult since this is often on private land. It is thus not easy to arrange long term conservation.

One of Mørkved's favourite plants is victory onion (*Allium victorialis*), a species found native on mountain meadows in e.g. the Alpine region, Balkan, Carpathians, and Japan, where it is used as food, medicine and a talisman. It does not grow wild in the Nordic countries, but is only cultivated in gardens. The exception is on Vestvågøy island in Lofoten, where it is common as a garden and church yard plant, and it has also become naturalised. It has supposedly been introduced or naturally spread from northern Russia or from central Europe. Mørkved's own hypothesis is that it may have been brought there by Vikings, but this has to be further investigated. More can be read in the web article *Seiersløk – fra vikingenes løkhager* (Mørkved, 2008).

Conservation of Cultural Relict Plants

Some CRPs can be found in large populations and behave like weeds, while others are threatened by extinction. In our experience, most CRPs occur in small groups of plants, often from ten to some hundred individuals per population. The distance to the next population varies a lot. Theoretical models say that the minimum viable population size in closed systems is in the range of hundreds to thousands of individuals, depending on the type of organism and its systems for avoiding inbreeding depression. Applying this knowledge on CRPs, the conclusion is that many of the populations are endangered and in urgent need for protection.

The survival of CRPs depends on a number of factors (Løjtnant 2007b), and are influenced by human activities such as:

- Destruction of habitat – e.g. urbanization, construction, drainage.
- Management – e.g. grass cutting, intensive cleaning, grazing, herbicides.
- Plant hunters – digging up, collecting
- Lack of knowledge

CRPs should primarily be preserved in their natural habitat as the plants are part of the history and heritage of the place. However, the questionnaire survey showed that most CRP sites have little or no protection. It also showed that in most instances it is unclear who has the formal responsibility to protect CRPs on these sites.

Conservation in gene banks cannot be a substitute for *in situ* conservation, but it can work as a supplement, as seeds can survive for many years in freezers and collected seeds can be used for multiplication and distribution. So far, NordGen has collected and stored 300-400 accessions of CRPs, most of them from selected places in Denmark with assistance from Bernt Løjtnant, but recently also from some locations in Sweden and Norway:

- Jylland: Kalø castle ruin, Agri manor, Kollerup manor, Mariager village, Mols villages, Ebeltoft old town, Egen church, Fiskbæk church, Ørslev monastery, Kvols village, Spøttrup castle.
- Fyn: Kærsgaard fort ruin, Brahetrolleborg castle, Hesselagergård manor, Kaleko watermill, Tranekær castle, Valdemars castle.
- Sjælland: Borreby castle, Holsteinborg manor, Agersø village, Skælskør village, Fyrendal church.
- Bornholm: Hammershus castle ruin, Allinge village, Hasle village, Melsted village, Bølshavn village, Gudhjem village, Svaneke village.
- Skåne: Lund old town, Uppåkra church, Håstad village, Trollenäs castle, Malmöhus castle, Helsingborg old town, Skanör and Falsterbo villages, Lomma village.
- Norway: Oslo old town, Tønsberg monastery ruin and old town.

After collection, the material has to be cleaned, verified, dried to an internal humidity of approximately 5%, packed and stored in freezers at -18°C, according to NordGen's gene bank standards. The accession data must also be stored, and the seeds made available to the public, as with other plant material conserved by NordGen. To ensure the quality and quantity of the material, germination tests and multiplication must be carried out. How to germinate and how to multiply CRPs is not always known. Hence, germination and regeneration protocols need to be established.

Several questions of the complex issue of conservation of CRPs remain to be answered. The CRPs of Kalø fort ruin, in Jylland, Denmark, can be used as an example of a complicated conservation situation. The fort of Kalø was built in 1313 and abandoned in the 1670s. CRPs of 26 species have been found on Kalø (Løjtnant, 2007b). According to existing knowledge about the history of the place, the plants were most likely introduced before the 1670s - but after 1313. Furthermore, at a fort like Kalø there could have been as many as 200 cultivated species. Today, 26 can be found, but only four have been collected and are stored in a gene bank. There is still a long way to go to collect the 22 remaining species - and what about the 150-200 possible species that may yet be discovered? Should we conduct more collectings for *ex situ* conservation, or should we focus more on conservation on site? Who is responsible for the *in situ* conservation? At least the owners and users must be involved (Løjtnant et al., 1995) and they need knowledge and resources to do the work. Authorities must see CRPs as part of our heritage. In order for estate owners and authorities to be engaged in the protection of remaining CRPs, it is important to increase the awareness of CRPs, and the knowledge of how to protect them.

Creating awareness and network in the Nordic region

One of the aims of this project was to connect national experts on CRPs to create a Nordic network to spread knowledge about CRPs and their uses and to stimulate improved cooperation among groups working with CRPs. This was one of the main purposes of the workshop that took place in Egilsstaðir, northeast Iceland, July 26-27, 2012. The conference gathered 18 participants from Denmark, Iceland, Norway and Sweden. One day was dedicated to talks and discussions about the concept of CRP, occurrences and conservation. Day two there was an excursion to the excavation site of the medieval monastery Skriðuklaustur, where some of the participants had made botanical inventories.



Figure 4. One of the authors Erik Persson and Magnus Göransson (NordGen) collecting seeds at Borreby in Denmark. (Photo Svein Ø. Solberg)

One of the outcomes of the conference was the decision to produce and keep a web page that can function as a forum for information dissemination and discussion. It is also important to spread the knowledge about CRPs outside the expert group, for example to politicians and practitioners. CRPs are vulnerable and sensitive to management practises and environmental changes. It is therefore important to create an understanding for measures that need to be taken against their extinction. In order to facilitate this understanding, we also decided to produce a pamphlet aimed at politicians and decision-makers higher up in the decision process, as well as anyone interested in botany and the cultural history of plants. The pamphlet is called *Reliktplanter – levende fortidsminner* and the distribution of it has started. It gives an overview of the concept of CRP, presents national examples and explains why CRPs are important and how they can be conserved.

A second pamphlet is also produced. It is aimed at the practitioners, both the organisations responsible for historical sites and the managing staffs on site. This pamphlet consists of two parts: first, an explanatory part containing information about CRPs, and second, a management guide showing good examples on how the historical sites can be managed with simple, and cost efficient methods, to create a beneficial environment for those living relics of the past. This second pamphlet will be distributed to relevant organisations in the Nordic countries.

Another way to spread knowledge is to write in journals and books aimed at botanists, archaeologists, managers of historical sites, etc. This article is one example of this. Two other examples are an article published by Gert Poulsen *et al.* in the 2010 year book of the Danish Agricultural Museum: *Reliktplanter – bevaring av levende kulturminner*; and one by Svein Ø. Solberg *et al.* in the journal *Nordisk Museologi* (2013): *Cultural relict plants – a living heritage*.

In the survey and interviews performed in connection with this project, several publications and websites were suggested to us that will provide more knowledge about

CRPs, plant genetic resources, historical and traditional use of plants, and other information related to CRPs.

Acknowledgments

The authors wish to thank the Nordic Council of Ministers' Arctic Cooperation Programme for their economic contribution. We also wish to thank our interviewees and the participants at the Nordic Relict Plant Meeting for generously sharing their knowledge and views on the subject. A special thanks to Bernt Løjtnant who kindly shared his data with us. Last but not least we wish to thank Professor Kathleen Keeler whose comments contributed considerably to the readability of the text.



Figure 5. Magnus Göransson (NordGen) collecting seeds of CRP at Borreby, Denmark. (Photo Svein Ø. Solberg)

Källor till trädgårdsodlingens historia: fyra tvärvetenskapliga seminarier 2010–2013 arrangerade av Nordiskt Nätverk för Trädgårdens Arkeologi och Arkeobotanik (NTAA). © Författarna, 2014.

Solberg, S.Ø., Breian, L., Ansebo, L. & Persson, E. (2013) *Cultural relict plants - a living heritage*. Oslo: Nordisk Museologi 2013, pp. 24-35.

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