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RESEARCH ARTICLE

Historical cultivars of *Allium cepa* L. (Aggregatum-Group) introduced to Sweden 1830–1860

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Abstract This study presents the plant material of *A. cepa* L. Aggregatum-Group introduced and spread in Sweden between 1830 and 1860. The plant material exemplifies different principles regarding the denominations and shows the range of cultons available in the north of Europe by the time, but also examples of domestic local cultivars. It is essential to deepen the knowledge of the plant material and the name use connected to cultons spread in the nineteenth century. Historical records of old growing systems and propagation methods add valuable insights of the preservation values tied to the genetic diversity of the gene pool for future breeding. Differing practices and principles for distinguishing between potato onions, shallots and onions in European countries have sometimes made it difficult to understand historical records. The results of this study shows that shallot and potato onions, later mainly vegetatively propagated, were already in the nineteenth century occasionally propagated and spread by true seed in Europe. In addition, a Russian growing system with a true seed generation was found in literature. The article concludes that knowledge of older cultivation systems and introduction history deepens the link between the cultural-historical and the biological conservation values of plant material in long time preservation. Gene bank accessions may not only be valuable in breeding but also utilized and preserved as part of a biological or green heritage.

Keywords Heirloom cultivars · Horticultural history · Multiplying onion · Potato onion · Shallot

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Introduction

In historical records, different cultons now regarded as *Allium cepa* L. has often been taxonomically divided into vegetatively propagated shallots and seed-propagated onions (Rabinowitch and Kamenetsky 2002). Multiplying onions, often referred to as shallots, are considered as part of the Aggregatum group (Fritsch and Friesen 2002) and locally adapted cultivars are important as a substitute crop in areas with difficult growing conditions for bulb onion (Rabinowitch and Kamenetsky 2002). Medieval laws suggest that onions has been part of the everyday diet in Sweden since at least the fourteenth century, but earlier studies has shown that the rural population did not always distinguished between multiplying onion and bulb onion in everyday use (De Vahl and Svanberg 2022). Swedish cookbooks of the nineteenth century shows that both bulb onions, sometimes collectively referred to as Spanish onions, and shallots where important in cooking (Björklund 1847; Weltzin 1804), while ethnographic records show that onions

where important as part of foods made of blood and offal prepared by the rural population in pre-industrial Sweden (De Vahl and Svanberg 2022).

Shallots have been known by the rural population in Sweden as *potatislök* [potato onion] and preserved as heirloom cultivars (Nygårds and Leino 2013; Strese and De Vahl 2018). The term heirloom cultivar is here used as a collective term including local cultivars, historical cultivars and landraces tied to cultural history and green heritage. Heirloom cultivars of multiplying onion (*Allium cepa* Aggregatum-Group.), known as *potatislök* or shallots and by other local names, were collected and evaluated from all over Sweden in nation-wide surveys conducted by the Swedish National Programme for Diversity of Cultivated Plants (POM) between 2002 and 2010. The onions are preserved by the Swedish National Genebank (Strese and De Vahl 2018). The collected onions originates from plant material that has been cultivated in the countryside for a long time (Leino and Hagenblad 2014) and has been found to be genetically diverse compared to accessions from Fennoscandia (Leino et al. 2018). They were often described as especially well suited for storage over winter (Strese and De Vahl 2018).

Knowledge of older cultivation systems and folk taxonomy is important in order to deepen the link between the cultural-historical and biological conservation values of the plant material that is documented and preserved within the Programme for Diversity of Cultivated Plants (De Vahl 2020). Traditional uses and practices of edible cultivated *Allium* species in Sweden has been described by De Vahl and Svanberg (2022), including the older cultural descriptions promoting autumn planting of both shallots and the more hard-to-identify cultural forms of onions called *johannislök* (Saint John's onion) and *jacobslök* (Saint Jacob's onion) that was advocated until the mid-nineteenth century in Swedish garden literature.

According to international policies, such as the *Global Plan of Action for the conservation and sustainable utilization of plant genetic resources for food and agriculture* developed by FAO (2009), it is vital to preserve the genetic spread found in heirloom cultivars. Also, non-governmental associations such as *Slow Food Foundation for Biodiversity* emphasize the importance of heirloom cultivars in relation to food sovereignty (Slow Food Foundation for Biodiversity 2023). One reason for this is that sources of genetic variability include generations of epigenetic variants, accumulation of mutation in clonally-propagated cultivars, and selections for adaptation to various environments Rabinowitch (2021).

The results of the genetic survey of European gene bank accessions of multiplying onions suggest that home gardens might have had an important role as plant genetic diversity hotspots, serving as a preserving environment for a surprisingly high number of unique genotypes from different European countries (Ruņģis et al. 2020). The collaboration for Allium that is part of the *European Cooperative Programme for Plant Genetic Resources* (ECPGR-Allium) has also documented older cultivation systems, such as the 4 years seed-propagation cycle known from villages near Lake Peipsi (Ruņģis et al. 2020). Onions have been grown there, mainly by Russian old believers, using the same method since the middle of the nineteenth century. The original cultivar was brought from the village of Bessonovka in Russia's Penza Oblast (TRIS—National Technical Regulations 2018). However, Hupel (1774) stated that onions in Estonia in the eighteenth century where cultivated especially by Russians who lived in the cities.

The inventories conducted by POM includes documentation of the donor's memories of the onions cultivation history and use (Nygårds and Leino 2013; Strese and De Vahl 2018). Since none of the heirloom cultivars collected is described as originating from commercial cultivars and cultivars of the crop was sparsely known from the assortment of the nineteenth century, this study describes a previously overlooked source material.

In addition, earlier studies has shown that no cultivars of shallots or potato onions where known from Swedish historical price lists (Börjeson 2015). This paper aims to deepen the knowledge of plant material and early cultivars in trade in Northern Europe during the nineteenth century with emphasis on the plant material imported and spread by the Swedish garden association founded in 1832. The paper also provides a Swedish example of how knowledge of horticultural history can be helpful in explicating preservation values for living germplasm collections. Differing practices and principles regarding distinguishing between potato onions, shallots and onions in European countries has made it difficult to understand historical records of early trade and spread of plant material. By highlighting historical examples from different

countries, this study deepens the knowledge of how historical sources regarding multiplying onions can be analyzed and understood.

Methods

For this study the yearbooks of Svenska trädgårdsföreningen [The Swedish Garden Association] 1834–1863 and the volumes of the journal *Tidning för Trädgårdsodlare* [Magazine for Gardeners] published 1862–1901 were investigated. Supplementary information were found through searches in the digitized historical newspapers available through the Swedish Royal Library's database *Svenska dagstidningar* with the Swedish common names as keywords (Svenska dagstidningar). Archive material from the Swedish Garden Association was studied at the National Archive's library and the Royal Swedish Academy of Sciences' archives. The digitization of the newspapers made it possible to search for relevant information through a relatively wide range of Swedish material. Digitized seed catalogues of German Haage and Schmidt 1869–1920 was studied besides digitized volumes of French Vilmorin-Andrieux et Cie-yearbooks and English literature, translations of French sources and correspondence in garden magazines concerning multiplying onions in the nineteenth century. However, the analyzed source material from these European countries is narrower and incomplete and therefore used as qualitative records supplementing the Swedish perspective. This source material was chosen to give insight to different naming principles and historic sentiments in northern Europe with the aim to find supplementary information of the plant material introduced to Sweden. Digitized source material was found using Google Books and Biodiversity Heritage Library with both common names and scientific names of the species as keywords (Biodiversity Heritage Library 2009; Google Books 2007). The cultivars found in these studies are included in the results as a separate table (Table 2).

Results

To understand the rise of several cultivars of multiplying onion in the nineteenth century, this article starts with presenting two tables with cultivars, synonyms and propagation methods. The result are also narrated though a few examples of different principles in distinguishing and naming cultons from Germany, England, France and Sweden. The presentation starts with the first known cultivars of shallots, follows the translated cultivar names to England and the subsequent discussions regarding the classification. Entwined with the presentation of both shallots and potato onions described in German source material are the narrative of the potato onion in different countries. Last, historical records of both shallot and potato onion grown from true seed are presented.

Cultivars in seed catalogues and litterature

The results are presented in Tables 1 and 2. Table 1 consists of data from the distribution catalogues of the Swedish Garden Association and these tables describes the propagation methods by seed or by sets and the span of years each cultivar is sold, spread or described in literature. The German source material referred to in Table 2 are the digitized plant catalogues of Haage and Schmidt and data from literature which do not hold information of propagation methods. On the other hand, the literature often points out at the time known synonyms or denominations in other languages.

The literature study show that several cultivars of shallots were imported, cultivated and distributed in Sweden a long time before the first literature data regarding a certain form of shallots, especially well adapted to Nordic cultivation conditions, was spread by famous Swedish gardeners Olof Eneroth and Daniel Müller in the mid-1800s (Table 1). The heirloom cultivar 'Leksand' was grown in the garden of the Swedish Garden Association in 1859 together with a number of other named cultivars (Fig. 1). The review of source material from France, Germany and England shows that several cultivars were known and described at the time and that different cultivars were named after their presumed provenance (Table 2). The popular and cultivar names used illuminate contradictory views on the status of shallots as their own "true" species at the time, making the distinction between potato onions and shallots inconsistent and differing in European countries during the nineteenth century. While the French and English source material doesn't mention any different cultivars of potato

Table 1 Cultivars of shallots sold or described in Sweden in the nineteenth century

Name	Synonyms given	Comment	Propagation method	Year	Source	Country
'Rysk Schalotten'	'Stor Rysk', 'Egyptisk potatislök'	Spread as shallots or potato onions	Seed/sets	1835–1880	Sv. Trädgårdföreningen (1835, 1846, 1859) Eneroth (1867) Göteborgs trädgårdsföreing (1870) Alnarps trädgårdar (1880)	Sweden
'Portugisisk Schalotten-Lök'		Spread as shallots	Seeds or sets	1837–1843	Sv. Trädgårdsföreningen (1837, 1843)	Sweden
'Spansk Chalottenlök		Spread as shallots	Sets	1845	Sv. Trädgårdsföreningen (1859)	Sweden
'Dansk schalotten'	'Stor Dansk', 'stora hållbara danska'	Spread as shallots	Sets	1846–1880	Sv. Trädgårsföreningen (1846), Göteborgs trädgårdsförening (1870) Sellbergs (1876) Alnarps Trädgårdar (1880)	Sweden
'Nordiska Schalotten'		Described as shallots or potato onions	Unclear	1851	Müller (1851)	Sweden
'Leksandslök'			Sets	1859	Sv. Trädgårdsföreningen (1845)	Sweden
'Vanlig Svensk'	'Vanlig'	Sold as shallots	Sets	1870–1880	Alnarps Trädgårdar (1880), Göteborgs trädgårdsförening (1870)	Sweden
'Johnssons potatislök'		Sold as potato onions	Sets	1934	Alnarps Trädgårdar (1934)	Sweden
'Julilök'		Sold as potato onions	Sets	1938	Alnarps Trädgårdar (1938)	Sweden

onion, the German pricelists from a later part of the century mentions several.

The first cultivars of shallot

In French, English and American literature from the nineteenth century, it is possible to follow the development of knowledge and its dissemination regarding cultivars of shallots based on the plant material described in the publications of the French seed company Vilmorin-Andrieux et Cie's (Table 2).

In *Le bon Jardinier* [The Good gardener] 1809, no cultivar names were mentioned at all, but in 1817 a cultivar called 'Grosse Echalotte' was mentioned (Poiteau 1809; Poiteau and Audot 1817).

In 1844 'Echalote de jersey' was described as a new species or cultivar in France that differed mainly on its earliness and leaf color (Poiteau 1844). A previous volume of the publication; *Le Bon Jardinier; Almanac pour l'Annee* [The Good gardener; Almanac for the Year] 1840 was reviewed in London 1840. The reviewer stated: "E'chalote de Jersey, known in Scotland as the Russian shallot, and E'chalote grosse de M. Houtton are recommended" (Loudon and Spottiswoode 1840). This statement stresses how different the origin of the cultivar 'Jersey' was considered.

Cultivars, strains and translations

A French catalog from 1856 describes four types of shallots; 'Ordinary', 'Grosse', 'De Jersey' and 'Grosse

Table 2 Cultivars of shallots sold or described in Germany, France, England and USA in the nineteenth century

Name	Synonyms given	Comment	Propagation method	Year	Source	Country
'Silberweisse'		Sold as potato onions	Seed	1869–1872	Haage and Schmidt	Germany
'Neue feine weisse'		Sold as potato onions	Sets	1869–1872	Haage and Schmidt	Germany
'Grosse'		Sold as shallots	Seed/sets	1869–1902	Haage and Schmidt	Germany
'Grosse von Jersey'		Sold as shallots	Seed	1869–1920	Haage and Schmidt	Germany
'Grosse Rothe'		Sold as potato onions	Seed/sets	1869–1920	Haage and Schmidt	Germany
'Dänishe, echt'	'Grosse Dänishe (russ)'	Sold as shallots	Seed/sets	1869–1920	Haage and Schmidt	Germany
'Grosse Gelbe'		Sold as potato onions	Seed/sets	1869–1920	Haage and Schmidt	Germany
'Feine lange graue'	Gewöhuliche	Sold as shallots	Seed/sets	1871–1912	Haage and Schmidt	Germany
'Russische, hellgelbe'		Sold as potato onions	Sets	1894–1920	Haage and Schmidt	Germany
'Weisse'		Sold as potato onions	Seed	1898–1920	Haage and Schmidt	Germany
'Edel'		Sold as shallots	Sets	1907–1920	Haage and Schmidt	Germany
'Common or Small Shallot'		Described as shallot		1863	Burr (1863)	USA
'Large Shallot'	'Grosse Echalotte', 'Grosse'	Described as shallot		1863	Burr (1863)	USA
'Jersey'	'Russian Shallot' (Poiteau 1844), 'False Shallot', 'Escalote de jersey', 'Grosse von Jersey'	Described as shallot		1863	Burr (1863)	USA
'Large Alencon'	'Alencon'	Described as shallot		1863	Burr (1863)	USA
'Long Keeping'		Described as shallot		1863	Burr (1863)	USA
'Potato Onion'	'English Potato Onion', 'Underground onion'	Described as potato onion		1822	Maher (1822)	England
'Large Brown'	'New Russian', 'Small Red', 'Large Red', 'Large Russian', 'Stuart and Mein's Exhibition Shallot'	Described as shallot		1883	Barron (1883)	England
'Small Red'	'Large Brown'	Described as shallot		1883	Barron (1883)	England
'Large Red'	'Large Brown'	Described as shallot		1883	Barron (1883)	England
'Large Russian'	'Large Brown'	Described as shallot		1883	Barron (1883)	England
'New Russian'	'Large Brown'	Described as shallot		1883	Barron (1883)	England
'Stuart and Mein's Exhibition Shallot'	'Large Brown'	Described as shallot		1883	Barron (1883)	England
'Jersey Giant Red Shallots'		Described as shallot		1883	Barron (1883)	England
'Jersey Silver-skin'		Described as shallot		1883	Barron (1883)	England

Table 2 (continued)

Name	Synonyms given	Comment	Propagation method	Year	Source	Country
'Russian Shallot'	'Jersey', 'Large Brown'	Described as shallot		1883–1920	Poiteau (1844), Barron (1883), Vilmorin-Andrieux et al (1920)	England
'Ghent Shallot'		Described as shallot		1920	Vilmorin-Andrieux et al (1920)	England
'Echalote ordinaire'	'Common or Small Shallot'	Described as shallot		1809	Poiteau (1809)	France
'Grosse Echalotte'	'Large Shallot', 'Grosse'	Described as shallot		1817	Poiteau (1817)	France
'L'ognon patate'	'd'Ognon sous terre'	Described as potato onion		1825	Vilmorin-Andrieux et al (1920)	France
'Escalote de jersey'	'Jersey', 'Grosse von Jersey'	Described as shallot		1844	Poiteau (1844)	France
'Echalote grosse d'Alengon'	'Large Alencon', 'Alencon'	Described as shallot		1920	Vilmorin-Andrieux et al (1920)	France
'Grosse de Noisy'		Described as shallot		1920	Vilmorin-Andrieux et al (1920)	France
'Hative de Niort'		Described as shallot		1920	Vilmorin-Andrieux et al (1920)	France
'Echalote Petite Hative de Bagnolet'		Described as shallot		1920	Vilmorin-Andrieux et al (1920)	France

Fig. 1 Allium cepa (Aggregatum-Group) 'Leksand'. Old heriloom cultivar known by name since the nineteenth century. Photo of accessions SWE106 kept at Swedish National Genebank by Erik de Vahl

d'Alençon' (Description des Plantes Potagères 1856). In 1863 the North American gardener Fearing Burr describes five cultivars of shallots with reference to Vilmorin's French cultivar names in brackets (Burr 1863). Described cultivars presented by Burr are 'Common or Small Shallot', 'Jersey', 'Large Alençon', 'Large Shallot' and 'Long Keeping' (Table 2).

In an English translation of Vilmorin from 1920 (Vilmorin-Andrieux et al. 1920) additional cultivars and information is added. Cultivars are now described as strains, "Sub-varieties", under either the "true" or "false" shallots. Included as 'True Shallot' sold in the market places of Paris are 'Echalote Petite Hative de Bagnolet', 'E. Grosse de Noisy' and 'E. Hative de Niort'. 'Jersey' is stated to be synonymous to 'False Shallot', but also 'Alençon' a silver-white variant of 'Jersey', 'Ghent Shallot' and 'Russian Shallot' are mentioned as such.

Discussions and misunderstandings concerning the new cultivars

There are examples of how the many new cultivars described in the garden literature during the nineteenth century were met with skepticism and resulted in misunderstandings. In 1859, British Robert Thompson claimed that there were in fact only four known cultivars of shallots, but that they often

degenerated into the common type again within 2–3 years (Thompson 1859).

In England, the ability of shallots to flower and set seeds was central to the discussion around the new cultivars. In 1883 Barron elaborated on various synonymous cultivar names used for the two *actual* cultivars of true shallots that he, after many years of cultivation experiments, could recognize. These were 'Common', with small bulbs, and 'Large Brown'. The later with the synonymous names 'New Russian', 'Small Red', 'Large Red', 'Large Russian', and 'Stuart and Mein's Exhibition Shallot' (Barron 1883). According to the author, there were two more cultivars, but unlike the "true shallots", they sat plenty of seeds: 'Jersey Giant Red Shallots' and the 'Jersey Silver-skin'. The propensity to set seeds, according to Barron, meant that these should not be considered as *Allium ascalonicum* but as an inferior form of common onion *A. cepa*, similar to "potato onions". Furthermore, Barron pointed out the unfortunate mistake of Vilmorin who considered 'Jersey' to be a synonym for 'Russian Shallot', while 'Russian Shallot' in England and Scotland was considered a synonym for "true" shallots, more specifically the cultivar 'Large Brown' (Barron 1883).

True seeds of both potato onions and shallots and early name forms of potato onions

In German price lists during the latter part of the nineteenth century, both true seeds and sets were sold of shallots and potato onions [kartoffel-zwiebeln] (Table 2). In Haage and Schmidt's catalog 1869 seeds of the cultivars 'Grosse von Jersey' and 'Dänishe, echt' and of the potato onion cultivars 'Grosse Gelbe' and 'Silberweisse' are for sale. Sets are also sold of "common large shallots" and 'Grosse Dänishe (russ)'. Other cultivars were sold and listed as potato onions.

The range of cultivars varied slightly over the following decades where different descriptive name variants were used both for seeds and for sets (Table 2).

Written evidence for the trivial name potato onion used for multiplying onion is available from Germany from 1795, as *kartofel-zwiebel* [potato onion] (Funke 1795). In Swedish literature Nils Lilja published the name potato onion in his flora in 1839, but already in 1834 the "Egyptian potato onion" was shown at the newly started Swedish Garden Association's exhibition according to newspaper articles and the association's yearbook (Lilja 1842; Rosenblad 1834). The name undoubtedly refers to the onion's way of multiply one set to several onions, similar to potatoes. The popular spread of the name potato onion cannot have preceded the popularization of potatoes (*Solanum tuberosum* L.) and it is likely that the potato onion, like the potato, came to be regarded as a novelty. However, Siemers, a Swedish gardener with German and Danish background, used the name for the small onions achieved the following year when planting the yellow Spanish onion in autumn (Siemers 1844). He used the term "yellow Spanish onion" as a category including all yellow cultivars of seed-propagated *Allium cepa* L.

An Egyptian onion with poor shelf life?

In 1818, the gardener at Arundel Castle in Norfolk wrote about what he calls "Under Ground-onion" but according to the author, it was called "potato onion" by others (Maher 1822). He argued against those who called these onions "Egyptian onion" and explained that he grew the onion in London already in 1796, 2 years before the Battle of the Nile, when others claimed that the British first came across the onion after defeating the French (McIntosh 1855). He further describes how the smallest bulbs is used as sets and that soil is raised around the bulbs, as done for potatoes, after they had started to sprout when planted in February. The bulbs is harvested in July. The crop was common in the west of England where tradition dictates that they should be planted on the shortest day of the year and harvested at the longest of the year. Furthermore, it was stated that a gardener from Exeter in the southwest England announced that this crop had been known and cultivated for 20 years (Maher 1822).

The gardener at the Horticultural Society of London also describes the potato onion as a crop whose best quality is that it give harvest in early summer, before other onions are ready for harvest. He describes it as a variant of *Allium cepa* and as a strong onion (Strachan 1822). According to Woodward (1996) the potato onion was spread to the United States in 1820. *The American farmer's encyclopedia* of 1844 stated that the potato onion was introduced to Scotland by Captain Burn of Edingburgh and accordingly known as 'The Burn Onion' (Johnson and Emerson 1844).

In French literature, *L'ognon patate* [potato onion] was often described as a horticultural form of *Allium cepa* in the nineteenth century. It was missing in *Le Bon Jardinier* 1809 and 1819 but was described as a novelty in 1825 when the name "d'ognon sous terre" [undergroun onion] also was coined (Poiteau 1809; Poiteau and Audot 1817, 1819, 1825). In 1837 an corresponding reader described the winter storage of the onions as something that required very dry and cold conditions along with an additional advice on leaving some of the wilted leaves during storage, from (Poiteau 1837).

The potato onion sometimes shared the pre-epithet "Egyptian" with tree onion, *Allium x proliferum* during the nineteenth century. In the French *Description des plantes potagères* [Description of vegetable plants] four known cultivars were described as shallots (*A. ascalonicum*), while both *Ognon d'egypte* [tree onion] and *Ognon Patate* [potato onion] were described as *Allium cepa* (Description des Plantes Potagères 1856).

Just as in *Le Bon Jardinier* from 1825 the potato onion was described as a possible culta of the "Egyptian Walking Onion" (Poiteau and Audot 1825). The potato onion did neither produce seeds nor bulbils, did ripen early and was difficult to storage according to the same French description.

A similar statement about poor storability was given in a North American price list (Vick 1878). The potato onion was here called 'English Potato Onion' and should be "the best underground variety". It was advocated in parts of the United States where it was problematic to grow onions from seed and it was claimed to be the onion that was most frequently sold in bundles in the spring at markets. If the onions were instead allowed to grow further through the summer, large onions were formed and could be used as a seed next year to get many small onions for sale in spring. The storage method proposed was to let the onion freeze in the winter and then cover with straw so they stayed frozen.

Also from Germany there were records that indicate a mixing of tree onions and potato onions. Meeting minutes from Dresden in 1836 stated that the chairman had received four potato onions from Hamburg that had multiplied to 22 bulbs, but that three of them also formed up to 20 bulbills in the inflorescence (Anonymous 1836).

"Moscovite potato onion" or Russian shallots?

In an article of a German magazine in 1839 the "Moscovite potato onion" [kartoffelzwiebel] was described with "Russian shallot" as a synonymous name (Ohm 1839). It was described as a cultivar tastier than ordinary onions, but it was not distinguished from shallots. During the second half of the nineteenth century, various cultivars were marketed and distributed as potato onions in Germany, often with cultivar names describing the country of origin and the color of the onion (Table 2). Potato onions from Denmark, Russia, England and Spain were described or/and spread. (Anonymous 1839, 1844). A report from a German plant exhibition in 1867 tells that gardener Pasewaldt displayed two onion cultivars. However, the first one called 'Pommersche Schalotte', turned out to be the "usual Danish", according to the report. The other was ordinary potato onion (Anonymous (1867).

It is obvious that a number of named cultivars was known and spread in Germany during the later part of the nineteenth century. While the English gardeners tried to group and separate cultivar of Shallots and potato onions through their ability to flower, it is more unclear if and how German gardeners and writers distinguished between potato onions and shallots at the time.

Shallots from seed?

There are examples of how shallots were historically propagated by seed, although cultivation descriptions generally describe shallots as vegetatively propagated. In 1694, the Swedish author Åke Rålamb describes shallots: "The seed comes from Italy and is sown like the other onion seeds" (Rålamb 1694).

In the British magazine *Gardeners Chronicle and Agricultural Gazette* correspondence between several growers describing how they successfully grew shallots from seed can be found. John May from Hayling Island shared his experience of how growing shallots both from seed and from sets gave him the impression that the plant material of both potatoes, potato onions and shallots should be replaced regularly from other regions to prevent plant diseases (May 1872). When plant material is spread this way, the writer believed that the bolting frequency of the onion was increasing. Another author claimed that cultivation of shallots from seed were less problematic and could give

three times as large yields (Perry 1872). The opposite view also emerges from the correspondence. One corresponding reader found that seedlings of the cultivar spread as 'Jersey' instead of forming large onions formed clusters with many small bulbs, which in his opinion is uneconomical and difficult to handle in the kitchen (Jersey 1872).

Later that year, another corresponding reader described how he for many years had tried to achieve the cultivar 'Jersey'. When he finally got the true sets of the cultivar from Germany it turned out that all seedlings flowered and produced seed (Davis 1872).

As previously shown, seeds of both shallots and various types of potato onions were spread in Germany during the nineteenth century (Table 2). In addition, Charles McIntosh described how Messrs. Hardy and Sons, obtained onions with many different characteristics from shallot seeds (McIntosh 1855). The offspring's where similar to both potato onions and ordinary onions. After the trial cultivation at the Horticultural Society of London, variations in both shape and color where noted, and the author believed there was a good basis for further selection to obtain a cultivar with good storage capacity.

In 1920, Swedish-Finish author Ossian Lundén gave an interesting insight to how seed cultivation of "onion sets" in southern Russia was carried out for export to Finland (Lundén 1920). The Russian onions sold to Finland were described as autumn-harvested onions from seeds sown in early spring. In southern Russia these sets where then planted to give "food onions" in year two when the onions formed clusters. Further, the most beautiful, medium-sized, and most solid onions of these where chosen for next spring to be replanted and give seed harvest on autumn year three. According to Lundén, there were no exports of true seeds from Russia.

Already in 1808 Swedish author Carl Ihström described how multiplying onions could be grown from seed and that the Russians according to him had achieved multiplying cultivars by crossing 'Gul Hollänsk' [Yellow Dutch] och 'Ljusröd Portugisisk Lök' [Light Red Portuguese Onion] (Ihrström 1808). Introduction of "Russian onions" are known already from P.J. Bergius garden journal in 1778 (Holmberg and Bergius 1960).

The descriptions of Lundén and Ihström corresponds with the Russian cultivation system combining vegetative and sexual reproduction also described by Bednarz (1994). From Northern Russia a tradition with small onions used as sets is described. The seed propagation takes place regularly every 5–7 years (Ibid). A possible relict of a similar growing system were found in modern times at Estonian Peipsi Lake where local growing tradition of multiplying onions included a seed generation every third or forth year (Ruņģis et al. 2020). The plant material in the Estonian cultivation system was found to be genetically heterogeneous and the genetic variation within the plant material from the region studied was greater than the variation in the older cultivars of shallots preserved in European gene bank collections at a whole, which was explained by the deliberate incrossing of ordinary onions (*A. cepa*) occurred (Ruņģis et al. 2020).

Discussion

Literature studies on onion cultivation in northern Sweden indicates that the shallots introduced and spread to Sweden was made popular first in the nineteenth century, which also corresponds to a statement from Scania in south of Sweden where 'Asian Red Onion' in 1822 was presented as a novelty (De Vahl 2020). Like the potato, it was propagated vegetatively and would therefore be of benefit to poor small scale farmers. In literature studies, older culture descriptions have been described by De Vahl and Svanberg (2022). Here it is concluded that autumn planting of both shallots and the hard-to-identify cultural forms of onions called by names like *johannislök* and *jacobslök* is advocated until the mid-nineteenth century, while the occurrence of culture descriptions of a certain kind of shallots especially suitable for northern conditions can be found first in the 1850's. During the early part of the nineteenth century the potato onion is often described in the literature with the prefix Egyptian and mix-ups also occur with the hybrid tree onion *A. x proliferum*, which for a long time goes by the common name *Egyptisk luftlök* in Swedish. According to Täckholm and Drar (1954) neither the tree onion nor the potato onion (referred to as *A. v. aggregatum*) were known in cultivation from Egypt. However, a cultivar of *A. cepa* called 'El Kirdási' said to form two or more small onions with good storability. The literature study shows that early introduction of potato onion to Sweden were done by

members of the Swedish Garden Association founded in 1832, and in archived protocols potato onion was listed with its French trivial name in the 1830's. However, descriptions from foreign garden literature indicate that the onion called potato onion in France and England differs in qualities from the onions that later came to go by this name in parts of Scandinavia. The regional limitations of the study and specially the fact that a very limited source material from other Scandinavian countries was studied, implies that further knowledge of introduction routes should be further explored. The German records of a Danish cultivar is interesting since genetic surveys has shown the heirloom cultivar 'Råneälvdalen' collected in north of Sweden to be identical with Danish clones (Leino et al. 2018).

Conclusions

The extensive literature study showed that seed-propagated plant material was spread to Europe from Russia during the nineteenth century and that true seeds and sets of both potato onion and shallots were sold through at least one German seed firms during the nineteenth century. Since shallots widely has been considered a vegetatively propagated crop in garden literature this result is of importance when evaluating plant material in long time preservation in Europe.

The genetic variability of preserved heirloom cultivars of vegetatively propagated multiplying onions might be a result of the increased trade, including true seeds, in the nineteenth century. The cultivars introduced to Sweden does not fully correspond to the early cultivars described in France, Germany and England at the time. This indicates that a wider range of cultivars might have been known from other European regions. The rise of the cultivar as a known concept, also for kitchen plants, during the time period reflects in the efforts found in the documentation of the Swedish Garden Association to introduce interesting cultivars and thereby improve the state and status of the Swedish garden practice. The notion of onions as an ancient crop with qualities connected to different origins are reflected in the early cultivar names, and the denomination 'Nordic Shallot', was introduced in literature, but remained absent in the trade and is not corresponding to plant names documented in POMs inventories (Strese and De Vahl 2018).

Knowledge of older cultivation systems, introduction history and folk taxonomy deepens the link between the cultural-historical and the biological conservation values of plant material in long time preservation. As earlier described by De Vahl and Svanberg (2022) gene bank accessions may not only be valuable in breeding but also utilized and preserved as part of a biological or green heritage. With continued focus on utilization of landrace and heirloom cultivars the social values of the plant material may also be strengthened and therefore also need to be defined further. In a European perspective, documentation on older cultivation systems and culture descriptions could provide further in-depth knowledge of the introduction and distribution paths of shallots.

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Conflict of interest The authors declare that they have no conflict of interest.

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