

Allium ursinum (Alliaceae) in Finland

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Allium ursinum L. is a perennial bulbous herb of broad-leaved woods of Western and Central Europe. Of two subspecies subsp. *ursinum* is distributed in Western Europe including the Nordic countries. The general distribution of *A. ursinum* in the Nordic countries is outlined. The localities for *A. ursinum* in Finland are the northeasternmost in Europe. The rather few localities are concentrated to the Åland Islands (Al) and the archipelago of Regio Aboënsis (Ab). They are described in a chronological order of the first find in each municipality. Several localities with *A. ursinum* as a cultivated plant or as a garden escape are referred to.

The habitat requirements for *Allium ursinum* are discussed. Although *A. ursinum* has a broad distribution with a clear tendency to occur as a weed, it is still a habitat specialist with a rather narrow range of ecological tolerance as it requires a mesic well-drained soil and drought as well as waterlogging seem to be unfavourable. *A. ursinum* is moderately calciphilic in the southwestern archipelago of Finland. Many of the accompanying species, 32.5 % of all species, are regarded as calciphilic.

Allium ursinum has been used as a spice by man since ancient times. Many of its localities point towards a fairly strong hemerophilic tendency. Of the 53 localities in Finland described, 17–19 can be regarded as more or less natural, 30–32 as cultivated or otherwise introduced and 4 as uncertain, because of insufficient information. Therefore we regard *A. ursinum* as a moderately hemerophilic species. The dispersal of the seeds by autochory or by myrmecochory is discussed. A possibility for hydrochorous dispersal of seedling is referred to. *A. ursinum* is most probably going to be more common in the future due to introduction to gardens as both living plants and seeds are sold in garden shops. Further, the warming of the climate will be favourable for this in Finland southern species. As a strong competitor in the field layer, *A. ursinum* may become a problem in protected areas in the future.

Introduction

Ramsons (buckrams, wild garlic, broad-leaved garlic, wood garlic, bear leek, or bear's garlic), *Allium ursinum* L., is a perennial bulbous herb of

broad-leaved woods of Western and Central Europe with a few scattered locations in Spain, Italy, Greece, Turkey and the Caucasus area (Lippmaa 1938, Stearn 1980, Hultén & Fries 1986, Oborny et al. 2011). Two subspecies have been distin-

guished (Stearn 1980, Rola 2012), namely subsp. *ursinum* and subsp. *ucrainicum* Kleop. et Oxner. Of these, subsp. *ursinum* is distributed in Western Europe including the Nordic countries, whereas subsp. *ucrainicum* is widely distributed in Eastern and South-eastern Europe (Rola 2012).

Allium ursinum has a southern distribution in the Nordic countries (Hultén 1971). It occurs throughout Denmark, with the exception of most of the central and western parts of Jutland (Fredriksen et al. 2012). In Norway, it grows from Østfold near Oslo along the coastal areas northwards to the vicinity of Trondheim in Sør-Trøndelag (approx. 64° N; Lid & Lid 2005). *A. ursinum* occurs in Sweden in parts of Scania, on the west coast to Norway, on the east coast northwards to south-eastern Gästrikland, along a zone across the south part of the country from the Stockholm area to Gothenburg and in the limestone islands of Öland and Gotland (Hultén 1971, Weimarck & Weimarck 1985, Jonsell 2010, Länsstyrelsen Gävleborg 2015).

A. ursinum is rather rare in Estonia with several localities along the northern coast from the Paldiski area in the west to Kalvi about 25 km NE of Rakvere in the east and a few localities in the western and south-eastern parts of the island of Saaremaa, in the island of Aburka, in the Virtsu area at the west coast of the mainland and in the southwest coast south of Pärnu. A few inland localities are also known from southern Estonia west of Viljandi and north of Lake Peipsi (Peipus) (Eichwald et al. 1984). *A. ursinum* is regarded as a near threatened species in Estonia (Red Data Book of Estonia 2008).

The localities for *Allium ursinum* in Finland are the north easternmost in Europe. The rather few localities are concentrated to the Åland Islands (Al) and the archipelago of Regio Aboënsis (Ab) (Fig. 1). It has been reported from eleven of the sixteen municipalities of Åland: Brändö, Finström, Föglö, Hammarland, Jomala, Lemland, Kökar, Mariehamn, Saltvik, Sund and Vårdö. In Regio Aboënsis, there are finds from Dragsfjärd (today included in the municipality of Kimitoön / Kemiönsaari municipality), Houtskär and Korpo (both today included in the town of Pargas / Parainen) and further, *A. ursinum* is known from four localities, either as a cultivated or as an escaped plant. At least four finds are known from

the province of Nyland (N), of which at least two are cultivated stands. One cultivated stand is known from Satakunta (St) and two of ruderal character in the province of Tavastia australis (Ta).

Allium ursinum is regarded as near threatened (NT) in Finland (Kalliovirta et al. 2010). It was protected by law in the Åland Island in 1924 (ÅFS 9/25). The protection was revoked in 1953 (ÅFS 12/53). However, the protection was re-established in 1984 (ÅFS 28/84) (cf. Hægström & Koistinen 1999). The protection did not prevent botanists from collecting the species without permission of the Alandian Authorities between 1925 and 1953. However, after the re-establishment of the protection in 1984, only very few specimens were collected.

The following report on *Allium ursinum* in Finland follows an approximately chronological order of the first observation of the species in the municipalities of the biogeographical regions where it occurs.

The first records of *Allium ursinum* in the Åland Islands

The obviously first known record of *Allium ursinum* in Åland is from Ramsholmen in the municipality of Jomala (Fig. 1, no. 1). J. M. af Tengström collected it there at the beginning of June [(H; for herbarium acronyms, see Index Herbariorum (2015)]. The label lacks a note of the year, but it is known that he visited the Åland Islands in 1841. He writes about the locality (translated from Swedish): a small fertile island at the south coast, belonging to the vicarage of Jomala. The second record is also from Ramsholmen: J. R. Chydenius collected it there on June 19, 1856 (H).

The third record is a voucher specimen from a school herbarium collected in a meadow in the municipality of Föglö by Ragnar Hult on July 6, 1871 (H). The collector Ragnar Hult (1857–1899) became a famous Finnish botanist and geographer (Collander 1965). This is the sole record of *A. ursinum* in Föglö, with the exception of two deliberate introductions. The first is in a cottage garden in Prästgården between Ekholm and Granholm [UCS with 100 m accuracy 66741:31326;

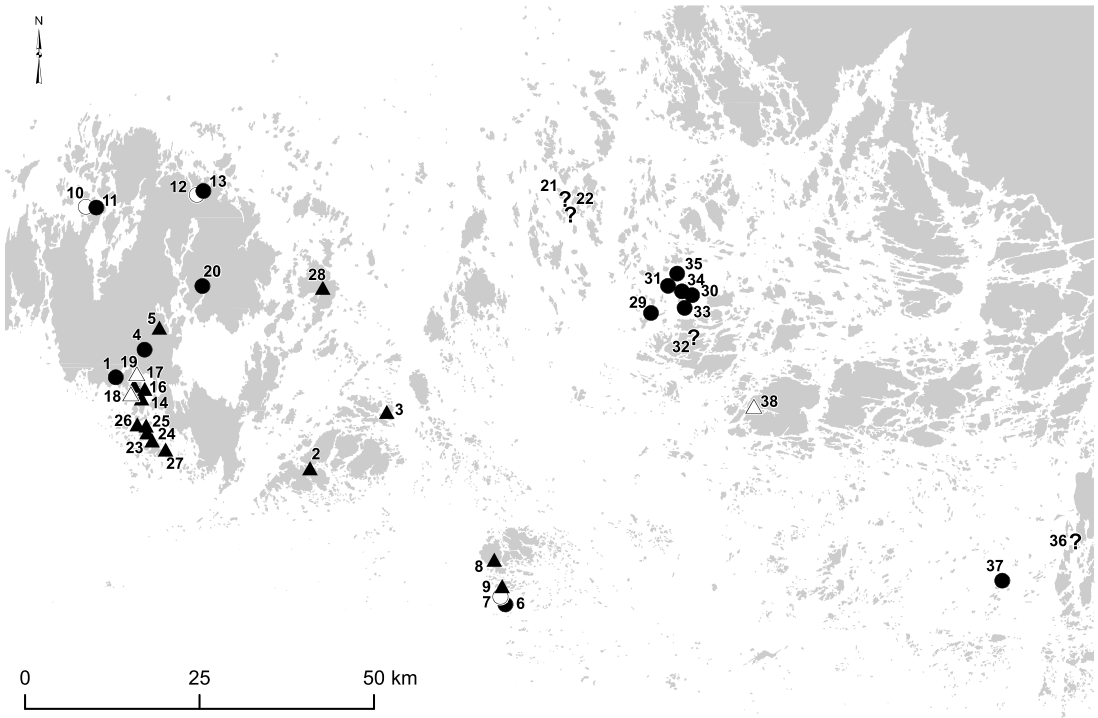


Fig. 1. The localities of *Allium ursinum* in the Åland Islands and the archipelago of Ab.

Legend:

- = more or less natural stand, still present;
- ? = more or less natural stand, no recent information about its presence;
- = more or less natural stand, disappeared;
- ▲ = cultivated or otherwise introduced, still present;
- △ = cultivated or otherwise introduced, disappeared.

The numbers refer to the different localities: 1 = Jomala Ramsholmen; 2 = Föglö Prästgården; 3 = Föglö Bänö; 4 = Jomala vicarage; 5 = Jomala Bertilas; 6 = Kökar Brunnskär; 7 = Kökar Idö; 8 = Kökar Karlby; 9 = Kökar Husö; 10–11 = Hammarland Strömma; 12–13 = Saltvik Åsgårda; 14–19 = Mariehamn; 20 = Sund Kastelholm; 21 = Brändö Baggholma Lökhholm; 22 = Brändö Baggholma Ramsholm; 23–26 = Lemland Nätö; 27 = Lemland Järsö Altarskärsgrundet; 28 = Vårdö Vårdöby; 29 = Houtskär / Pargas Rosmanskär; 30–31 = Houtskär / Pargas Sundholm; 32 = Houtskär / Pargas Näsby-Näs; 33 = Houtskär / Pargas Nätöholm; 34 = Houtskär / Pargas Bjonholm; 35 = Houtskär / Pargas Apelholmen; 36 = Dragsfjärd / Kimitoön Jungfruholmen; 37 = Dragsfjärd / Kimitoön Äpskär; 38 = Korpo / Pargas Kopois Solhem.

the coordinates are according to the Uniform Coordinate System (UCS): Grid 27° E and given with an accuracy of 10, 100 or 1000 m, depending on the information available of the exact location of each locality] (Fig. 1, no. 2). A few specimens were seen there by Monica and Torsten Stjernberg in 1981 (personal communication in 1981). The species may have been introduced in the 1920s or 1930s. The second introduced locality in Föglö is on the Island of Bänö where the authors CAH and EH observed it together with the landowners Helene and Johan Franzén in a deciduous

stand near the habitation (UCS 668221:314359), on June 30, 2006 (Fig. 1, no. 3). *A. ursinum* was introduced to this place from the archipelago of Karlby in the municipality of Kökar by the landowners in c. 1980.

The following records were again made in Ramsholmen, on July 10, 1871, by F. Elfving (H, TUR), J.W. Hasselblatt (VOA) and H. Ingelius (TUR).

Ramsholmen was visited by numerous persons during the following years and more than 130 collections and observations were made be-

tween 1878 and 2015. Collections were made almost every year until the 1950s, but thereafter only a few collections were made, and observations only since 1994 (Lampinen et al. 2015).

Allium ursinum in Jomala

Allium ursinum has been found in three different parts of the municipality of Jomala, namely 1) in Ramsholmen, 2) at the vicarage of Jomala and 3) at Bertilas in Jomalaby.

The authors CAH and EH have visited Ramsholmen (UCS with 10 m accuracy 668718–668790:310480–310507) on many occasions since 1964; the latest visits were in 2015. Ramsholmen is geologically a drumlin with a length of about 720 m, a width of maximum about 270 m and a maximum height of 10 m above the sea level. The size of the protected area is about 13 hectares. Ramsholmen was still an island in J. M. af Tengström's days, but due to the land uplift, it was connected to the mainland island more than 100 years ago. Ramsholmen is the oldest nature reserve in the Åland Islands; it was protected already in 1925, with the exception of the private cottage area in the northern part (ÅFS 36/1925, Palmgren 1943–44, Kulves 2004). Ramsholmen is included in the Natura 2000 network since 1998. The protected area is divided into three fenced subareas which are grazed by young cattle during June – September. The northernmost subarea is partly a wooded meadow (cf. Hægström 1983) which is managed by the Environmental Authorities of Åland by mowing the sward every year and by repollarding a few of the former ash pollards.

Ramsholmen has been well known for its luxuriant vegetation, which has a resemblance of a Central European deciduous wood (Palmgren 1943–44). During the 2000s, the authors CAH and EH have observed about 160 species of trees, shrubs and field layer species in the meadow and wooded areas of Ramsholmen (Table 1). Most of Ramsholmen is covered by a *Fraxinus excelsior* and *Ulmus glabra* wood with dense and extensive stands of *Corylus avellana* with some other deciduous species scattered, e.g. *Acer platanoides*, *Betula pendula*, *B. pubescens*, *Malus sylvestris*, *Quercus robur*, *Sorbus aucuparia* and *S.*

hybrida [the nomenclature of the vascular plants is mainly according to the Field Flora of Finland (Hämet-Ahti et al. 1998, 2005)]. (Table 1). Two of the oaks are large trees growing in the highest part of the area. The girth of their stems at about 1.3 m height is approx. 380–400 cm. Several younger oaks grow in the south part where they were planted in 1929–1941 by the chief forester of the Alandian Government, Leo Björkman (cf. Palmgren 1943–44). A few of these oaks were cut about ten years ago. *Alnus glutinosa*, *Hippophaë rhamnoides* and *Prunus padus* grow along the seashores. A few shrub species occur, too, e.g. the protected *Rosa sherardii* (Table 1).

More than half of the Nature Reserve (approx. 7–8 hectares) is covered by *Allium ursinum* (Fig. 2). It also occurs outside the Nature Reserve in the mixed stand of Röjskär (Rökärr) north of Ramsholmen and on an area of some ten square metres on the east side of the road leading to the Nature Reserve (UCS 668799:310494). A planted stand, together with the orchid *Cypripedium calceolus*, was seen in a garden in Röjskär in 1981 (Hægström et al. 1982).

There is no exact information on the abundance and frequency of *A. ursinum* in Ramsholmen in earlier days. Palmgren (1915) wrote that it occurs as dense stands in several places in more or less closed *Corylus* stands. In 2015, *A. ursinum* grew in practically every dense stand of deciduous wood, from the *Alnus glutinosa* fringe at the seashores to the top of the drumlin. However, the species does not occur in the open meadows, e.g. the former field areas in NE, NW and W, in the wooded pasture with scattered *Picea abies*, *Pinus sylvestris* and *Juniperus communis* south of the cottage, and on the south end of the drumlin. A few small stands grow in the NW wooded meadow area. The impression of the authors CAH, EH and RC is that *A. ursinum* has considerably expanded its area in Ramsholmen during the last 40–50 years.

The spring flora of the field layer in Ramsholmen is amazingly rich with dense carpets of *Anemone nemorosa*, *A. ranunculoides* and *Ranunculus ficaria* and intermingled with them, e.g. *Corydalis solida*, *Dentaria bulbifera*, *Gagea lutea*, *Hepatica nobilis*, *Lathraea squamaria*, *Primula veris* and *Ranunculus elatior*. A few orchids occur also: *Dactylorhiza fuchsii*, *Listera ova-*



Fig. 2. Large and dense stands of *Allium ursinum* among hazel shrubs and deciduous trees, mainly *Fraxinus excelsior* and *Ulmus glabra*, in the Ramsholmen Nature Reserve, June 16, 2015. Photo: C.-A. Hægström.

ta and *Orchis mascula*. Two stands of *Fritillaria meleagris* originate from plantings in 1929–1941 (Palmgren 1943–44). Later in the summer many herbs, grasses and a few sedges typical of lush deciduous woods grow together with *A. ursinum* (Table 1).

Another locality of *A. ursinum* was found in the municipality of Jomala during the 19th century, namely at the small lake Prästräsket (also called Dalkarbyträsk) (Fig. 1, no. 4). Here A. Arrhenius & A. O. Kihlman collected it on May 18, 1878 (H). The locality was most probably either the garden of the vicarage of Jomala or the terrain next to the northern shore of the small lake. According to Palmgren (1927), *A. ursinum* was probably brought from Ramsholmen to the vicinity of the vicarage of Jomala. *A. ursinum* have been collected or observed in this locality about ten times between 1912 and 2015 (Lampinen et al. 2015).

This locality was visited by the authors CAH and RC on May 17, 2015. *Allium ursinum* grew abundantly or very abundantly in an area of approximately 40 m × 180 m at the lower part of the slope towards the lake and on the embankment at the lake shore (UCS 669113–669117:310893–310911) (Fig. 3). The area is covered by a deciduous wood of *Alnus glutinosa*, *Fraxinus excelsior* and *Prunus padus*. The field layer was rather poor in species (Table 1). Three garden escapes, *Myrrhis odorata*, *Petasites hybridus* and *Scilla siberica*, grew together with *A. ursinum*. Of these, *Petasites hybridus* formed a large and dense stand SW of the vicarage main building where it was collected already by J. Tengström, probably in 1841 (H). *Scilla siberica* formed large and dense stands, especially E of the vicarage main building.

A third locality for *A. ursinum* was found in the garden of Bertilas in Jomala Jomalaby (UCS



Fig. 3. A dense carpet of *Allium ursinum* with a flowering stand of *Ranunculus ficaria* in the mid part grows between the vicarage of Jomala and the small lake Prästräsket, dimly seen behind the dense stand of *Alnus glutinosa*. A few shrubby *Prunus padus* grow among the alders. May 17, 2015. Photo: Ralf Carlsson.

66943:31110) by the authors CAH and EH on October 16, 2014 (Fig. 1, no. 5). The owners of Bertilas told that *A. ursinum* had appeared spontaneously in the garden. However, an unintentional introduction with garden plants or soil is most probable.

Two voucher specimens are labelled Jomala, Möckelö, Ilmari Kause, August 1, 1957 (OULU, TUR). The locality is probably Ramsholmen, because Möckelö is located immediately to the east of Ramsholmen. No other find is known from Möckelö. Two voucher specimens are labelled Jomala, Möckelö, Ramsholm, deciduous stand, Lea Talonpoika, May 25, 1952 (OULU) and Jomala, Möckelö, Ramsholm, Kari Pohjakallio, June 6, 1956 (H). These two are obviously collected in the Nature Reserve of Ramsholmen. One observation has the locality marked as Jomala, Maarianhamina, Ramsholmen, nature re-

serve (UCS 6687:3104–3105), Antti Hovi & Maija Hovi, July 20, 1999. Here the town of Mariehamn and the rural municipality of Jomala have been combined.

Allium ursinum in Finström

A voucher specimen was collected in a lush wood in Ämnäs, municipality of Finström by A. Rantaniemi on June 15, 1895 (TUR). No other information of this location has come to our knowledge. Another voucher specimen of *A. ursinum* was collected by A. Rantaniemi in Jomala Rams-holm in June 1895 (OULU). A confusion of labels may have taken place. However, the collector Pekka Aappo "Ape" Rantaniemi (1873–1952) was known as a keen and exact botanist.

Allium ursinum in Kökar

The oldest information on *Allium ursinum* in the archipelago municipality of Kökar is a collection labelled Kökar, Emil Eriksson, 1881 (H). The locality was probably one of the two islands in the village of Karlby where *A. ursinum* was later collected, namely Brunnskär (Brunskär) or Idö (Fig. 1, nos. 6–7). These islands have been the well-known locations for *A. ursinum* since 1910 when Erik Johansson collected it in Brunnskär (H) and Nandor Johansson collected it in both Brunnskär and Idö (H) (cf. Palmgren 1915, 1927, 1935, Eklund 1958). Palmgren (1935) describes the location of *A. ursinum* on Brunnskär: there were masses of it in the northern part and in moist depressions in the central part with dense herb shrub and tree vegetation; ferns were particularly lush in this area.

More than ten collections and observations have been made in Brunnskär between 1913 and 2007 and at least six in Idö between 1911 and 1956 (Lampinen et al. 2015). [Palmgren (1927) mentions that *A. ursinum* occurs on an island called Brändholm which is almost connected to Idö; later, he corrected the island's name to Brunnskär (Palmgren 1935).]

Brunnskär is a rocky island in the outer archipelago zone. Half of the island, the southwestern and the northeastern parts belong to the Idö Nature Reserve (Kulves 2004). Luxuriant deciduous wood grow in depressions and along the seashores. The authors CAH and EH have observed *A. ursinum* in Brunnskär in 1969, 1979 and 2007. The species occurs in large and dense stands in the *Alnus glutinosa* fringe on the northern seashore (UCS 66551–66552:31603–31605; Fig. 4). Another rich locality was seen in a moist wood in the central part of the island in 1979 (UCS 66550–66551:31601–31602). Here *A. ursinum* grew very abundantly along a 15 m broad zone in a fern-rich area and in a more open meadow below *Alnus glutinosa*, *Prunus padus* and *Viburnum opulus*. These both localities are identical to Palmgren's (1935).

Almost all of Idö belong to the Nature Reserve. The stands of *A. ursinum* have been small in Idö, compared to Brunnskär. While Eklund (1958) wrote that *A. ursinum* occurred very abundantly in Brunnskär, the species was fairly sparse

in Idö, although it was spreading. No exact locality can be given as the labels of the voucher specimens lack further information. However, Palmgren (1926, 1935) mentions that *A. ursinum* occurs in Lökliden, i.e. "the Leak Slope" (UCS approx. 66556–66558:31602–31606), a place which is located on the southern part of Idö near the point where the sea bay towards Brunnskär is narrowest. This Lökliden area belongs to Idö Nature Reserve. The author CAH have visited Idö in 1964, 1969, 1978 and 1979 without observing *A. ursinum* there and the authors CAH and EH did not observe it in 2007 in the western part of the island. Neither did the author MvN and M.Sc. Turka Korvenpää find it in Idö in 2003. They found it, however, in Brunnskär.

According to Laine (1955), *A. ursinum* grew in the classical locality for the species in Källskär, an island close to Idö to the west. This information is wrong, as there is no classical locality for *A. ursinum* in Källskär; the locality is most probably Brunnskär because he collected it in that island on June 19, 1955 (TUR). There is no other information about the species in Källskär and the authors CAH and EH could not find it there on May 28, 2007.

According to Mr. Unto Laine, Lic. phil. (Turku, personal communication in 1980), a small stand of *A. ursinum* occurs in a hazel grove in the village of Karlby (UCS 6661:3159) (Fig. 1, no. 8). No further information is available.

According to information given by a woman who visited Nätö island together with Mrs. Marianne Ahlqvist on May 20, 2015, *A. ursinum* grows in the island of Husö (UCS 6657:3160–3161), belonging to Karlby and located about 1.5 km NE of Idö (Fig. 1, no. 9). This information is reliable.

There are three collections of *A. ursinum* from Kökar in the herbaria, which have dubious information about the locality. These are:

- Brändholm, deciduous stand (UCS 6656–6657:3161), Reijo Jussilainen, 17.VI.1955 (TUR). This island is located about 1.5 km NE of Idö. No other information about *A. ursinum* from this island is known to us. Perhaps Jussilainen's Brändholm is Brunnskär [cf. Palmgren's (1927, 1935) Brändholm above].
- Bergskär, in a depression in a deciduous stand at the seashore (UCS 665:315; 6659:3158), Jorma Haapala, 19.VI.1955 (H, TUR).



Fig. 4. A dense stand of *Allium ursinum* on the northern shore of Brunnskär in Kökar, Karlby. The trees are *Alnus glutinosa*, *Fraxinus excelsior* and *Prunus padus*. May 28, 2007. Photo: C.-A. Hægström.

The name Bergskär is probably mistaken for Brunnskär, because several collectors from Turku were in Brunnskär that day. There are two islands with the name of Bergskär in Kökar, one in Hellsö, which seems to be too barren for *A. ursinum* and the other in Österbygge. The UCS coordinates with one km accuracy were later added by somebody in the herbarium TUR. These coordinates suite for Tärnskär and Bässkär, two very barren rocky islands without any lush wood located about 3.5 km NNW of Idö.

- Ramsö (UCS 665:315), Ilmari Kause, VI.1965 (OULU). An island with the name Ramsö in Kökar is not known to us. Ilmari Kause visited Brunnskär on June 20, 1965 as *A. ursinum* was collected there by Raili Alho, Kalevi Alho, Ilmari Kause, Kaija Laine, Unto Laine & Marjatta Raudaskoski (TUR).

Allium ursinum in Hammarland

The oldest information about *A. ursinum* in Hammarland was given by senior teacher Walter Sjöblom (Mariehamn) who told Alvar Palmgren that the species grew in Skarpnätö (Palmgren 1927). This locality has not later been confirmed.

The first observation of *A. ursinum* in the municipality of Hammarland was done by the Forster and botanist Bo Högnäs in 1958. Some ten specimens grew at the *Alnus glutinosa* fringe on the shore of Lake Lerviksfjärden in Strömme (Högnäs 1960) (Fig. 1, no. 10). Unfortunately, he did not give a description of the exact location of the stand. A collection was made in a mesic wood in Strömme by Mrs. Aune Haakana on June 23, 1964 (H). The author CAH asked Mrs. Haakana about details of the locality in the 1970s, but she only remembered that it was near the shore of



Fig. 5. The gentle slope towards the east in Hammarland Strömma, with the stand of *Allium ursinum*. Norway spruces (*Picea abies*) are abundant on the slope. A shrub of *Corylus avellana* is seen to the right. July 25, 2015. Photo: C.-A. Hægström.

Lake Lerviksfjärden. This could be the same locality where Högnäs found it a few years earlier. The author RC saw *A. ursinum* between the road to Skarpnåtö and the lake on June 11, 1983. The authors CAH and EH could not find it at the shores of Lake Lerviksfjärden in 2015 or 2016.

A new locality was found by the author CAH and Mr. Håkan Kulves, Lic. phil., on July 5, 1971. The locality was also in Strömma. *A. ursinum* grew on an E facing gentle slope below a 6–10-m high rock-face extending in NNE–SSW direction along a fault E of Bockberg (UCS 671157–671160:310170–310174) (Fig. 1, no. 11). This locality is about 700 m NE of the eastern shore of lake Lerviksfjärden. There were two stands with several hundred shoots. The vegetation of the northern part was a shady grassherb forest with *Picea abies* (max. height about 15–18 m) and large *Corylus avellana* shrubs (max. height about 10 m). To the south, the grassherb forest was more open because some trees had been cut. The tree layer consisted mainly of *Ulmus glabra* with scattered *Acer platanoides*, *Betula pendu-*

la, *Corylus avellana* and *Picea abies*. In the field, *Actaea spicata*, *Anemone nemorosa*, *Carex muricata*, *Dentaria bulbifera*, *Galium odoratum*, *Hepatica nobilis*, *Paris quadrifolia*, *Oxalis acetosella* and *Sorbus aucuparia* seedlings were the most abundant species (Hægström 1994).

The locality was visited again by the author CAH in 1978 and 1980. *A. ursinum* was sparser than in the previous years, because the locality was overgrown with small spruces. The area was again rather open due to felling of almost all spruces and most of the *Corylus* shrubs when the author CAH visited the locality in 1994. *Deschampsia cespitosa* was fairly abundant then (very sparse in 1971). Grazing has also occurred, as the area was fenced by a fairly new wire net fence. However, no grazing animals were seen in 1994.

The authors CAH and EH visited the locality on July 25, 2015. *Allium ursinum* grew, partly as dense stands, on an area of approximately 20–25 m × 40 m (Fig. 5). The tree layer consisted of tall specimens of *Acer platanoides*, *Picea abies* and

Table 1. Taxa observed in localities of *Allium ursinum* in Finland. 1. Al, Jomala, Ramsholmen, 2015. 2. Al, Jomala, vicarage, 2015. 3. Al, Lemland, Nåtö 2016. 4. Al, Saltvik, Åsgårda, 1927 (Nordberg 1929). 5. Al, Saltvik, Åsgårda, 1979. 6. Saltvik, Åsgårda, 2015. 7. Hammarland, Strömma, 2015. 8. Ab, Houtskär, Rosmanskär 1928 (Eklund 1929b). 9. Ab, Houtskär, Sundholm, 1928 (Eklund 1929b). n = number of localities with a certain taxon. The nomenclature is according to the Field Flora of Finland (Hämet-Ahti et al. 1998, 2005). Taxon observed = +, taxon not observed = –.

¹⁾ The subspecies of *Pteridium aquilinum* is *latiusculum*. ²⁾ *Betula* sp. ³⁾ *A. cf. monticola*. ⁴⁾ *D. maculata*; *D. fuchsii* was not recognised in 1927. ⁵⁾ *Taraxacum praestans*. ⁶⁾ *Vicia sepium* coll.

The calcium dependence Ca (cf. Eklund 1946, Carlsson et al. 2008) is given by the following abbreviations: Ca⁺⁺⁺ = strictly limestone-dependent (*kalkstet*); Ca⁺⁺ = strongly calciphilic (*stark kalkhold*); Ca⁺ = moderately calciphilic (*kalk-begünstigt*). The calcium-neutral (*kalkindifferent*) species are not separately marked.

Locality no. / Taxon	Ca	1	2	3	4	5	6	7	8	9	n
Trees and shrubs											
<i>Acer platanoides</i>	Ca ⁺	+	-	-	-	+	+	+	-	-	4
<i>Acer pseudoplatanus</i>		-	-	+	-	-	-	-	-	-	1
<i>Alnus glutinosa</i>		+	+	-	-	+	+	-	+	-	5
<i>Betula pendula</i>		+	-		+ ²⁾	-	+	-	-	-	3
<i>Betula pubescens</i>		+	-	+	-	-	-	-	+	-	3
<i>Corylus avellana</i>		+	-	+	-	-	-	+	+	+	5
<i>Crataegus monogyna</i>	Ca ⁺⁺	+	-	-	-	-	-	-	-	-	1
<i>Crataegus rhipidophylla</i>	Ca ⁺⁺	+	-	-	-	-	-	-	-	+	2
<i>Daphne mezereum</i>	Ca ⁺⁺	-	-	-	-	-	-	-	+	-	1
<i>Fraxinus excelsior</i>	Ca ⁺⁺	+	+	+	-	-	-	-	-	-	3
<i>Hippophaë rhamnoides</i>	Ca ⁺⁺	+	-	-	-	-	-	-	-	-	1
<i>Juniperus communis</i>		-	-	+	-	-	-	-	+	-	2
<i>Lonicera xylosteum</i>	Ca ⁺⁺	-	-	-	-	+	-	+	+	-	3
<i>Malus domestica</i> × <i>sylvestris</i>		+	-	-	-	-	+	-	-	-	2
<i>Malus sylvestris</i>	Ca ⁺	+	-	-	-	+	-	+	-	-	3
<i>Picea abies</i>		-	-	+	-	+	+	+	+	-	5
<i>Pinus sylvestris</i>		-	-	-	-	-	-	-	+	-	1
<i>Populus tremula</i>		-	-	-	-	+	-	-	+	-	2
<i>Prunus padus</i>		+	+	-	-	+	-	-	+	-	4
<i>Quercus robur</i>		+	-	-	-	-	-	-	-	-	1
<i>Ribes alpinum</i>		+	-	-	-	+	-	-	+	-	3
<i>Ribes nigrum</i>		+	-	-	-	-	-	-	-	-	1
<i>Ribes rubrum</i> coll.		-	+	-	-	-	-	-	-	-	1
<i>Rosa caesia</i>		+	-	-	-	-	-	-	+	-	2
<i>Rosa dumalis</i>		+	-	-	-	-	-	-	-	-	1
<i>Rosa mollis</i>	Ca ⁺	+	-	-	-	-	-	-	-	-	1
<i>Rosa sherardii</i>	Ca ⁺⁺	+	-	-	-	-	-	-	-	-	1
<i>Salix aurita</i>		-	-	-	-	-	-	-	+	-	1
<i>Salix caprea</i>		+	-	-	-	-	+	+	+	-	4
<i>Sorbus aucuparia</i>		+	-	+	-	+	+	-	+	-	5
<i>Sorbus hybrida</i>		+	-	-	-	-	-	-	-	-	1
<i>Sorbus intermedia</i>	Ca ⁺	-	-	+	-	-	-	-	-	-	1
<i>Ulmus glabra</i>	Ca ⁺	+	-	-	-	-	-	+	-	-	2
<i>Viburnum opulus</i>		+	-	+	-	-	-	-	+	-	3
Number of taxa: 34		12	24	4	9	1	9	7	7	16	2
Field layer taxa											
<i>Achillea millefolium</i>		-	-	-	-	-	+	-	-	-	1
<i>Achillea ptarmica</i>		-	-	-	-	+	-	-	-	-	1
<i>Actaea spicata</i>	Ca ⁺⁺	-	-	-	-	-	-	+	+	-	2
<i>Aegopodium podagraria</i>		-	+	-	-	-	+	-	-	-	2
<i>Agrostis capillaris</i>		+	-	-	-	-	-	-	-	-	1
<i>Alchemilla monticola</i>		+	-	-	-	+ ³⁾	+	-	-	-	3

Table 1 continued

Locality no. / Taxon	Ca	1	2	3	4	5	6	7	8	9	n
<i>Allium oleraceum</i>	Ca ⁺	+	+	-	-	-	-	-	-	-	2
<i>Allium ursinum</i>	Ca ⁺	+	+	+	+	+	+	+	+	+	9
<i>Anemone nemorosa</i>		+	+	+	-	+	+	+	+	-	7
<i>Anemone ranunculoides</i>	Ca ⁺	+	-	-	-	-	-	-	+	-	2
<i>Angelica sylvestris</i>		+	-	-	-	+	+	-	-	-	3
<i>Anthoxanthum odoratum</i>		-	-	-	+	-	-	-	-	-	1
<i>Anthriscus sylvestris</i>		+	-	-	-	+	+	+	-	-	4
<i>Arabis hirsuta</i>	Ca ⁺⁺	+	-	-	-	-	-	-	-	-	1
<i>Athyrium filix-femina</i>		-	-	-	-	+	+	-	-	-	2
<i>Bergenia</i> sp.		-	-	+	-	-	-	-	-	-	1
<i>Calamagrostis canescens</i>		-	-	+	-	-	-	-	-	-	1
<i>Calamagrostis epigejos</i>		-	-		-	+	-	-	-	-	1
<i>Campanula persicifolia</i>		-	-	+	-	-	-	-	-	-	1
<i>Campanula trachelium</i>	Ca ⁺⁺	+	-	-	-	-	+	+	-	-	3
<i>Carex digitata</i>	Ca ⁺⁺	+	-	-	-	-	-	+	+	-	3
<i>Carex flacca</i>	Ca ⁺⁺⁺	+	-	-	-	-	-	-	-	-	1
<i>Carex nigra</i> subsp. <i>nigra</i>		-	-	-	+	-	-	-	-	-	1
<i>Carex pallescens</i>		+	-	+	-	-	+	-	+	-	4
<i>Carex panicea</i>	Ca ⁺	+	-	-	-	-	-	-	-	-	1
<i>Centaurea jacea</i>		+	-	-	-	-	-	-	-	-	1
<i>Cerastium fontanum</i> subsp. <i>vulgare</i>		-	-	+	-	-	-	-	-	-	1
<i>Chelidonium majus</i>		-	+	-	-	-	-	-	-	-	1
<i>Convallaria majalis</i>		+	-	-	-	-	+	-	+	-	3
<i>Corydalis solida</i>		+	+	-	-	-	-	-	+	-	3
<i>Dactylis glomerata</i>		+	-	+	-	+	+	+	-	-	5
<i>Dactylorhiza fuchsii</i>	Ca ⁺⁺	+	-	-	+ ⁴⁾	+	-	-	-	-	3
<i>Dactylorhiza sambucina</i>	Ca ⁺⁺	-	-	-	+	-	-	-	+	-	2
<i>Dentaria bulbifera</i>	Ca ⁺	+	-	-	-	-	-	+	+	+	4
<i>Deschampsia cespitosa</i>		+	-	-	-	+	-	-	-	-	2
<i>Dryopteris carthusiana</i>		-	-	-	-	-	-	+	-	+	2
<i>Dryopteris dilatata</i>		-	-	-	-	-	-	+	-	-	1
<i>Dryopteris filix-mas</i>		+	-	-	+	-	-	-	-	+	3
<i>Epilobium angustifolium</i>		-	-	-	-	-	+	-	-	-	1
<i>Equisetum arvense</i>		-	-	-	-	-	+	-	-	-	1
<i>Equisetum pratense</i>	Ca ⁺	-	+	-	-	-	+	-	-	-	2
<i>Equisetum sylvaticum</i>		-	-	+	-	+	-	-	+	-	3
<i>Filipendula ulmaria</i>		+	+	-	+	+	+	+	-	-	6
<i>Filipendula vulgaris</i>	Ca ⁺	+	-	-	+	-	-	-	-	-	2
<i>Fragaria vesca</i>		+	-	+	+	+	-	+	-	-	5
<i>Fritillaria meleagris</i>	Ca ⁺⁺	+	-	-	-	-	-	-	-	-	1
<i>Gagea lutea</i>	Ca ⁺	+	-	-	-	-	-	-	-	-	1
<i>Galium aparine</i>		-	+	-	-	-	-	-	-	-	1
<i>Galium boreale</i>		+	-	+	+	-	-	-	-	-	3
<i>Galium odoratum</i>	Ca ⁺	-	-	-	-	-	-	+	-	-	1
<i>Galium uliginosum</i>		-	-	-	-	+	-	-	-	-	1
<i>Geranium robertianum</i>	Ca ⁺⁺	-	-	-	-	-	+	-	+	-	2
<i>Geranium sylvaticum</i>		+	-	+	+	+	+	+	+	-	7
<i>Geum rivale</i>		+	-	+	+	+	-	+	-	-	5
<i>Geum urbanum</i>	Ca ⁺	+	+	-	-	-	-	+	-	-	3
<i>Glechoma hederacea</i>		+	-	-	-	-	-	-	-	-	1
<i>Gymnocarpium dryopteris</i>		-	-	-	-	-	+	-	+	-	2

Table 1 continued

Locality no. / Taxon	Ca	1	2	3	4	5	6	7	8	9	n
<i>Hepatica nobilis</i>		+	-	-	-	+	-	+	+	-	4
<i>Heracleum sibiricum</i>	Ca ⁺⁺	+	-	+	-	-	+	-	-	-	3
<i>Hieracium, Sylvatica</i>	Ca ⁺	-	-	-	-	-	-	+	-	-	1
<i>Hieracium, Vulgata</i>		-	-	+	-	-	+	-	-	-	2
<i>Hypericum maculatum</i>		+	-	+	+	+	-	-	-	-	4
<i>Juncus effusus</i>		-	+	-	-	-	+	-	-	-	2
<i>Lathraea squamaria</i>	Ca ⁺⁺	+	-	-	-	-	-	-	-	-	1
<i>Lathyrus pratensis</i>		-	-	-	-	-	+	-	-	-	1
<i>Lathyrus vernus</i>		+	-	-	-	-	+	+	-	+	4
<i>Listera ovata</i>	Ca ⁺	+	-	-	+	-	+	+	-	-	4
<i>Luzula pallescens</i>		-	-	+	-	-	-	-	+	-	2
<i>Luzula pilosa</i>		+	-	+	-	-	-	-	-	-	2
<i>Lysimachia vulgaris</i>		-	-	+	-	-	-	-	-	-	1
<i>Maianthemum bifolium</i>		+	-	+	+	+	-	+	-	-	5
<i>Melampyrum nemorosum</i>		+	-	-	-	-	-	-	-	-	1
<i>Melampyrum sylvaticum</i>		-	-	-	-	-	-	-	+	-	1
<i>Melica nutans</i>		+	-	-	-	+	+	+	+	-	5
<i>Milium effusum</i>	Ca ⁺	+	-	+	+	+	+	+	+	-	7
<i>Moehringia trinervia</i>		+	-	+	-	-	+	-	+	-	4
<i>Mycelis muralis</i>	Ca ⁺⁺	-	-	+	-	-	+	+	-	-	3
<i>Myrrhis odorata</i>		-	+	-	-	-	-	-	-	-	1
<i>Orchis mascula</i>	Ca ⁺⁺⁺	+	-	-	-	-	-	-	-	-	1
<i>Oxalis acetosella</i>		+	-	+	-	+	+	+	+	-	6
<i>Paris quadrifolia</i>	Ca ⁺	+	-	+	+	-	-	+	+	-	5
<i>Petasites hybridus</i>		-	+	-	-	-	-	-	-	-	1
<i>Pilosella officinarum</i> coll.		-	-	-	+	-	-	-	-	-	1
<i>Plantago lanceolata</i>	Ca ⁺	-	-	-	+	-	-	-	-	-	1
<i>Plantago major</i> subsp. <i>major</i>		-	-	-	-	-	+	-	-	-	1
<i>Platanthera chlorantha</i>	Ca ⁺	-	-	-	-	-	-	+	+	-	2
<i>Poa annua</i>		-	-	-	-	-	+	-	-	-	1
<i>Poa nemoralis</i>		+	+	+	-	-	+	+	+	-	6
<i>Poa trivialis</i>		+	-	-	-	+	-	-	-	-	2
<i>Polygonatum multiflorum</i>	Ca ⁺	+	-	-	-	-	-	+	-	-	2
<i>Polygonatum odoratum</i>		-	-	-	+	-	-	-	-	-	1
<i>Primula veris</i>	Ca ⁺	+	-	-	+	-	-	+	+	-	4
<i>Prunella vulgaris</i>		+	-	-	-	-	-	-	-	-	1
<i>Pteridium aquilinum</i> ¹⁾		-	-	-	-	+	+	+	-	+	4
<i>Pyrola rotundifolia</i>		-	-	-	+	-	-	-	-	-	1
<i>Ranunculus acris</i>		+	-	+	+	+	+	+	-	-	6
<i>Ranunculus auricomus</i> coll.		+	-	+	+	+	-	+	-	-	5
<i>Ranunculus elatior</i>	Ca ⁺⁺	+	-	-	-	+	+	-	-	-	3
<i>Ranunculus ficaria</i>		+	-	-	-	-	-	-	+	-	2
<i>Ranunculus polyanthemus</i>	Ca ⁺	+	-	-	-	-	+	-	-	-	2
<i>Ranunculus repens</i>		+	-	-	-	-	-	-	-	-	1
<i>Rubus idaeus</i>		-	-	-	-	+	+	-	-	-	2
<i>Rubus saxatilis</i>		+	-	+	-	+	+	+	-	-	5
<i>Rumex acetosa</i>		+	-	-	-	-	-	-	-	-	1
<i>Rumex crispus</i>		-	+	-	-	-	-	-	-	-	1
<i>Sanicula europaea</i>	Ca ⁺⁺	+	-	-	-	+	-	-	-	-	2
<i>Scilla siberica</i>		-	+	-	-	-	-	-	-	-	1
<i>Scrophularia nodosa</i>		-	-	+	-	-	+	+	+	-	4

Table 1 continued

Locality no. / Taxon	Ca	1	2	3	4	5	6	7	8	9	n
<i>Sesleria caerulea</i>	Ca ⁺⁺⁺	+	-	-	-	-	-	-	-	-	1
<i>Silene dioica</i>		-	-	-	-	-	-	-	+	-	1
<i>Solidago virgaurea</i>		-	-	-	-	+	+	-	-	-	2
<i>Sorbus aucuparia</i> , saplings		-	-	-	-	-	-	+	-	-	1
<i>Stachys sylvatica</i>	Ca ⁺⁺	-	+	-	-	+	+	+	-	-	4
<i>Stellaria media</i>		-	-	-	-	-	+	-	-	-	1
<i>Taraxacum</i> spp.		+	-	-	+	-	+	-	+ ⁵⁾	-	4
<i>Thalictrum flavum</i>	Ca ⁺	+	-	-	-	-	-	-	-	-	1
<i>Trifolium europaea</i>		-	-	-	+	-	-	+	-	-	2
<i>Trifolium medium</i>		-	-	-	-	-	+	-	-	-	1
<i>Trifolium repens</i>		-	-	-	-	-	+	-	-	-	1
<i>Tussilago farfara</i>	Ca ⁺	-	-	-	-	-	+	-	-	-	1
<i>Urtica dioica</i>		+	+	+	-	-	-	-	-	-	3
<i>Vaccinium myrtillus</i>		-	-	-	-	+	+	-	-	-	2
<i>Veronica chamaedrys</i>		+	-	+	-	+	+	+	-	-	5
<i>Vicia cracca</i>		+	-	-	-	-	-	-	-	-	1
<i>Vicia sepium</i> subsp. <i>sepium</i>		+	-	-	-	-	+	-	+ ⁶⁾	-	3
<i>Vicia sylvatica</i>		-	-	-	-	+	+	+	-	-	3
<i>Viola canina</i> subsp. <i>canina</i>		-	-	-	+	-	-	-	-	-	1
<i>Viola canina</i> subsp. <i>montana</i>		-	-	-	-	-	-	-	+	-	1
<i>Viola riviniana</i>		+	-	+	-	+	-	+	+	-	5
Number of taxa: 129	38	69	18	33	27	37	51	41	32	6	

Ulmus glabra. Dense stands of *Corylus avellana*, one *Malus sylvestris*, one small *Salix caprea* and one shrub of *Lonicera xylosteum* grew as a lower tree and shrub layer. The accompanying field layer taxa were typical of lush woods of the Åland Islands (Table 1). A few small stands of *Melica uniflora* grew only about ten metres from the *A. ursinum* stand (cf. Hæggström 1994).

Allium ursinum in Saltvik

Sven Nordberg found a stand of *A. ursinum* in Åsgårda in Saltvik on June 16, 1927 (H) (Fig. 1, no. 12). The locality belonged to a crofter's holding named Nydal and was located on a northern slope with birch pollards. *A. ursinum* grew on an area of about 3 000 m². The stands totally covered parts of the area. The species had diminished due to cultivation of most of the surroundings. It seems that the species is hard to eradicate, because it had survived six years of cultivation and it grew among oats and potatoes in the field. (Nordberg 1929). The accompanying vascular plant flora was noted by Nordberg (1929; see Table 1).

Later, two collections were made in Åsgårda, namely Verkan, Alvar Palmgren, 3 VII.1929 (H; cf. Palmgren 1935) and Nydal, slope, N. Herlin, 26.VII.1932 (H).

Nydal is located on the eastern side of the narrow sea bay Inre Verkvik (called Verkan or Inre Verkan by Palmgren). The authors CAH and EH visited Nydal on June 20, 1979. *Allium ursinum* grew very abundantly on an area of about 100 m² in the NE part of a fenced mixed wood and further in the adjacent abandoned cultivated field to the north and in the ditch between the wood and the field (UCS 67136:31170). There were also abundant seedlings of *A. ursinum* among the larger shoots. A sample of the species was collected (Carl-Adam Hæggström 2204, H).

The trees and shrubs of the fenced area were: *Acer platanoides*, *Alnus glutinosa* (fairly abundant), *Picea abies* (abundant, up to 16-m-high trees), *Prunus padus*, *Ribes alpinum* and *Sorbus aucuparia*. The field layer consisted of among others *Anemone nemorosa* (very abundant), *Geranium sylvaticum*, *Hepatica nobilis* (very abundant) and *Oxalis acetosella* (abundant). Small specimens of *Acer platanoides*, *Lonicera xylos-*

teum, *Malus sylvestris*, *Populus tremula* and *Sorbus aucuparia* grew in the abandoned cultivated field. The field layer was rich in species with *Anthriscus sylvestris* and *Geranium sylvaticum* as the most abundant species (Table 1).

The authors CAH and EH visited the locality in Åsgårda again on June 15, 2015. The locality had totally changed and *A. ursinum* could not be found anywhere. The mixed stand had been cut. That area and the old cultivated field areas were now regularly cut lawns. Wild meadow plants, e.g. *Plantago lanceolata*, *Plantago media* and *Antennaria dioica*, grew abundantly in the mown areas.

However, *Allium ursinum* was found at the road Söderdalsvägen 29–31 about 300 m to the NNE of the former locality. It grew on both sides of the road and along a ditch in the wooded area NW of the garage (UCS 671380–671383:311708–311712) (Fig. 1, no. 13). *A. ursinum* occurred abundantly or very abundantly

in stands of some metres length with scattered shoots here and there, altogether on an area of approximately 100 m² (Fig. 6).

Trees and shrubs grew on the both sides of the road: *Acer platanoides*, *Alnus glutinosa*, *Betula pendula*, *Malus domestica* × *sylvestris*, *Picea abies*, *Salix caprea* and *Sorbus aucuparia*. The field layer comprised many common species of roadsides and meadows and woods (Table 1).

Allium ursinum in Mariehamn

Allium ursinum occurs in Mariehamn as a cultivated plant. It was probably brought from Ramsbolmen in the 1930s by Leo Björkman to the meadow area Tullarns äng where it initially occurred immediately north of the reconstructed stone labyrinth (Swedish: jungfrudansen) (Fig. 1, no. 14).



Fig. 6. A small stand of *Allium ursinum* at the road Söderdalsvägen in Saltvik Åsgårda. Accompanying species are, e.g. *Convallaria majalis*, *Dryopteris filix-mas*, *Equisetum pratense*, *Geranium sylvaticum* and *Rubus saxatilis*. June 15, 2015. Photo: C.-A. Hægström.

The oldest collection labelled Mariehamn was collected by T. J. Hintikka on June 29, 1912 (H). However, the locality was most probably Ramsholmen in Jomala, because four other persons collected *A. ursinum* there on the same day (voucher specimens in H. KUO, TUR). Another voucher specimen is labelled Mariehamn, K. K. Kari, without any date or other information (H).

The next voucher specimen collected in Mariehamn is the following:

— Mariehamn, Vallgrensgården, Leila Airikka, 12.VI.1963 (TUR).

The so-called Vallgrensgården is located at Storagatan 18 (UCS 66859:31073) (Fig. 1, no. 15). The original building was pulled down in the 1960s and replaced with a new one. The garden is today a smooth lawn. The author CAH studied the surroundings of Vallgrensgården on July 24, 2016. *A. ursinum* was found very abundantly on an area of about 10 m × 12 m just a few metres to the SE of the garden of Vallgrensgården (UCS 668593–668593:10731–10732). The locality is a deciduous stand with *Acer platanoides*, *Crataegus rhipidophylla*, *Fraxinus excelsior*, *Prunus padus* and a cultivated shrub of *Syringa vulgaris*. At the time of the visit, the sward was mown. However, wilted and wilting leaves and shoots with mostly empty capsules of *Allium ursinum* covered the ground. Two small separate stands grew at the small rock outcrops a metre apart from the S edge of the large stand. The accompanying field layer flora was rather scarce and comprised common species, such as *Allium oleraceum*, *Filipendula ulmaria*, *Geranium sylvaticum*, *Geum rivale*, *G. urbanum*, *Trifolium medium* and *Urtica dioica* and the grasses *Agrostis gigantea*, *Dactylis glomerata* and *Elymus repens*. A few weeds, such as *Alliaria petiolata*, *Cirsium arvense* var. *arvense* and *Lapsana communis* occurred, too.

Two other collections are known from Mariehamn:

— Mariehamn, deciduous wood, Armas Kosonen, 27.VI. 1963 (H, OULU). This collection was perhaps made in Tullarns äng.

— Mariehamn, mown protected nature meadow, 6685:3108, L. O. Ervi 767106, 10.VII.1976 (JYV). This locality is located in Tullarns äng.

Sonja Grönholm studied the vascular plant flora of Mariehamn in detail in 1988 and her report was published three years later (Grönholm

1991). She found *A. ursinum* as a cultivated plant in three localities: In Tullarns äng at the stone labyrinth, at the street Södragatan 9 and in a yard at the street Strandgatan.

The authors CAH and EH studied the original locality in Mariehamn, Öfvernäs, Tullarns äng, in 1979, 2008 and 2015. *Allium ursinum* occurred abundantly to very abundantly on an area of approximately 30 m × 30 m in the vicinity of the stone labyrinth in 1979 (UCS 668583–668586:310821–310824). The species has enlarged its area since, and several small and large, dense stands occurred in the N part of the Nature Reserve in 2015 (UCS 668569–668591:310817–310829). The locality is a managed deciduous wood and the sward is usually mown once in the summer. The tree layer consists of, e.g. *Alnus glutinosa*, *Fraxinus excelsior* and *Prunus padus*. *Corylus avellana* is the most prominent shrub. The field layer has some of the common spring flowering species, e.g. *Anemone nemorosa*, *Gagea lutea*, *Hepatica nobilis*, *Luzula pilosa* and *Ranunculus ficaria*. Later, many herbs and grasses develop, e.g. *Geranium sylvaticum*, *Myosotis sylvatica* (garden escape), *Dactylis glomerata* and *Poa trivialis*.

Cultivated or escaped stands of *A. ursinum* were found in the following localities in the town:

— Mariehamn, Öfvernäs, at the street Södragatan 9, on the S side of the lane Klockargränd, two small stands in flowerbeds with shrubs (UCS 668568:310787 and 668571:310787), May 20, 2015 (Fig. 1, no. 16). This is identical with Grönholm's (1991) locality at Södragatan.

— Mariehamn, Öfvernäs, at the street Havsgatan 7, S of the house in the shrubs, more than 50 flowering shoots grew on an area of 2 m × 6 m size (UCS 668591:310727), May 29, 2015 (Fig. 1, no. 17). This stand is located only about 50 m to the west of the Vallgrensgården locality.

According to architect Folke Wickström (e-mail November 30, 2015), *A. ursinum* grew in his daughter's garden at Storagatan 20 about 20 years ago (UCS 668598:310728) (Fig. 1, no. 18). It was not found by the author CAH in this garden in 2015, which is located about 70 m to the north of the Havsgatan locality and is the neighbour garden to the west of the Vallgrensgården locality.

The locality of *A. ursinum* at Strandgatan (Grönholm 1991; UCS about 66867–66869:31080) could not be found on May 29, 2015 (Fig. 1, no. 19). The exact location is not known. However, due to building activity in the area since 1988, there have been considerably changes in the yards and gardens.

Three voucher specimens are labelled Maarianhamina, Ramsholm or Ramsholmen:

- Jomala, Maarianhamina, Ramsholmen, Aarno Kalela, June 19, 1938 (H).
- Jomala, Maarianhamina, Ramsholm, shady *Fraxinus* stand, Paavo Kallio, June 30, 1941 (TUR).
- Jomala, Maarianhamina, Ramsholmen, Tor-Leif Westman, June 15, 1945, ex Herb. Ragnar Bäck (VOA).

These collectors have probably not noticed that Ramsholmen is located in Jomala.

One voucher specimen is labelled Mariehamn, Espholm, in the deciduous grove between the road to Gripen and the sea, V. J. Lyly, June

29, 1965 (H). A note is included with the following text: According to the amanuensis of the Nätö Biological Station, FK C-A. Hægström not reliable. Björn Federley 1974. – *Allium ursinum* has not been found by other persons in this area. This is most probably one of many of Mr. Lyly's fake labels attached to plants collected by him somewhere else.

Allium ursinum in Sund

The authors CAH and EH found a stand of *Allium ursinum* on the W side of the mediaeval castle ruin of Kastelholm (UCS 670025–670028:311722–311724; cf. Hægström & Hægström 1980, Hægström et al. 1982) (Fig. 1, no. 20). The most surprising about this find was that the castle ruin of Kastelholm has been frequently visited by botanists during the previous one hundred years. The stand of *A. ursinum* was about 10 m² large next to the rock outcrop upon which the castle was built.



Fig. 7. The *Allium ursinum* stand located west of the mediaeval castle ruin of Kastelholm. The stand extends from the rock outcrop to the fence. The small enclosure is to the right of the nearest ash (*Fraxinus excelsior*) tree. The three large ashes are approx. 170–180 years old. June 2, 2015. Photo: C.-A. Hægström.

A voucher specimen was collected by the author CAH (no. 2497) on 14.VI.1980 (H). One other collection was made by Aarre Koskinen on June 3, 1983 (H). Two observations are included in the database Kastikka, by O. K. Silkkilä on July 24, 1985 and by Raino Lampinen on July 28–29, 1991 (Lampinen et al. 2015).

The area west of the castle ruin is a meadow with a few approx. 170–180 years old *Fraxinus excelsior* trees growing along the fence and the gravel path. An about 3 m × 3 m large fenced enclosure is located in the meadow. Originally, this enclosure harboured a stand of the protected plant *Chenopodium bonus-henricus*. However, this protected species disappeared soon as the enclosure was overgrown by other herbs and grasses. The meadow has been grazed by sheep since the early 1980s. The stand of *A. ursinum* has expanded considerably. It covered an area of about 20 m × 30 m in 2015–2016 and it grew to the gravel path at the fence (Fig. 7). The sheep are eating *A. ursinum* and on June 19, 2016, hardly anything could be seen of the species above ground, with the exception of dense stands inside the small enclosure. However, grazing does not seem to stop the spreading of the species as it has enlarged its area despite the annually repeated sheep grazing.

Allium ursinum in Brändö

Mr. Jens Harberg, who worked with the nature reserves of Åland, informed the authors CAH and EH in the early 1980s about a locality of *A. ursinum* on Korsö Lökholm in the north-eastern archipelago of the municipality of Brändö. The information was included in the report on protected and rare vascular plants of Åland (Hæggström et al. 1982).

Mr. Jens Harberg kindly informed the author CAH (e-mail November 23, 2015) that the location where he saw *A. ursinum* was Baggholma Lökholm (UCS 67124:31692) (Fig. 1, no. 21). According to Jens Harberg, an inhabitant of Baggholma, Mr. Martin Söderlund, had told him that *A. ursinum* also occurs at Baggholma Ramsholm (67106–67111:31703–31711), an island connected to the road network of Brändö (Fig. 1, no. 22). No other information on *A. ursinum* in Brändö is available.

Allium ursinum in Lemland

A few shoots of *A. ursinum* was observed by the author CAH on a refuse heap behind the old toilet at the Nätö Biological Station, municipality of Lemland, on May 20, 2006 (UCS 668025:310913) (Fig. 1, no. 23). The stand consisted of one large specimen and four small ones on June 1, 2008. The population had increased to one dense stand of about 1 m² size with tens of plants and of tens of large and small plants scattered on an area of approx. 5 m × 7 m on May 20, 2015. *A. ursinum* was most probably introduced to this place from Ramsholmen. After mowing the sward there, the mowers were brought to the storage room at the Nätö Biological Station and when cleaned from attached rests of vegetation, the debris was thrown on the refuse heap.

A. ursinum is cultivated in a garden at Svärtesnabba in the SE part of Nätö island (UCS 667919:310965–310970; personal information by Mrs. Marita Andersson on May 31, 2007) (Fig. 1, no. 24).

A third locality of *A. ursinum* in Nätö, located about 300 m NW of Svärtesnabba, was reported by architect Inga Kåhre-Maury on June 13, 2014 (Fig. 1, no. 25). This locality is located at a track in a mixed wood (chiefly *Betula pubescens*, *Picea abies* and *Populus tremula*) on the SE part of Nätö Island. Some tens of plants were seen there in June 2014. *A. ursinum* was probably unintentionally introduced to this locality, either from the cultivated stand at Svärtesnabba or with debris, including leaves and twigs of cultivated *Juglans mandshurica* Maxim. from Mariehamn. The landowner took debris from his garden to improve the track, which was partly wet. An approx. 1-m-high sapling of *J. mandshurica* grew at the track in 2007 (cf. Hæggström & Hæggström 2009). *A. ursinum* has, however, not been observed in the garden with *J. mandshurica* in Mariehamn.

The locality in the SE part of Nätö was studied by the authors CAH and EH on June 10, 2016. Three stands of *A. ursinum* was found along a nine-m-long distance on the S side of the track in a mixed wood (UCS 667955:310938–310939). One stand comprised one flowering shoot only. The two other stands comprised more than ten flowerings shoots and a few leaves on an area

of about one square metre each. Two garden escapes, a 1.5-m-high sapling of *Acer pseudoplatanus* L. and two small stands of *Bergenia* sp. grew in the area.

The mixed wood comprised of dominating *Picea abies* and among others *Betula pubescens*, *Corylus avellana* and *Sorbus aucuparia* (Table 1). The field layer comprised mostly of quite common meadow and wood species (Table 1).

Two other cultivated stands of *A. ursinum* in the municipality of Lemland have come to our knowledge:

- Nåtö, Skobholm (UCS approx. 6680–6681:3108), personal communication by MA Kjell Johansson, May 25, 2015) (Fig. 1, no. 26).
- Järsö Altarskärsgrundet (UCS 667717–667721: 311198–311201), personal communication by MSc Kristina Palmgren, June 26, 2015 (Fig. 1, no. 27).

Allium ursinum in Vårdö

MA Conny Andersson (e-mail May 22, 2015) reported that *A. ursinum* grows in the municipality of Vårdö. The exact location given by him was a garden in Vårdöby, on the N side of the road at the house called Tomtebo (UCS 669999–670000:313443–313446) (Fig. 1, no. 28).

The authors CAH and EH visited this locality on June 27, 2015. *A. ursinum* grew abundantly on an area of approx. 20 m × 12 m in an overgrown garden close to the road. The trees and shrubs in the garden were *Acer platanoides*, *Acer pseudoplatanus* (cultivated), *Populus tremula*, *Prunus domestica* (cultivated, a very dense thicket), *Ribes alpinum*, *Rosa caesia*, *R. dumalis* and *Sorbus hybrida*. The field layer was poor in species with common herbs and grasses: *Allium oleraceum*, *Alopecurus pratensis*, *Anthriscus sylvestris*, *Dactylis glomerata*, *Festuca rubra*, *Geum urbanum*, *Poa pratensis* and *Urtica dioica*.

A small stand of *A. ursinum* also grew along a stonewall at the path to the minor building (UCS 669999:313443).

A. ursinum was most probably cultivated in this locality. A previous owner of the house was the pharmacist Edward Wennström (1922–1998) who was interested in botany.

Allium ursinum in Regio aboënsis

Allium ursinum has been found in two areas in the archipelago of Ab. Seven localities are known in the former municipality of Houtskär, today belonging to the town of Pargas / Parainen. Two localities are in the former municipality of Dragsfjärd, now belonging to the municipality of Kimitoön / Kemiönsaari. In addition, *A. ursinum* is known from four localities, either as a cultivated or as an escaped plant.

Houtskär, today Pargas / Parainen

Allium ursinum was found as a new species for Regio Aboënsis (Ab) by Ole Eklund in 1928 (Eklund 1929a, 1929b). The species grew in two localities in the municipality of Houtskär, namely in the eastern part of the island Rosmanskär (UCS 66964:31815) (Fig. 1, no. 29) and on the northeastern part of the island Sundholm (UCS 66994–66996:31861–31862) (Fig. 1, no. 30). Eklund collected *A. ursinum* in both localities (voucher specimens in H). A third locality with a single plant was observed by Miss Inger Lindgren in Näsby-Näs (= Roslax näs) SW of the hill Kasberget on the mainland of Houtskär (UCS approx. 66929:31878; Eklund 1929a, 1929b, 1958) (Fig. 1, no. 32).

Eklund (1929b) gives a detailed description of the vegetation and flora in Rosmanskär and Sundholm (Table 1). *A. ursinum* grew fairly abundantly in Rosmanskär and very abundantly and with great luxuriance in Sundholm.

Sundholm in the village of Björkö has been the most visited *A. ursinum* locality in Houtskär with five collections and one observation between 1936 and 1998 (Lampinen et al. 2015).

The author MvN visited Sundholm on June 5, 2015. A large stand of *A. ursinum* occurred on the eastern side of the island along a distance of approx. 100 m (Fig. 8). Further, a small stand was observed near the northern point of the island (UCS 669984:318588) (Fig. 1, no. 31).

Only one collection was made after Eklund's find on Rosmanskär, a protected island today: Hypeis, Rosmanskär, a lax stand on an area of about 150 m² in a rather dry *Populus tremula* dominated grove the E part of the island togeth-



Fig. 8. A dense stand of *Allium ursinum* on Ab, Pargas (former municipality of Houtskär), Björkö, Sundholmen. Photo: Mikael von Numers, June 5, 2015.

er with *Dactylorhiza sambucina* and *Dryopteris filix-mas* (UCS 66964:31815), Pekka Rautiainen 98-031 & Kimmo Syrjänen, June 9, 1998 (TUR).

A fourth locality of *A. ursinum* in Houtskär was found by Ole Eklund on Björkö Nätöholm [Nätaholm] in a lush hazel grove where it grew abundantly on July 5, 1929 (H; cf. Eklund 1930) (Fig. 1, no. 33). One further collection in this now protected island is known: Björkö, Nätaholm, on the W and NW side of the meadow and field area on the central part of the island, in the lower part of the slope with hazel, on an area of about 200 m², dense stands, partly flowering (UCS 66971:31863), Kimmo Syrjänen, Veli-Pekka Rautiainen, Roosa Leimu & Susanna Puustinen, June 9, 1998 (TUR). The accompanying flora consisted of, e.g. *Alchemilla glaucescens*, *Anemone nemorosa*, *Briza media*, *Dactylorhiza sambucina*, *Dentaria bulbifera*, *Dryopteris filix-mas*, *Heracleum sphondylium* (most probably *H. sibiricum*), *Hypericum hirsutum*, *Paris quad-*

rifolia, *Poa nemoralis*, *Polygala vulgaris*, *Polygonatum odoratum*, *Populus tremula*, *Potentilla crantzii*, *Primula veris*, *Stellaria holostea* and *Viola canina* subsp. *canina*. The stand was still present in May 2016 (MvN).

Two other localities in Houtskär have been found during later years:

- Mossala, Bjonholm, on the SE point in a hazel grove, in an area of 3,5 m × 1,5 m (UCS 66994:31867), Pekka Rautiainen 98-025 & Kimmo Syrjänen, June 9, 1998. (TUR) (Fig. 1, no. 34). The locality is probably belonging to the protected area of the island. According to the label, the following species grew in the field layer: *Anemone nemorosa*, *Heracleum sphondylium* (most probably *H. sibiricum*), *Paris quadrifolia*, *Polygonatum multiflorum*, *Poa nemoralis* and *Stellaria holostea*.
- Lempnäs, Apelholmen, immediately S of the island of Lempnäs (UCS 67012:31853), Mikael von Numers, June 1994, a small stand

near the SSE shore (Fig. 1, no. 35). The accompanying flora consisted of, e.g. *Anemone nemorosa*, *Dentaria bulbifera*, *Geranium sylvaticum*, *Primula veris* and *Polygonatum multiflorum*. In 2016, the stand had markedly increased in size (MvN).

Dragsfjärd, today Kimitoön / Kemiönsaari

The first find of *A. ursinum* in Dragsfjärd was made by Börje Olsoni on the island of Jungfruholmen on July 24, 1930 (H) (Fig. 1, no. 36). The locality was a mossy depression among hazels on the lush and species rich eastern slope of the island (UCS approx. 66636:32426); about 15 shoots of *A. ursinum* grew on an area of 4 m², together with *Heracleum sibiricum* (Olsoni 1931).

One other find is known from Dragsfjärd, namely in the protected island of Äpskäer (UCS 66580:32318–32320) (Fig. 1, no. 37). *A. ursinum* grew on an area of about 100 m² on the N side of the island in the *Alnus glutinosa* stand. Many specimens of *A. ursinum* were bitten by sheep. A collection was made by Kimmo Syrjänen & Sari Haapala on June 2, 1993 (TUR).

Cultivated or escaped stands in Ab

Eklund (1936) reports that he had planted *A. ursinum* at Soltorp (= Nyhem) in Kopojs in the municipality of Korpo in 1914 (UCS approx. 6683:3196) (Eklund 1927b, 1958) (Fig. 1, no. 38). The species was taken from the locality at the vicarage of Jomala and it had performed well despite strong competition from *Bistorta major*, *Pulmonaria obscura* and *Stellaria nemorum*. No later information is known to us.

Allium ursinum has been observed as an escape from cultivation in the south mainland of Finland in Ab, Suomusjärvi (UCS approx. 6695:3318) by Pentti Havia & Jaakko Nurmi, in the years 1985–1993 (Lampinen et al. 2015).

An occurrence of *A. ursinum* at Vuorenmäki in the town of Salo (UCS approx. 67026–67028:32888–32891) was reported by Valta (2005). The species grew on 6 m² in an oak and hazel stand. The number of flowering specimens

were five. As the locality has been studied by botanists earlier, the occurrence may be new. An intentional or unintended introduction may be the reason for this occurrence.

Living plants of *Allium ursinum* was introduced from Estonia to a summer cottage garden in Finby / Särkisalo in Salo (UCS 667482:327609) in 2014. The species flowered and set seed in 2016 (MSc Björn Federley, e-mail, September 13, 2016).

Allium ursinum in Nylandia

The first and for long only known locality for *A. ursinum* in the province of Nyland (N) was the island of Hasselö in the municipality of Pellinge. The first collection was made in a wood meadow by Vera von Hertzen on July 6, 1908 (H). Two later collections from the same location are known to us:

- Pellinge, Hasselö, in a grove, Gösta Roos, July 14, 1920 (H).
- Pellinge, Hasselö, Greta Catani (via Göran Catani), June 1933 (H).

Pettersson (1942) reports that Ms. Ärla Backman observed the species in 1922. Then there were ten flowering specimens on an approx. 2 m² large area. According to Pettersson, the species was not found later. However, there is the voucher specimen from 1933. The author CAH visited the locality on the S side of the island W of the escarpment (UCS approx. 66791:34429) together with Dr. Karl-Gustav Widén in the early 1980s. Nothing of *A. ursinum* could be seen.

One voucher specimen was collected in a lush mixed wood in Hanko (UCS 664:327) by Paula Vuori on July 3, 1930 (JYV). *A. ursinum* has not been found previously or later in the Hanko area.

A. ursinum is cultivated in Kyrkslätt / Kirkkonummi Estby. Living plants were brought from either Åland or Sweden in the 1980s and planted in a garden (UCS approx. 66651–66655:33587–33589). The species has grown vigorously and it fills half the garden today. Many persons have taken plants from this garden and introduced it in their own. (Dr. Pekka Borg, personal communication, November 1, 2016.)

A cultivated stand occurs at the Gobbas Gård farm in Backböle / Pakila in the municipality of

Mörskom / Myrskylä (UCS about 67211:34349). About 200 shoots were growing in 2015 (Mrs. Aira Sevón, e-mail March 31, 2016). *A. ursinum* was introduced there a few years ago and it is spreading.

***Allium ursinum* in Satakunta and Tavastia australis**

Allium ursinum was planted, together with many other plants, in St. Hämeenkyrö, Kyröskoski (UCS 684:329) by engineer Herman Ad. Printz (1849–1943) (cf. Jahnsson 1927, Suominen 2013).

There are two finds of *A. ursinum* in Ta. The first is from the town of Hämeenlinna (UCS approx. 676:336) where it was collected in a grove by M. R. Hakala on June 12, 1904 (H). As the voucher specimen is from a schoolboy's herbarium, the information about the location may be unreliable.

The second find is from the town of Tampere, Lielähti, in the former area of the sawmill of Niemi (UCS 6828:3324). It was found on a refuse area in 2000–2004 by Matti Kääntönen, Kari Korte, Lasse Kosonen & Tapio Lahtonen. There were some shoots of *A. ursinum*, a few of them in flower, in the SW corner of the area in 2004 in a stand of *Aegopodium podagraria*. A collection was made by Matti Kääntönen 111/04 on June 20, 2004 (H).

Discussion

The habitats of *A. ursinum* are mostly lush deciduous woods. Suessenguth (1939) and Oborny et al. (2011) give a good synopsis of its habitat requirements in Central Europe where it often occurs in masses. It occurs also in dense and wide stands in some islands in the Södermanland and Uppland regions of Sweden (Rydberg & Wanntorp 2001, Jonsell 2010). The situation is similar in several localities in Finland, e.g. Ramsholmen, at the vicarage of Jomala and in Brunnskär in the Åland Islands, and in Björkö Sundholmen in Regio Aboënsis.

As a spring geophyte, *A. ursinum* requires much light, but the canopy of the deciduous

trees and shrubs do not hamper it as dense stands grow in quite shady localities later in the summer. However, too much shade is not favourable (Tutin 1957). This was seen in the locality in Hammarland Strömma where the shade of small spruces stunted *A. ursinum* in the late 1970s and 1980s. It rarely occurs in open meadow habitats (Tutin 1957). Small stands are growing in the meadow glades of the wooded meadow area of Ramsholmen Nature Reserve, but the large and dense stands are found in the dense wooded areas.

Although *A. ursinum* has a broad distribution and has a clear tendency to occur as a weed, it is still a habitat specialist with a rather narrow range of ecological tolerance (Grime et al. 2007). It requires a mesic well-drained soil and drought as well as waterlogging seem to be unfavourable.

Hermý (1992) and Rola (2012) consider *A. ursinum* as a species of ancient forests and it is unable, or almost unable, to establish in secondary forests. The number of localities of hemerophilic origin and even successful introductions in Finland in deciduous stands in the cultural landscape and in gardens does not support the ancient forest idea by us.

According to (Eklund 1946), *A. ursinum* is moderately calciphilic (German: Kalkbegünstigt) in the southwestern archipelago of Finland. Many of the accompanying species (Table 1) are common ones without any strong calciphilic trend. However, of the accompanying species, 11 of 34 trees and shrubs and 38 of 127 field layer taxa (saplings of *Sorbus aucuparia* were omitted) are regarded as calciphilic. The percentage of calciphilic species is 32.5 of all species. This is a slightly higher percentage than found in the vascular plant flora of shell gravel deposits of the Åland Island (Carlsson et al. 2008).

Regarding its edaphic requirements, the soil ought to be nutrient-rich with a pH near 7. Lindquist (1931) gives a pH range of 5.5–7.0 in South Scandinavian beech woods. According to Suessenguth (1939), the pH range is between 5.5 and 7.9. Tutin (1957) refers to studies in Wales where the pH was 5.28 and 5.45 in *Quercus robur* – *Q. petraea* woods and 4 to 6 in *Alnus glutinosa* stands. Grime et al. (2007) narrowed the pH range to between 6.0 and 7.5. The only measurement available from Finland is from Ab, Hout-



Fig. 9. A dense carpet of wilting leaves of *Allium ursinum* covers the ground in the so-called Vallgrensgården locality in Mariehamn. Such a mat can inhibit other species from growing, perhaps through allelochemical inhibition. Åland Islands, Mariehamn, July 24, 2016. Photo: C.-A. Hægström.

skär, Björkö, Nätöholm: the pH was 6.2 in the lush species rich hazel stand (Eklund 1930).

Allium ursinum has a Clan-of-clones strategy for monopolising space (Oborny et al. 2011). The strategy has four attributes: 1) Most of the seeds are dispersed close to the parent plant, 2) the development of seedlings is facilitated by surrounding adult plants, 3) vegetative reproduction is fairly low whereas the plants allocate resources to persist in their localities, and 4) the genet is not integrated physiologically, except for a transient connection between parent and offspring.

Ernst (1979) studied the population biology of *A. ursinum* in northern Germany. He observed that the wilting leaves might cover the soil up to an one-cm-thick mat. This mat may prohibit other plants from growing in the *A. ursinum* stand (Fig. 9). Ernst (1979) tested whether there is an allelochemical effect by adding fresh leaves of *A. ursinum* to three stands of *Mercurialis perennis* and *Glechoma hederacea*. No response was, howev-

er, observed compared to untreated stands of the two species.

Allium ursinum has been used as a spice by man since ancient times (Pettersson 1942). He suggested that *A. ursinum* was brought to Finland by man, because many of the then known localities were close to the Mediaeval sailing routes through the SW archipelagos of Finland. Eklund (1958) did not agree, because his finds in the archipelago of Houtskär were located on low altitude and in uninhabited islands. Thus, Eklund (1958) regards it as a probably hemerophobic species. However, many of its localities point towards a fairly strong hemerophilic tendency. Of the 53 localities in Finland described above, 17–19 can be regarded as more or less natural, 30–32 as cultivated or otherwise introduced and 4 as uncertain, because of insufficient information. As *A. ursinum* thrives well in cultivated stands in woods and gardens, some of the old archipelago populations may have been introduced by man.

Therefore we regard *A. ursinum* as a moderately hemerophilic species.

The seeds of *A. ursinum* are dispersed either by autochory or by myrmecochory (Sernander 1906). The autochorous dispersal is probably the most common. As the seeds ripen, the scape bends down and the seeds are falling to the ground next to the plant. The seeds may later be removed by ants. Sernander (1906) observed that the seeds of *A. ursinum* are covered by an ant-attracting fatty seed coat. He conducted three experiments on myrmecochory of *A. ursinum*, each with ten seeds. In each experiment, all seeds were removed by ants (*Formica rufa*) in 25 minutes to a little less than 1½ hour. He also observed ants transporting seven seeds of *A. ursinum* in one of his experiment areas, Skabbholmen, in the archipelago east of Stockholm. Unfortunately, no information is given about the distance of the dispersal of *A. ursinum* seeds. However, Sernander (1906) gives dispersal distances for seeds of other myrmecochorous plants, e.g. 70 m for *Melica nutans* and *Viola hirta*. Several myrmecochorous plants grew around anthills in a distance of some metres. In these cases, the seeds were carried to the nest and when the elaiosomes were used by the ants, the seeds were discarded and brought to the terrain next to the anthill.

Eklund (1927a, b) experimented with the ability of seeds and fruits to float in the brackish water of the Baltic Sea. His result regarding *Allium ursinum* was that all 12 seeds sank immediately in a glass vessel with brackish water with a salinity of about 5 ‰ (Eklund 1927b). However, after almost three months, 8 of the seeds (Eklund 1927b gives the figure 83.3 %) had germinated. Unfortunately, no other information about the result of this experiment was given. Eklund (1927a, b) performed a similar experiment with *Allium schoenoprasum*. Of 100 seeds, 95 sank instantly and all had sunk after four days. A few seeds germinated in the glass vessel in a week or so and after half a year 67 vigorous, 2–4-cm-long green and onion-scented seedlings with good buoyancy floated in the vessel. His general conclusion of this and several other similar experiments with seeds and fruits of other species was that some seeds which instantly sink in the brackish water of the Baltic Sea, nevertheless may be dispersed as floating seedlings to new localities. As they ob-

viously could stand in good condition during long time floating in the water, they had the ability for long distance hydrochorous dispersal.

Allium ursinum is most probably going to be more common in the future due to introduction to gardens as both living plants and seeds are sold in garden shops (Fröer 2016, Siemenkauppa 2016, Taimilaari 2016). Further, the warming of the climate will be favourable for this in Finland southern species.

As a strong competitor in the field layer, *A. ursinum* may be a problem in protected areas in the future. This can already be observed in the Ramsholmen Nature Reserve, where ever more of the area is invaded by the species. Another problematic area is Nåtö where *A. ursinum* is a new introduced plant that spreads from the refuse heap at the Biological Station.

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