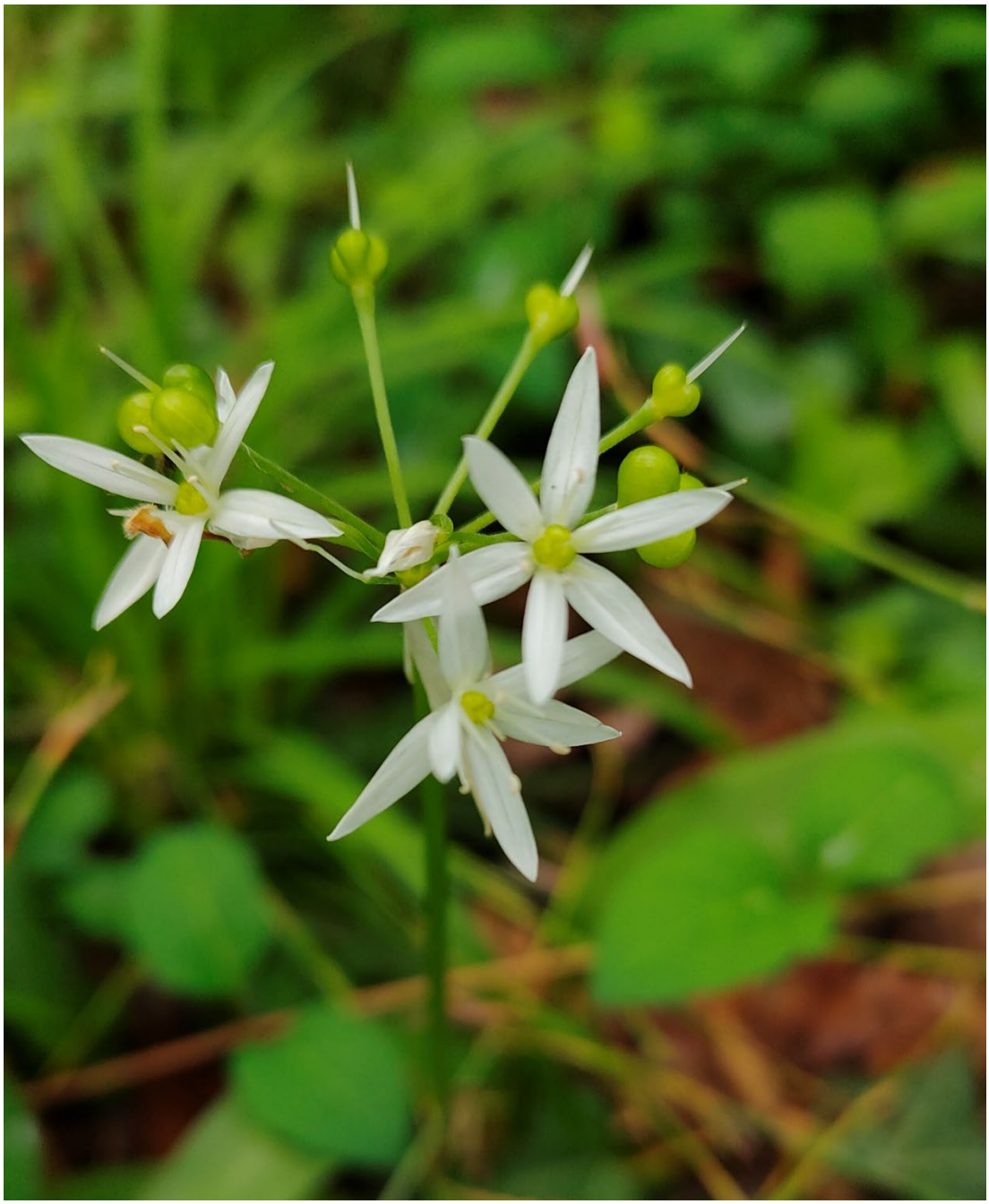
European Cooperative Programme for Plant Genetic Resources
ECP/GR

Report of a Working Group on *Allium*

Ninth Meeting of the ECPGR *Allium* Working Group
21-22 May 2025, Gatersleben, Germany



The **European Cooperative Programme for Plant Genetic Resources (ECPGR)** is a collaborative programme among most European countries aimed at rationally and effectively conserving *ex situ* and *in situ* plant genetic resources for food and agriculture, providing access and increasing their sustainable use (http://www.ecpgr.cgiar.org).
The Programme, which is entirely financed by the member countries, is overseen by a Steering Committee composed of National Coordinators nominated by the participating countries. The Coordinating Secretariat is hosted by the Alliance of Bioversity International and CIAT.

The Programme operates through Working Groups composed of pools of experts nominated by the National Coordinators. The ECPGR Working Groups deal with either crops or general themes related to plant genetic resources (crop wild relatives, cryopreservation, documentation and information, and on-farm conservation). Members of the Working Groups carry out activities based on specific ECPGR objectives, using ECPGR funds and/or their own resources.

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Cover photos: *Allium ursinum* L. Credit: L. Maggioni

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RELATED PRESENTATIONS ARE AVAILABLE ONLINE

HERE

SUMMARY REPORT OF THE MEETING

Review of the work of the ECPGR *Allium* Working Group since its last meeting and discussion

The meeting, organized by the Leibniz Institute of Plant Genetics and Crop Plant Research (IPK), back-to-back with an *Allium* Symposium and final meeting of the ECPGR Activity Garli-CCS[1] (20-22 May 2025), was opened with a welcome by the Chair of the *Allium* Working Group (WG), Helena Stavělíková. The participants briefly introduced themselves.
H. Stavělíková gave an overview of the *Allium* WG activities for ECPGR Phase X (2019–2023) and Phase XI (2024–2029) and provided a brief history of the WG for guests and new members.

Allium Working Group activities and related events during Phase X

- **14 September 2020.** The results of the SafeAlliDiv project were published as a research article:
  Ruņģis, D., Leino, M.W., Lepse, L. *et al.* 2020. Genetic characterization of European potato onion (*Genet Resour Crop Evol*. https://doi.org/10.1007/s10722-020-01014-2
- **April–May 2021**. Prepared remarks for the first and second drafts of the *Plant Genetic Resources Strategy for Europe.*
- **2 February 2022**. Preparation for the ECPGR WG Chairs meeting.
  Questionnaire to the Working Group Chairs in preparation for the Mid-Term Steering Committee meeting, 7-9 June 2022.
- **April 2022**. ECPGR WG Chairs meeting online.
- **11-12 October 2022.** Eighth meeting of the *Allium* WG held in Skierniewice, Poland.
- **December 2022.** The Garli-CCS project submitted by the *Allium*, Cryopreservation and Documentation & Information WGs was selected for funding by the ECPGR Executive Committee.
- **10 March 2023**. First virtual Garli-CCS meeting.
- **17 April 2023.** 2nd webinar on ECPGR Grant Scheme Activities, focused on the SafeAlliDiv project, was presented by Helena Stavělíková, Crop Research Institute Czech Republic and Dainis Runģis, Latvian State Forest Research Institute.
- **22 September 2023**. Second virtual Garli-CCS meeting.

Allium Working Group activities and related events during Phase XI

- **17-20 September 2024**. Garli-CCS-Cryopreservation workshop held in Prague, Czech Republic.
- **8 January 2025**. Chair of the *Allium* WG sent to all members of AWG a questionnaire about their *Allium* collection and their topic or aim for possible project proposals.
- **20-22 May 2025**. *Allium* Symposium and ECPGR Activities (Garli CCS meeting and *Allium* Working Group meeting), Gatersleben, Germany.

[1] GarliCCS - Genotyping-by-sequencing of the European garlic collection to develop a sustainable *ex situ* conservation strategy, https://www.ecpgr.org/working-groups/allium/garli-ccs

- Other WG Chair activities:
- **7-10 October 2019.** Visit to Banco Germoplasma Vegetal, Cuenca Spain (contact person: Marcelino de los Mozos Pascual).
- **10-13 July 2022**. Visit to the Institute of Horticulture, Latvia (contact person: Liga Lepse).
- **22 July to 2 August 2024**. PhD student Vaida Cepuliene from Lithuanian Research Centre for Agriculture and Forestry, Institute of Horticulture joined the team of CRI, Department of Genetic Resources of Vegetables and Specialty Crops Olomouc, for a scientific traineeship.

Discussion

Danguolė Juškevičienė from the Lithuanian Research Centre for Agriculture and Forestry (LAMMC) Babtai, Lithuania presented *Allium* species collections and distribution. The institute maintains 24 accessions of generatively propagated *A. cepa* L., 60 accessions of vegetatively propagated *A. sativum* L. and 25 local accessions of *A. cepa* L. var. *aggregatum* Don. Studies of the distribution and habit of perennial edible *Allium* species in Lithuania showed that *A. oleraceum* L., *A. scorodoprasum* L., *A. ursinum* L., *A. vineale* L., *A. angulosum* L. and *A. schoenoprasum* L. were found, mostly growing naturally in 55 habitats in different regions of Lithuania. The largest amount of data was collected on *A. ursinum* and *A. oleraceum* habitats, other species are rare or very rare.
The institute participates in the breeding of onion (*Allium cepa*), garlic (*Allium sativum*) and chives (*Allium schoneoprasum*).

Cristina Mallor presented the *Allium* Germplasm Collection Vegetable Germplasm Bank – Centro de Investigación y Tecnología Agroalimentaria (CITA) Aragon (Zaragoza, Spain).
The Spanish genebank BGHZ was founded in 1981. Now it maintains 19,019 accessions belonging to more than 300 species mainly of Spanish landraces/farmers' varieties. Accessions are stored in hermetic glass bottles, as dry seeds with silica gel, in freezing room chambers at18ºC. Eight hundred twenty (820) accessions of *Allium* are in the Germplasm Collection, Vegetable Germplasm Bank CITA. The main collections are onion (*Allium cepa*) (653 accessions) and leek (*Allium porrum*) (119 accessions). CITA published a book about Spanish traditional onions.
CITA participates in breeding programmes focusing on *Allium pyrenaicum* Costa & Vayr. This species is a rare and endangered species endemic to Spain (Pyrenees). Seeds of this species were recently collected as part of a collaboration agreement between CITA and CGN.

Presentation of a questionnaire on *Allium* collections in Europe

H. Stavělíková presented a summary of the WG members' replies to her questionnaire on the number of accessions in *Allium* collections in Europe, as received by 21 May 2025. Answers were received from 24 countries, representing 28 genebanks (Table 1). France, Italy and Sweden maintain genetic resources of *Allium* in two banks. In Spain, nine different genebanks are currently preserving *Allium* genetic resources. Other countries have no collections of *Allium* or did not respond to the questionnaire. On the other hand, data were received from Hungary, which is currently not represented in the *Allium* WG. The WG members have in their collections 11,268 accessions, which include all the important edible species of *Allium*. In

Germany, IPK maintains a unique taxonomic collection of the genus *Allium* as a collection of genetic resources.

Table 1. Number of *Allium* accessions conserved in European collections, based on the results of a survey conducted by the Chair of the *Allium* Working Group

No. of species	No. of accessions	Country
8	73	Albania
3	7	Austria
5	42	Bosnia and Herzegovina
17	300	Bulgaria
3	167	Croatia
7	798	Czech Republic
3	22	Estonia
4	50	Finland
6	507	France
183	1,943	Germany
3	119	Greece
16	871	Hungary
7	190	Italy
3	134	Latvia
2	84	Lithuania
13	437	Netherlands
6	43	Norway
12	1,399	Poland
8	536	Portugal
10	142	Romania
2	139	Serbia
2	112	Slovenia
28	1,544	Spain
11	225	Sweden
4	1,391	UK
Total accessions	**11,275**	

The complete 16-page table including all data received, was printed and circulated during the meeting so that the contributors could review it and find any discrepancies. Updated data were then provided during or just after the meeting. Once the updated and confirmed data from all contributors have been received, the updated table will be sent to all contributors with

an invitation to provide the necessary updates to their respective EURISCO National Inventory focal points, so that these can be reflected in the central catalogue.
Pawel Chrominski from the Nordic Genetic Resource Center (NordGen) explained the relationship between NordGen and the national banks in Scandinavia.

Discussion on a potential *Allium* WG project within the ECPGR Activity Grant Scheme (Phase XI)

Together with the question about the number of accessions in the *Allium* collections, WG members were also asked for topics for a project to be submitted under the ECPGR Grant Scheme. Seven replies were received with suggestions for a potential project. Mariusz Chojnowski proposed to organize a workshop on germination, physiology and storage of *Allium* seeds, as well as on seed reproduction.
A round of discussion followed, during which several ideas and proposals were put forward:
M. Chojnowski emphasized the importance of organizing a workshop addressing seed germination challenges.
Ingunn Molund Vågen supported the need for the workshop and proposed extending the scope to include broader activities related to seed propagation and germination.
Liga Lepse proposed focusing on *Allium ursinum* as a crop wild relative to be included in germination trials.
Manuela Nagel suggested initiating activities related to the preservation of seeds and/or pollen of specific wild *Allium* species.
Smiljana Goreta Ban recommended combining several themes: organizing a workshop, giving attention to *A. commutatum* Guss., and establishing contact with the ECPGR Crop Wild Relatives (CWR) group for collaborative collection efforts.
Rina Kamenetsky highlighted the need for scientific impact and deliverables. She proposed adopting a three-pillar approach: (1) working with ***underutilized wild relatives*** with potential for future commercial use, (2) developing ***advanced seed storage methods*** (e.g. cryopreservation), and (3) studying the ***ecophysiology*** of selected model species, such as ***A. ursinum***, to develop or refine ***germination protocols***. She also suggested employing a 'conservation through cultivation' strategy.
Erik de Vahl noted that *A. scorodoprasum* also presents challenges in *ex situ* conservation.
P. Chrominski supported efforts to obtain high-quality seeds and to adapt germination protocols for *A. ursinum*.
H. Stavelíková endorsed the idea of involving the CWR WG and proposed monitoring existing *in situ* populations alongside the adaptation of germination protocols.
I. M. Vågen further proposed focusing on three species: *A. ursinum, A. fistulosum* L. and A. *schoenoprasum*. She raised the possibility of introducing additional species or genotypes from other countries with potential for commercial cultivation. She reminded the group that, as is usual for ECPGR-funded projects, co-financing from participating countries will be required for the proposal to be viable.
S. Goreta Ban reiterated support for both *in situ* and *ex situ* conservation efforts.
Rik Lievers expressed support for working with underutilized crops but stressed the role of genebanks, suggesting it may be more beneficial to focus on cost-effective and efficient collection maintenance strategies.
Katja Richert-Pöggeler agreed on the importance of underutilized crops and wild relatives and stressed the need to raise public awareness and promote crop diversification.

Summary and tentative project focus

H. Stavelíková summarized the discussion, proposing a tentative project topic: Development of integrated *ex situ* and *in situ* conservation strategies and methodologies for *Allium ursinum*, development/adaptation of germination protocols, and exploration of innovative preservation methods (e.g. cryopreservation), scientifically based in seed physiology.

Discussion on current issues (safety duplication, AEGIS, etc.)

A total of 1,750 *Allium* accessions from seven countries are currently included in AEGIS (Table 2). The majority of accessions (1,247) belong to six species: *Allium ampeloprasum, Allium cepa, Allium fistulosum, Allium porrum, Allium sativum, Allium schoenoprasum* (Table 3).

Table 2. Number of accessions per country listed in AEGIS

Country	**No. of accessions**
Germany	1,267
Netherlands	151
United Kingdom	141
Nordic Countries	105
Czech Republic	82
Bulgaria	2
Estonia	1
Italy	1
Total	**1,750**

Table 3. Number of accessions of the six most represented species listed in AEGIS

Species	**No. of accessions**	**Country**
Allium ampeloprasum	208	Bulgaria (2), Germany (106), Netherlands (19), Nordic Countries (37), United Kingdom (44)
Allium cepa	466	Estonia (1), Germany (276), Italy (1), Netherlands (77), Nordic Countries (24), United Kingdom (87)
Allium fistulosum	75	Germany (62), Nordic Countries (4), United Kingdom (9)
Allium porrum	37	Netherlands (37)
Allium sativum	385	Czech Republic (82), Germany (303)
Allium schoenoprasum	76	Germany (26), Netherlands (10), Nordic Countries (40)
Total	**1,247**	

According to the current rules for AEGIS accessions, as outlined in the *Allium* Field Genebank Specific Standards and the *AEGIS Model Crop Progress Report:* Allium, *July 2008*, each accession should be planted in the field with 40 plants.
H. Stavělíková suggested whether it would be possible to include in AEGIS additional accessions that are currently safety-duplicated in a cryobank.

An important topic of the discussion was the issue of safety duplication. One of the bottlenecks in the conservation of garlic genetic resources is the long growing season – from October to July. Damage to plants from abiotic influences – frost, quick temperature changes, floods, heavy long-term rainfall and biotic stresses – damage from birds, hares and deer sometimes can be greater than damage from pests, bacterial and fungal diseases.
Safety duplication is solved in some countries, such as the Baltic countries, Poland and Scandinavia, by growing the accessions in different locations. The Czech Republic, Germany and Poland use cryopreservation. The Czech Republic offers space for accessions in field conditions.

Others
Lovro Sinkovič from Agricultural Institute of Slovenia, Ljubljana, Slovenia presented their online publications about:

- Garlic: https://www.kis.si/f/docs/Druge_publikacije/Nas_cesen_s_CIP.pdf
- Onion: https://www.kis.si/f/docs/Druge_publikacije/Nasa_cebula_CIP_mar2023_.pdf

On the basis of discussions held during the meetings of the ECPGR Garli-CCS Activity and the *Allium* Working Group, the below questions related to cryopreservation were prepared, to be sent to all WG members. The answers to these questions, included as Annex 3, will be used in the preparation of the *Allium* cryopreservation strategy, to be jointly drafted by the *Allium* and the Cryopreservation Working Groups.

1. Do you routinely cryopreserve *Allium* accessions for safety duplication?
    - Yes
    - No
2. If no, do you plan to cryopreserve your *Allium* accessions in future?
    - Yes, we will start in the next 2 to 3 years
    - Yes, we will start in the next 3 to 10 years
    - Yes, we will start in the long-term future
    - No, we do not plan
3. Which *Allium* species will you cryopreserve first?
    - Please, specify

ANNEXES

Annex 1 – Agenda

Ninth Meeting of the *Allium* Working Group

21-22 May 2025, Gatersleben, Germany

Agenda

21 May

8:30	Transfer from Quedlinburg to Gatersleben
09:00 – 11:00	**Discussion on Garli-CCS data, conservation and cryopreservation strategy of genebanks**
11:00 – 11:30	**Coffee Break**
11:30 – 13:00	**Allium Working Group meeting** Review of the work of the ECPGR Allium Working Group since its last meeting
13:00 – 14:00	**Lunch Break**
14:00 – 15:30	**Allium Working Group meeting** Presentation of a questionnaire on Allium collections in Europe
15:30 – 16:00	**Coffee Break**
16:00	Transfer from Gatersleben to Quedlinburg
16:00 – 18:00	**Cryopreservation course I**
18:30	Individual transfer to Quedlinburg
19:00	**Sightseeing tour in Quedlinburg** Meeting Point: Roland statue at the town hall Markt 1 ǀ 06484 Quedlinburg View on a map
20:00	**Dinner in Quedlinburg** *Le Feu – Der Flammkuchen in Quedlinburg* Wordgasse 5 ǀ 06484 Quedlinburg View on a map

22 May

8:30	Transfer from Quedlinburg to Gatersleben
9:00 – 10:30	**Allium Working Group meeting (continued)** Discussion on a potential Allium WG project within the ECPGR Activity Grant Scheme (Phase XI)
10:30	**Allium WG photo**
10:30 – 11:00	**Coffee Break**
11:00 – 12:15	**Allium Working Group meeting (continued)** Discussion on current issues – safety duplication, AEGIS, etc.
12:15 – 13:00	**Lunch Break**
13:00	Transfer to Quedlinburg Alternatively: Departure directly from the Gatersleben railway station
13:00 – 15:00	**Cryopreservation course II**
15:30	Individual transfer to Quedlinburg

Annex 2 – List of participants

Ninth Meeting of the *Allium* Working Group

21-22 May 2025, Gatersleben, Germany

List of participants

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Annex 3 – Questionnaire on *Allium* cryopreservation in Europe

Country	Person	Do you routinely cryopreserve Allium accessions for safety duplication?	If no, do you plan to cryopreserve your Allium accessions in future?				Which Allium species will you cryopreserve first?	Remarks
			Yes, we will start in the next 2 to 3 years	Yes, we will start in the next 3 to 10 years	Yes, we will start in long-term future	No, we do not plan		
Albania	Nertila Curri Lila	no			yes		*A. cepa, A. porrum*	
Austria	Wolfgang Palmer	no	no	no	no	yes	none	
Bosna and Herzegovina	Sonja Umićević	no			yes		Allium sativum and Allium cepa	
Bulgaria	Elisaveta Vasileva	no	yes				Allium sativum and Allium angulosum	
Croatia	Smiljana Goreta Ban	no	yes				garlic	Given the significance of garlic as a species, the associated maintenance costs are substantial, and there exists a considerable risk of genetic material loss.
Czech Republic	Helena Stavělíková	yes					Garlic and shallot	
Estonia	Külli Annamaa	no	no	no	no	yes	none	
Finland	Terhi Suojala-Ahlfors	yes					Allium cepa var. aggregatum (probably not other Alliums)	(but maybe this is not routine yet, we have only cryopreserved 9 accessions (and the work is still going on)
France	Charles-Henry DUVAL	no	no	no	no	yes	none	
France	ESNAULT Florence	no	no	no	no	yes	none	
Germany	Manuela Nagel	yes					Garlic and shallot	
Greece	Catherine Cook	no	no	no	no	yes	none	
Italy	Alessandro Natalini	no	no	no	no	yes	If possible, garlic, but it is not plan yet.	
Israel	Dr Ori Fragman-Sapir	no	no	no	no	yes	none	
Latvia	Liga Lepse	no		yes			potato onion and garlic	
Lithuania	Danguolė Juškevičienė	no	no	no	no	yes	Allium sativum	
Netherlands	Rikl Lievers,	no	no	no	no	yes	none	
North Macedonia	Prof.dr Rukie Agic	no			yes		Allium sativum	
Norway	Ingunn M. Vågen -	no		yes			shallot depend on finance	
Poland	Mariusz Chojnowski	yes					Allium sativum – Polish landraces and cultivars, In the next 2 to 3 years we plan to start with wild Alliums seed preservation.	Yes -we have duplicated 210 accession of Allium so far and each year we preserve in cryopreservation 10 new accessions as well as we maintain 85 accessions from Gatersleben and Prague as safey duplicates .
Portugal	Isabel Gomes da Silva	yes					Allium sativum	Now, we are in the testing phase for cryopreserving the basal disc.
Romania	Blaga Dumitru Dorel	no	no	yes			Allium sativum and Allium angulosum	
Serbia	Maja Jecmenica	no		yes			Allium sativum	
Slovenia	dr. Lovro Sinkovič	no		yes			Allium sativum	
Spain	Marcelino de los Mozos Pascual Cristina Mallor Giménez	no	yes				Allium sativum, Allium cepa	This action is currently being started with the garlic materials preserved at IMIDRA (FAO code ESP198) and probably extended in the future to other garlic collections in Spain. Also in CRF (FAO code ESP004) is currently considering to start in
Sweden	Jenny Hagenblad	no	no	no	no	yes	none	
Switzerland	Christina Kägi	no			yes		*Allium cepa* var. *aggregatum*	We are not sure yet. In 2018, we carried out a pilot project for the cryopreservation of shallots (*Allium cepa* var. *aggregatum*). The results were mixed, so we did not continue with this approach. For the time being, we have opted for vegetative preservation in the field.
UK	Charlotte.Allender	no	no	no	no	yes	none	
Nordic Genetic Resource Center – NordGen	Pawel Chrominski	No			yes		Garlic (Allium sativum) and potato onion (Allium cepa var. aggregatum)	Currently, NordGen has a mandate from the five Nordic countries to conserve only generatively propagated Allium species. Nevertheless, NordGen could potentially serve as a backup location for genetic resources of vegetatively propagated Allium species, in collaboration with the National