PART C:
FINAL TECHNICAL ACTIVITY REPORT

Note that this report covers the entire implementation period from the start to the end of the action. It could be seen as a summary of the submitted annual interim technical reports

COUNCIL REGULATION (EC) N° 870/2004 of 26 April 2004
establishing a Community programme on the conservation, characterisation, collection and utilisation of genetic resources in agriculture

AGRI GEN RES 050

Acronym: EURALLIVEG
Action title: Vegetatively propagated alliums, Europe's core collection with higher maintenance safety at lower cost and better health conditions

FINAL TECHNICAL ACTIVITY REPORT No. 01
Reporting period from 01/04/2007 to 31/03/2011

Action starting date:	<01/04/2007>
Action closure date:	<31/03/2011>
Action duration (in months)	<48> months
Total budget	1.089.000 €
EC contribution:	544.500 €
(%) of total costs	100,00%
(%) of eligible costs	50,00%

Data Coordinator

Name of the coordinator (Partner no 00)	Mr. E. R. Joachim Keller
Contact persons	Mr. E. R. Joachim Keller / Mrs Christine D. Zanke
Postal address	Leibniz Institute of Plant Genetics and Crop Plant Research (IPK), Department Genebank Corrensstrasse 3 D-06466 Gatersleben, Germany
Telephone	+49-39482-5-267
Fax:	+49-39482-5-741
E-mail	keller@ipk-gatersleben.de
Action Website	http://euralliveg.ipk-gatersleben.de/

Data Co-beneficiaries

Partner no 01	Mr Jiří Zámečník Crop Research Institute (CRI) Drnovska 507, 161 06 Prague, Czech Republic
Partner no 02	Mrs Teresa Kotlińska Research Institute of Vegetable Crops (RIVC), (new name:Institute of Horticulture) Konstytucji 3 Maja 1/3, 96-100 Skierniewice, Poland
Partner no 03	Mr Vito Miccolis Dipartimento Scienze Sistemi Colturali, Forestali e dell'Ambiente Università degli Studi della Basilicata (UNIBAS), Viale dell´Ateneo Lucano, 10, 85100 Potenza, Italy

Data Co-beneficiaries

Partner no 04	Mr. Chris Kik Centre for Genetic Resources, the Netherlands (CGN), Bornsesteeg 65, gebouw 122, 6708 PD Wageningen, the Netherlands
Partner no.05	Mrs Florence Esnault National Institute for Agricultural Research (INRA) INRA UMR-APBV 0118, Domaine de Keraïber 29260 Ploudaniel, France
Partner no 06	Mrs Agnese Kolodinska Brantestam (replaced by Mr Svein Solberg) Nordic Genetic Resource Center (NordGen) Smedjevägen 3, 230 53 Alnarp, Sweden

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1. EXECUTIVE SUMMARY

- **Action objectives during the reporting period**

WP1:

Objective 1: Update contribution to the European *Allium* Database

Objective 2: Documentation of the European Garlic and Shallot Core Collections

Objective 3: Documentation of the Virus-free garlic Core-in-Core Collection

Objective 4: Documentation of the Tripartite Garlic Cryo-Genebank

WP2:

Objective 1: Identifying duplicate accessions in the germplasm of garlic and shallot.

Objective 2: Analysing the genetic relationships among the accessions of garlic and shallot.

WP3:

Objective 1: Routine cryopreservation - long-term storage of *Allium* accessions in ultra-low temperature.

Objective 2: Cryopreservation as a part of backbone storage of sound *Allium* accessions.

Objective 3: Safe duplication of cryopreserved *Allium* accessions in the partners' cryobanks

WP4:

Objective 1: Coordinate and realize the work on virus elimination from garlic collections held by the genebanks of P0, P1, P2, P3 and P5.

Objective 2: The aim is to have the most important material virus-free to constitute the Core-in-Core Collection.

WP5:

Objective 1: Effective management of the project.

- **Key results achieved and outputs**

WP1:

Result 1: Documentation of the garlic and shallot core collections were completed including the regeneration rates of the cryopreserved garlic accessions (Annexes 2, 4, 11, 12).

Result 2: Documentation of the Tripartite Garlic Cryobank including safety duplication completed (Annex 14). The consignment agreement is signed by the three partners and deposited there (Annex 15).

WP2:

Result 1: AFLP analysis was done on 219 garlic and 63 shallot accessions (Annexes 8-10).

Result 2: SNP analysis was performed on 24 garlic accessions. They were used to develop new markers. 1028 SNP markers were detected.

WP3:

Result 1: Total numbers of 220 accessions were completely cryopreserved consisting either of 100 explants with regeneration rates better than 30 % or of 200 explants with regeneration rates between 10 and 30 %.

Result 2: A number of 18 accessions are *in vitro*. They may be multiplied further and finally cryopreserved by the partners.

Result 3: Transfer of safe duplication of cryopreserved *Allium* accessions between the partners' cryobanks was completed on March 28 – 30, 2011 (Annex 14).

WP4:

Result 1: Virus-free material of the backbone subset (22 accessions) was sent to the cryopreservation partners (Annex 16).

Result 2: Virus-free material's of the routine virus elimination (30 accessions) was sent to the cryopreservation partners (Annexes 17-19).

Result 3: First measures to the field performance tests of virus-free material were done.

WP 5:

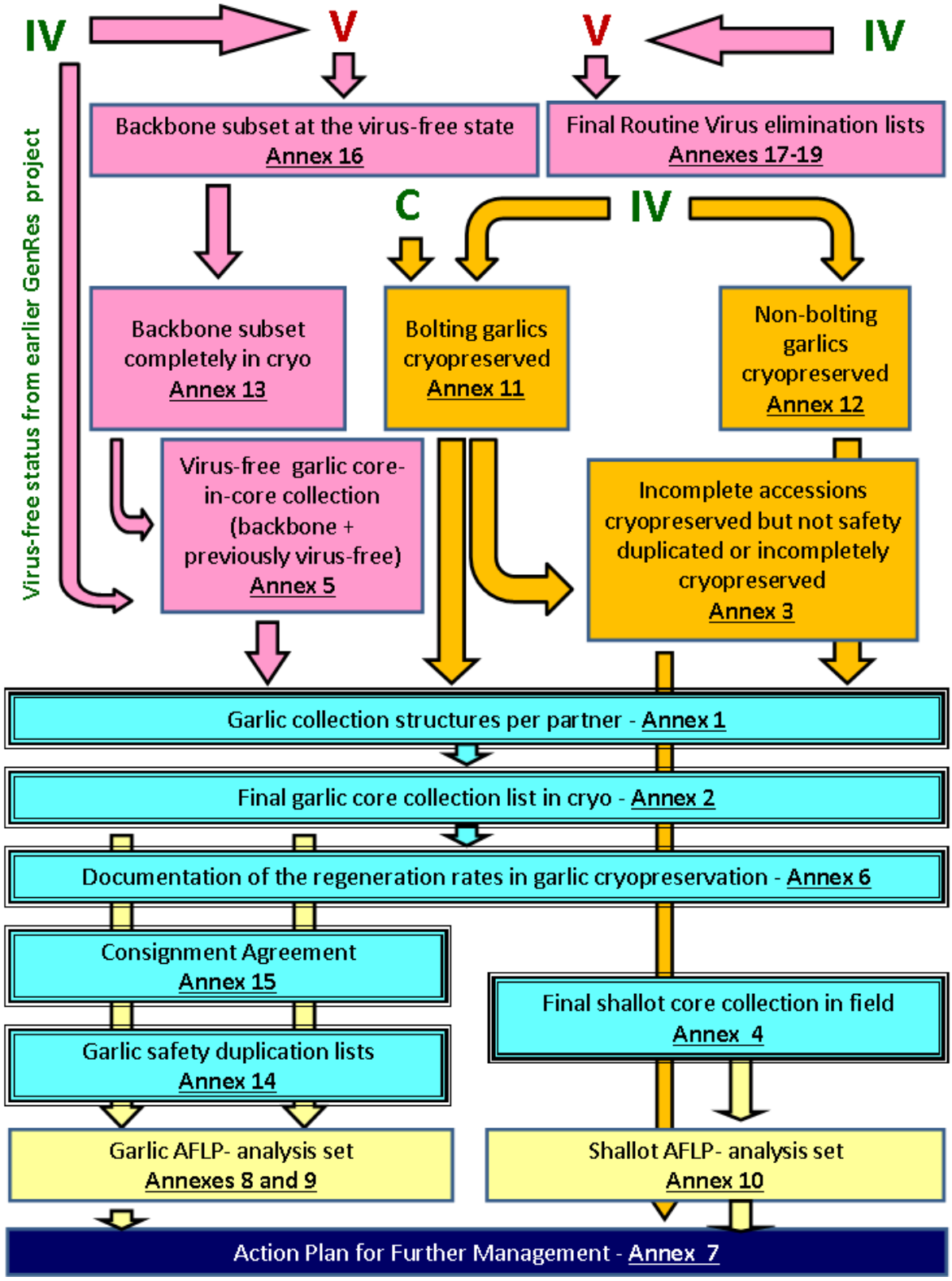
Result 1: The Annual Meeting was organised.

Result 2: The project website http://euralliveg.ipk-gatersleben.de is permanently and further conducted.

Result 3: One oral and 4 poster presentations were held to promote the project.

- **Key results achieved and outputs**

Survey on the annexes for better insight into the management arrangements:



Explanations: green - material sources IV in vitro introduction, C direct cryopreservation without in vitro introduction; violet - virus-elimination-(V)-related actions; orange - cryopreservation-related actions; blue - main project results; yellow - molecular marker-related actions; dark blue - future actions

2. DETAILED RESULTS ACHIEVED

Work package number	WP 1	Start date 1-4-2007 End date 31-3-2011	Month 01 Month 48

Work package title: Documentation

No of lead partner	*P0*									
No of participating partners		*P1*	*P2*	*P3*	*P4*					
Total person-months	*30*									

- ***Main objectives***

- **Objective 1:** Update contribution to the European *Allium* Database
- **Objective 2:** Documentation of the European Garlic and Shallot Core Collections
- **Objective 3:** Documentation of the Virus-free garlic Core-in-Core Collection
- **Objective 4:** Documentation of the Tripartite Garlic Cryo-Genebank

- **Task 1:** Safety duplicates accessions**.**

							Start date: Month 01 **End date**: Month 12	
No of participating partners	*P0*	*P1*	*P2*	*P3*	*P5*	*P6*		

Preceding Years:
There were 250 official duplicates in the whole collection of 1549 garlic accessions, which originated from the six project partners. In the shallot collection, with a total of 530 accessions, only 81 official duplicates were recorded.

The results of the first year's comparisons are as follows:
Czech/German duplications:

- One accession originally from the Czech collection exists now in three collections: IPK (All 0974), CRI (09H0100190) and RIVC (225404 [0071K]). All three partners provided material for DNA analysis.
- One accession (All 0130 'Dunganskij Mestnyj'), originally from the Czech collection but lost there, changed to MAA status in IPK. IPK gave these accessions as safety duplicates to CRI.
- Two accessions (All 1029 and All 1048), which were originally safety duplicates from CRI, were sent to CRI in order to reintroduce them into the Czech genebank.

Polish/German duplications:

- One accession, originally from the Polish collection, exists in three collections now: IPK (All 1477), RIVC (225 558 [83K=247K]) and CRI (09H0101083) (=247K in the RIVC collection). All three partners provided material for DNA analysis.
- For one accession (All 1473), originally been safety duplicate from RIVC, was sent to RIVC in order to reintroduce it into their genebank.

Italy/German duplications:

- The 20 accessions, which were provided by UNIBAS for cryopreservation, were introduced into the IPK collection as safety duplicates.

France/German duplications:

- Five accessions exist in the French and German collections. One accession (All 0821) originated from USA and four accessions (All 0827, All 0834, All 0848 and All 0853) originated from Georgia. Both partners provided material for DNA analysis from these accessions.

Final Year: -

CONCLUSION: Task 1 was completed as planned. Throughout the whole project implementation, this was considered. Only the original side was working with the respective accessions, whereas the duplicate side kept only the duplicates without working on them.

• **Task 2:** Definition of the Most Appropriate Sample conditions								
							Start date: Month 01 **End Date**: Month 12	
No of participating partners	*P0*	*P1*	*P2*	*P3*	*P4*	*P5*	*P6*	

Preceding Years:
During the start-up meeting the MAA discussion was introduced into the project by the coordinator of the European AEGIS policy who participated in the start-up meeting. It is intended to arrange the MAA policy of EURALLIVEG in concordance to the general AEGIS policy.

Final Year : -

CONCLUSION: Task 1 was completed as planned. The criteria for Most Appropriate Accessions (MAA) were kept from the beginning without substantial modification as follows:

Primary criteria (fully discriminative, i.e. accepted accessions will need to comply with all requirements below; these criteria are not crop-specific)

1. In the public domain (i.e. Annex I*) material that is in the Multi-lateral System and non-Annex I material designated to AEGIS by governments or any other holder)
2. Genetically unique (i.e. genetically distinct accessions; assessment based on available data and/or on the recorded history of the accession)
3. Agronomically (including research material) and/or historically/culturally important
4. Plant Genetic Resources, including medicinal and ornamental species, and crop wild relatives (i.e. excluding forest genetic resources; non-plant agro-biodiversity species, etc.)
5. European origin or introduced germplasm that is of actual or potential (breeding/research) importance to Europe

   *) Annex I is the crop list of the International Treaty for Plant Genetic Resources for Food and Agriculture (IT-PGRFA)

Secondary criteria: (not fully discriminative; might be crop-specific; used when deciding which accession to accept among two or more “quasi duplicate” or similar accessions)

1. Maintained in “country of origin”
2. A known origin (collected and/or bred; pedigree data!?)
3. Comprehensiveness of passport information
4. Number of regeneration/multiplication cycles
5. Health status (i.e. is the germplasm disease free?) Existence of morphological/molecular characterization data
6. Existence of (agronomical) evaluation data
7. Validated accession name (particularly relevant for perennial clonal crops, where the same name can be attributed to different accessions; history of individual accessions is important; special attention to be paid to synonyms and homonyms)

• **Task 3:** Documentation of the garlic bolting and non-bolting collection								
						Start date: Month 03 **End date**: Month 46		
No of participating partners	*P0*	*P1*	*P2*	*P3*	*P5*			

Preceding Years:
Following the decision to suspend the activities for cryo-knife, the distribution of the accessions, which were scheduled to be cryopreserved by the various partners, was changed after the second project year. The 20 accessions, formerly associated with the cryo-knife action, were added to the 155 accessions of routine cryopreservation.

The following distribution was determined:

- P0:
  56 acc. for routine cryopreservation (36 bolting and 20 non-bolting acc. including 9 non-bolting acc. from P3).
  31 acc. for virus elimination (26 acc. for main virus elimination and 5 acc. for backbone set).
- P1:
  62 acc. for routine cryopreservation (37 bolting and 25 non-bolting acc. including 7 acc. from P5).
  19 acc. for virus elimination (14 acc. for main virus elimination and 5 acc. for backbone set).
- P2:
  57 acc. for routine cryopreservation (37 bolting and 20 non-bolting acc. including 6 non-bolting acc. from the P3).
  31 acc. for virus elimination (26 acc. for main virus elimination and 5 acc. for backbone set).
- P3:
  15 acc. for routine cryopreservation (9 acc. will be cryopreserved by P0 and 6 acc. by P2)
  19 acc. for virus elimination (14 acc. for main virus elimination and 5 acc. for backbone set).
- P5:
  7 acc. for routine cryopreservation (will be cryopreserved by P1).
  5 acc. for virus elimination (5 acc. for backbone set).

This final distribution is shown in Annex 1.

Final Year:
The final list of the safety-duplicated Core Collection accessions is given in Annex 2.
Another list is given in Annex 3. They cover material which was not finalized in the project period.
The prerequisite of the final documentation was the permanent updating of the target accessions and their specific data. Since many general pieces of information are valid for all material treated in the project, the documentation of all garlic as well as of shallot (see below task 4) accessions is finally summarized in the EURALLIVEG Core Accession Documentation, in the following texts called “EURALLIVEG Catalogue”, which contains some general information about the partner collection and the description of the morphological characters of the accessions within the core collection, together with passport data and images. Passport data are the main data that describe the origin of a given accession. Depending on the character of the material, whether it was acquired from donors or collected in original sites they cover the accession numbers, year of introduction, taxon, either donor and donor place including original collecting site if known or the collection, collecting site and collection number. Since in IPK accessions had been analysed by Maaß & Klaas 1995 for isozymes and RAPD markers as described in the project proposal, the resulting grouping was added to the description after the passport data. Passport data are followed by characteristic images arranged in the following order: field pictures, bulbs, cuts of bulbs, inflorescences. After the pictures a descriptor list with the main characters is added. In IPK, these characters had been recorded in the frame of the preceding GenRes project. In other cases data were recorded later. The characterisation data are according to the IPGRI descriptor list for Allium. Most accessions are characterised by 15 parameters: 100-bulbil weight (7.1.23.); flower number in umbel (7.2.6.); ability to produce scape (7.2.2.); bulb structure type (7.1.20.); foliage colour (7.1.1.); foliage attitude (7.1.5.); number of bulbils (7.1.24.); number of cloves per compound bulb (7.1.19.); outer skin colour of compound bulb (7.1.16.1); shaft diameter (7.1.10.); shaft length (7.1.9.2.); shape of compound bulb in horizontal section (7.1.21); shape of mature garlic bulb (7.1.12.); skin colour of the clove (7.1.16.2.); weight of cloves (7.1.22.). The characterisation list is followed by further remarks: inclusion into the AFLP analysis; regrowth rate from cryopreservation; place of safety duplication. The methodology to record these data is based on visual observation, length measuring and counting.

Annex 3 covers accessions which are cryopreserved but not safety-duplicated and such accession which are incomplete in respect of both factors. The partners will work on this material in their respective institutes on own expenses (see Action Plan for further management, Annex 7).
The documentation about the distribution of the regeneration rates is covered in Annex 6. The final list of the European garlic accessions which entered the EURALLIVEG catalogue was sent on June 22, 2011 to the manager of the European Allium Database EADB for incorporating the related information.

CONCLUSION:

The main documentation was completed with a delay of 21 months due to the problems caused by the failure of the molecular screening (see WP2). It covers the accessions selected in the process of the project implementation on the basis of morphological characterisation and the MAA criteria as well as suitability to be cryopreserved. It is seen as the main collection-related document for further use. It covers 656 printable pages and contains all the relevant information on the accessions, data and images. All garlic and shallot accessions are described on two specific pages per accession The catalogue may be updated with new issues in case the future collection will expand.
Based on the agreement of the partners, the images, together with the respective passport and characterisation data of all EURALLIVEG accessions will be introduced into and further hosted in the Garlic and Shallot Core collection database of IPK, which afterwards will get a new name.

• **Task 4:** Documentation of the Shallot Core Collection								
							Start date: Month 19 **End date**: Month 46	
No of participating partners	*P0*	*P1*	*P2*	*P3*	*P5*	*P6*		

Preceding Years:
The actual list of the Shallot Core Collection, done by morphological traits only, is summarized in Annex 4.

Final Year:
The shallot collection is included in the EURALLIVEG catalogue in the same manner as the garlic was treated. In contrast to garlic there was no criterion of cryopreservation included. For shallot, the same arrangement of characterisation data is followed as for garlic. However the number of descriptor is lower in some cases. Thus, e.g. P0 recorded subgroup characterisation, shape of mature dry bulbs (7.1.11); bulb skin colour (7.1.15); bulb flesh colour (7.1.18); bulb hearting (7.1.27); dry matter content of storage organ (8.1.2). P1 recorded foliage colour (7.1.1); leaf diameter (7.1.3); foliage attitude (7.1.5); degree of leaf waxiness (7.1.8); shape of mature dry bulbs (7.1.11); population uniformity of bulb shape (7.1.14); bulb skin colour (7.1.15); bulb flesh colour (7.1.18); average number of bulbs per cluster (7.1.25); ability to flower (7.2.1); flower number in umbel (7.2.6). The methodology to record these data is based on visual observation, length measuring and counting.

The final list of the European shallot accessions which entered the EURALLIVEG catalogue was sent on June 22, 2011 to the manager of the European Allium Database EADB for incorporating the related information.

CONCLUSION:
See above, Task 3.

• **Task 5:** Documentation of the virus-free garlic Core-in-Core Collection completed								
							Start date: Month 37 **End date**: Month 48	
No of participating partners	*P0*	*P1*	*P2*	*P3*	*P5*	*P6*		

Preceding Years:
Since documentation was intended to be done from the running protocols at the end of the project, no special actions were performed before.

Final Year:
Due to the weak growth, which has been reported under WP 3 task 5 both the number of backbone accessions and the number of routine virus elimination revealed to be lower than expected. Nevertheless, there are 4 backbone accessions, free of all viruses, included into cryopreservation. Other 18 accessions could be conducted at least until the step of re-sending to the partners (see Annex 18). Of the main virus elimination set, in one accession a number of virus-free explants were added, but separately placed, to the virus-infected sample as an additional sample of smaller size. Furthermore, there is some material *in vitro,* which will be transferred to soil to re-establish vigour, multiplied and later included into cryopreservation (see Action Plan for further management, Annex 7). A set of 19 accessions had been provided to the project in an already virus-free state (which has been achieved by the partner's own activities). The documentation about all this material is presented in Annex 5.

CONCLUSION: The task has been completed.

• **Task 6:** Documentation of the Tripartite Garlic Cryobank including safety duplication								
							Start date: Month 37 **End date**: Month 48	
No of participating partners	*P0*	*P1*	*P2*	*P3*	*P5*	*P6*		

Preceding Years:
Since documentation was intended to be done from the running protocols at the end of the project, no special actions were performed before.

Final Year:
The safety duplication action was performed by P1. In course of this action, the documents were exchanged, which cover the list of accessions and the arrangement of the various materials into cryoboxes. For details see also WP 3, Task 6. The consignment agreement for all three partners has been prepared, signed and deposited in the three participating laboratories. The detailed location documents follow a blackbox regime as usual for genebanks. The documents of the consignor party are deposited in closed envelopes in the respective consignee laboratory. The consignee is only allowed to open the envelopes in emergency cases. Since the genebank material allocation is confidential it is not added to this report.

A sample how this documentation is structured is given below (Accession numbers fictitious, colour codes are given for quick access to the tubes):

Storage schedule for duplicates sent to P2

Tank number:	BS / 6 - 1
Box:	not vf
Box number:	1

	A	B	C	D	E
1	All 0123 15.01.2008 pink a	All 0123 15.01.2008 pink a	All 0123 11.11.2008 pink c	All 0123 11.11.2008 pink c	All 0123 11.11.2008 pink c
2	All 0321 15.01.2008 braun a	All 0321 15.01.2008 braun a	All 0321 16.01.2008 braun b	All 0321 16.01.2008 braun b	All 0321 21.01.2009 braun e
3	All 9999 14.01.2009 orange b	All 9999 14.01.2009 orange b	All 9999 14.01.2009 orange b	All 9999 22.04.2009 orange c	All 9999 22.04.2009 orange c
4	All 0000 13.01.2009 weiß c	All 0000 13.01.2009 weiß c	All 0000 10.02.2009 weiß d	All 0000 10.02.2009 weiß d	All 0000 10.02.2009 weiß d
5	All 7777 06.03.2008 grau b	All 7777 06.03.2008 grau b	All 7777 06.03.2008 grau b	All 7777 20.01.2009 grau c	All 7777 20.01.2009 grau c

Tank number:	BS / 6 - 2
Box:	vf
Box number:	2

	A	B	C	D	E
1	All 6543 vf/07 10.06.2008 gelb b	All 6543 vf/07 17.06.2008 gelb c	All 6543 vf/07 17.06.2008 gelb c	All 6543 vf/07 17.06.2008 gelb c	All 6543 vf/07 17.06.2008 gelb c
2	All 1000 vf 02.04.2008 blau a	All 1000 vf 02.04.2008 blau a	All 1000 vf 02.04.2008 blau a	All 1000 vf 15.07.2008 blau d	All 1000 vf 15.07.2008 blau d
3	Italy 6666 vf 17.06.2009 grau b	Italy 6666 vf 17.06.2009 grau b	Italy 6666 vf 30.06.2009 grau c	Italy 6666 vf 30.06.2009 grau c	Italy 6666 vf 30.06.2009 grau c
4	All 9898 vf 02.04.2008 weiß a	All 9898 vf 02.04.2008 weiß a	All 9898 vf 02.04.2008 weiß a	All 9898 vf 15.07.2008 weiß d	All 9898 vf 15.07.2008 weiß d
5	All 9876 vf 24/97/3 26.06.2007 grün a	All 9876 vf 24/97/3 11.10.2007 grün b	All 9876 vf 24/97/3 11.10.2007 grün b	All 9876 vf/07 16.07.2008 grün c	All 9876 vf/07 16.07.2008 grün c

CONCLUSION: The task has been completed.

- **Task 7:** Action plan for further *Allium* management

Start date: Month 42
End date: Month 48

No of participating partners	*P0*	*P1*	*P2*	*P3*	*P5*	*P6*		

Preceding Years:
Since documentation was intended to be done from the running protocols at the end of the project, no special actions were performed before.

Final Year:
A detailed Action plan for further managing the EU *Allium* collection in the years 2011-2021 is given in Annex 7. It shows the actions which need to be fulfilled because of the too slow growth of non-bolting genotypes and in vitro plants after meristem culture. This part is separated from actions intended to be done as new initiatives.

CONCLUSION: The task has been completed.

Work package number	WP 2	Start date 1-4-2007 End date 31-3-2011	Month 01 Month 48

Work package title: Molecular duplicate screening												
No of lead partner	P04											
No of participating partner(s)		P0	P1	P2	P3	P5	P6					
Total person-months	60											

- **Main objectives**

Objective 1: Identifying duplicate accessions in the germplasm of garlic and shallot.

Objective 2: Analysing the genetic relationships among the accessions of garlic and shallot.

- **Task 1: Sampling and sending freeze-dried garlic and shallot accessions**

	Start date: Month 01 **End date:** Month 15
No of participating partner(s)	**P0** and P1-P6

Preceding Years:

At the start of the project fifty unique garlic accessions were transferred by CGN (P4) to IPK (P0). The sampling and sending of the freeze-dried garlic and shallot material from the rest of the partners to IPK was completed by the end of July 2007. In total 1436 garlic and 538 shallot accessions were received by IPK which constituted 92.7 % and 92.1 % respectively of the planned accessions to be screened.

Final Year: -

CONCLUSION: *Task 1 was completed as planned*

- **Task 2: Isolation of DNA of garlic and shallot**

	Start date: Month 04 **End date:** Month 16
No of participating partner(s)	**P0,** P4

Preceding Years:

DNA isolation of all garlic and shallot accessions sent by the partners to IPK was done routinely although some slight problems were encountered because of a sometimes problematically functioning DNA isolation robot. However this task could be finished according to schedule.

Final Year: -

CONCLUSION: *This task was successfully completed in year 1.*

• **Task 3: EST sequencing and SNP discovery**	
	Start date: Month 02 **End date:** Month 07
No of participating partner(s)	**P4**, P0 (+ subcontractors)

Preceding Years:
The sequencing, the identification of SNPs and the subsequent development of primers for garlic took place at both Gen-X-Pro and Array-On (the latter being the sub-contractor for the external assistance). The high throughput micro-array SNP analyses of the 1600 garlic accessions took place at Array-On. For shallot the whole process took place at Array-On. In total 20 SNP markers were developed for garlic and 21 SNP markers for shallot.
Three major problems were identified in year 3, firstly when analysing the garlic and shallot SNP data intentional duplicates were not scored via SNP fingerprinting as identical, secondly garlic accessions which had identical SNP fingerprints were not identical in passport data and thirdly there was a large discrepancy in SNP fingerprinting output observed in the two garlic groups analysed.

1. Intentional duplicates
For both garlic and shallot, intentional duplicates were included in the material to be analysed. These intentional duplicates were unknown to Array-On and were used to check the reliability of the data. For garlic nine intentional pairs of duplicates were included in the analyses and for shallot eight duplicate pairs. For each duplicate pair 2 x 3 SNP data were produced. When inspecting the SNP results for both crop species, it was found that for garlic as well as for shallot none of the intentional duplicates had an identical SNP profile. For garlic on average 7.4 SNP markers of the 20 markers varied within the intentional duplicates and for shallot 2.6 SNP markers of the 21 markers. For garlic 2 of the 20 markers gave for all intentional duplicates the same SNP marker outcome and for shallot 11 out of the 21 markers produced the same SNP marker outcome. For shallot it needs to be mentioned that for 9 SNP markers only 2 x 1 SNP data were produced instead of 2 x 3 SNP data. Therefore it is possible that the real number of markers that give variation within the intentional duplicate sets is higher than 2.6 per 21 markers.
2. Molecular duplicates and passport data
For garlic the accessions that had the same SNP profile (molecular duplicates) were checked with respect to their passport data. Only the groups consisting of 2 accessions were checked. In total there were 74 of these groups and for 46 of these groups were passport data available. The outcome of this analysis was that no single molecular duplicate group had passport data indicating a common origin (= duplicate). Also vice versa we came to the same conclusion as accessions which were known to be exchanged between genebanks (RIVC/IPK: 15 passport duplicate accessions checked and RIVC/CRI: 18 passport duplicate accessions checked) proved to be in no way molecular duplicates.
3. SNP data output discrepancies between the two garlic groups analysed
In the first group of 1489 accessions almost no SNP data (0.05 %) were missing and also the variation within an accession was very low (0.6 % of the accessions had variation between the three plants analysed). In the second group of 128 garlic accessions were analysed. After the first set a large percentage of SNP data were missing (9.61 %) and there was also within accessions a large amount of variation (88.28 % of the accessions analysed had variation within an accession). As there were no obvious differences between both groups from a genetic or agronomical point of view it is unclear why this difference is present. The problem remained also after consulting Array-On.
On the basis of the abovementioned findings for garlic an *ad hoc* meeting in January 2009 took place in Gatersleben between IPK, CGN and Array-On. During this meeting various sources of error were discussed but no final conclusion was reached at that date, although it became clear that the problem most probably existed within the Array-On that carried out the molecular fingerprinting. However, as IPK and CGN, we were willing to give Array-On a second chance. Unfortunately too much SNP variation was found in the eight intentional shallot duplicate groups rendering also this SNP analysis as unreliable.

The EU Commission had been informed about this problem by a special letter.

Final Year:
No direct continuation was possible. Additional actions see WP2, Task 7.

CONCLUSION:
On the basis of the aforementioned it can be concluded that the external service company (Array-On) has failed to produce reliable SNP results as intentional duplicates in shallot and garlic were not identified via SNP fingerprinting and also failed to give a satisfactory answer for the discrepancy in SNP data between the two garlic groups analysed. This has severely damaged this WP as no rationalization could be carried out on the basis of a molecular duplicate screening of the European collections of garlic and shallot.

• **Task 4: Genetic fingerprinting in garlic and shallot using SNP micro-array technology**		
		Start date: Month 04 **End date:** Month 24
No of participating partner(s)	**P4**, P0 (+ subcontractors)	+ *2 sub contractors*

Preceding Years:
The history of the SNP markers development and their failing has been documented under Task 3. No action was possible for fingerprinting, since this would have been based on results of Task 3.

Final Year:
No direct action was possible. Additional activities see WP2, Task 7.

CONCLUSION:
Despite the fact that the screening was not possible as has been planned, there is common sense that SNP markers are the most suitable tool to detect duplicates in collections. The only way is to do another screening by using further sources as has been written in the Action plan for further managing (Annex 7).

• **Task 5: Cluster analysis of garlic and shallot germplasm on the basis of SNP – micro array data**		
		Start date: Month 08 **End date:** Month 24
No of participating partner(s)	**P4,** P0 (+contractors)	

Preceding Years:
This task could not be finalized due to fatal problems in tasks 3 and 4. Fiore garlic, a preliminary cluster analysis had been done, which revealed the problem of clustering of non-related accessions together and real duplicates in different clusters. Since the problems persisted for shallot, the conclusion of all these results led to the stop of the activities, so that no cluster analysis was done for shallot at all.

Final Year:
No direct action was possible. Additional activities see WP2, Task 7.

CONCLUSION:
No results could be obtained due to the failures within subcontracting companies.

• **Task 6: Additional activities at IPK for testing availability of the SNP markers**		
		Start date: Month 29 **End date**: Month 36
No of participating partners	P0	P0 + subcontractors

Preceding Years:
In order to verify the results of the first SNP analysis of garlic accessions, received from Array-On, in a first action additional amplicons of five selected EST's were sequenced. Only for three primers complete reproducibility of the sequencing results were obtained. Of these SNP's results of two primers confirmed those obtained by the initial data set in most cases. The third primer gave different SNP patterns compared to the initial data set. It was found out that, within this primer used for the PCR to detect the SNP, an additional SNP existed, which was situated only four base pairs downstream of the initially detected SNP. Depending on the annealing position of the PCR-primer within the amplicon, a variable SNP position was detected at the end.
The screening for SNP reliability was repeated by using the remaining 17 previously not sequenced SNP markers. It was found out that the reliability of the markers was confirmed in 11 cases only, which means 55 % of the total marker set. Furthermore, the sequences found in the initial analyses for the main garlic set were different to the sequences found in the second test in most cases. This left identity, hence reliability, for two primers only.

Final Year:
After the proof of low reliability of the SNP markers so far obtained, no further action was possible.

CONCLUSION: The markers developed by the laboratories of the external assistance were not able to fulfil their intended task.

• **Task 7: New strategy for molecular characterisation of the core collection**		
Sub-task 7 title:-		**Start date**: Month 29 **End date**: Month 46
	P0	P0

Preceding Years:-

Final Year:

Based on the failure of task 4, the genetic fingerprinting in garlic and shallot using SNP micro-array technology, an alternative screening method was applied that was not included in the project proposal.

New DNA was isolated for 219 garlic accessions and 63 shallot accessions. Implementation details of the analyses were given in the Annual report of year 4.

In general, the neighbour-joining tree of the garlic accessions showed clear clusters of accessions which were sent by the different partners. These well-defined groups correlate mainly with geographic regions from which the materials were collected by the respective genebanks. Within the geographical groups the accession were more or less closely related to each other (Annexes 8 and 9).

In contrast to garlic, the neighbour-joining tree of the 62 analysed shallot accessions (one accession could not be amplified, Annex 10) did not show strong clustering. The genetic diversity is higher and relatively uniformly distributed. The material that originated from the different genebanks is mixed and does not represent such narrow country-specific genotypes like it was found for the garlic accessions. This might indicate a much higher exchange (trade) of shallot accessions between countries during historic times then in garlic, where the materials seem to consist of locally adapted and selected lineages.

CONCLUSION: This tree analysis covers 72.5 % of the EURALLIVEG Core Collection. The substructuring of the species garlic is well reflected by the AFLP tree. There are different parts of clusters showing closer relationships and others with wider distances. However, the method is not able to show real duplicates, as has been expected from using SNP markers. If duplicate screen will be endeavoured (see Action plan for further managing, Annex 7), then real duplicates should be expected rather in the denser parts of the tree.

In the shallot AFLP tree, there are no denser clusters. Rather the branches seem evenly distributed.

• **Task 8: New development of SNP markers**		
		Start date: Month 30 **End date**: Month 46
No of participating partner(s)	**P4** + P0-P6	

Preceding Years:-

Final Year:

In parallel to the AFLP analysis, additional actions were initiated in order to develop a new set of usable SNP markers. On June 26, 2010, DNA isolation was done for 24 selected garlic accessions originated from the German collection. The isolated DNA was given to a new external company (TraitGenetics, Gatersleben, Germany) on June 30, 2010. On September 24, 2010, this company started developing SNP markers. DNA of two garlics and, as a negative control, of two shallot accessions was amplified with 283 primers. For 162 primer pairs (57 %) amplicons were achieved, that were specific for the garlic accessions. In the following step, a total set of the 24 selected garlic accessions was sequenced by using these suitable 162 primer pairs. For 137 primer pairs (85 %) amplicons were amplified for the total set, which then were all sequenced and aligned in order to find polymorphisms which were stable enough and usable as SNP markers. Within the 109 analysed amplicons, 1028 SNP markers were detected.

CONCLUSION: A set of 1028 SNP markers is now available for the screening of the core collection. Due to the end of the project period it was not be possible any more to do the analysis within EURALLIVEG. Further activities are part of the Action plan for managing (Annex 7).

• **Task 9: Writing a paper on molecular screening of European vegetative *Allium* collections**	
Sub-task 9 title:-	**Start date**: Month 30 **End date**: Month 47
No of participating partner(s)	**P4** + P0-P6

Preceding Years:

This task could not be carried out due to fatal problems in tasks 3 and 4.

Final Year: -

CONCLUSION:
After implementation of a new project (see Action plan for managing), a paper will be produced on the new analysis.

Work package number	WP 3	Start date 1-4-2007 End date 31-3-2011	Month 01 Month 48

Work package title: Cryopreservation

No of lead partner	*P1*									
No of participating partners		*P0*	*P1*	*P2*	*P5*					
Total person-months	*304*									

- ***Main objectives***

- **Objective 1:** Routine cryopreservation - long-term storage of *Allium* accessions in ultra-low temperature
- **Objective 2:** Cryopreservation as a part of backbone storage of sound *Allium* accessions
- **Objective 3:** Cryo-knife test for first routine application.
- **Objective 4:** Logistic transfer for safe duplication of cryopreserved *Allium* accessions in the partners' cryobanks

- **Task 1:** Virus eradication by cryo-knife

Start date: Month 01
End date: Month 24

No of participating partners	*P0*	*P1*	*P2*	*P3*	*P5*			

Preceding Years:
Due to the final success rate of cryo-knife amounting to 40 % only and not reaching the 80 % as had been fixed to be the targeted level, it was decided to suspend the activity and to concentrate the efforts on the main virus elimination and cryopreservation. This change did not imply any changes in the financial arrangements within the project.

Final Year: -

CONCLUSION: The action on cryo-knife was stopped after the second project year. A letter had been sent to Mr. Scheele informing about all the problems. As has been learned in international symposia, so far no usable result of cryo knife in garlic (in contrast to other crops) had been published worldwide despite the real expectations in the initial phase of the project. The lost accessions were replaced by 20 more accessions treated according to Task 2 below.

- **Task 2** Cryopreservation of bolting material from bulbils

Start date: Month 01
End date: Month 48

No of participating partners	*P0*	*P1*	*P2*	*P3*				

Preceding Years:
The accumulation of the cryopreserved samples proceeded as presented in the following table:

Year	Bolting*)		Non-bolting*)		%
	achieved	due	achieved	due	
Year 1 (2007/08)	13	30	-	15	28.9
Year 2 (2008/09)	30	50	5	40	38.9
Year 3 (2009/10)	72	68	13	57	68.0
Year 4 (2010/11)	182	118	39	82	110.5

*) Backbone accessions finally added to the bolting and non-bolting material, since the separation of the backbone was a technical means for the project only, which is not relevant any more for the finally stored collection.

This history shows clearly two facts:
- the delay caused mainly by the problems of WP2,
- the weakness of the non-bolting material, which is clearly a material-inherent problem.

Final Year:
See last line of the table above. Details see Annual technical report of the fourth year.

Standard sample definition: A complete sample consists of 100 explants with regeneration better than 30 % in the control or with 200 explants with regeneration between 10 % and 30 % in the control.

CONCLUSION*:* Task 2 is completed. Details about the accessions in the cryopreserved collection see Annex 11. The documentation about the distribution of the regeneration rates is covered in Annex 6.

• **Task 3:** *In vitro* multiplication of non-bolting material for cryopreservation								
							Start date: Month 03 **End date:** Month 48	
No of participating partners	*P0*	*P1*	*P2*	*P4*				

Preceding Years:
Altogether, between 36 and 48 accessions were permanently cultivated for micropropagation in order to provide source material for cryopreservation of non-bolting material.

Final Year:
A number of 18 accessions were cultivated. The remaining material will be treated according to the Action plan of further management (Annex 7) on the own costs of the partners.

CONCLUSION*:* The task 3 was completed as planned. As a conclusion can be stated that *in vitro* multiplication needs to be relatively high in order to get enough usable material for cryopreservation. So far, it is the bottleneck for non-bolting garlic.

• **Task 4:** Cryopreservation of non-bolting garlic from *in vitro* culture								
							Start date: Month 04 **End date**: Month 48	
No of participating partners	*P0*	*P1*	*P2*					

Preceding Years:
Summarised history see task 2.

Final Year:
See Table in Task 2.

Standard sample definition: see Task 2.

CONCLUSION:
In detail, the bolting accessions are more than planned, and in non-bolting and the back bone collection, the figures could not be reached. This is mainly caused by following technical problems: 1) the personnel were occupied by the efforts to rescue the failing molecular marker analysis in the lab of P0, 2) some personnel problems in P1 and some technical problems in P2. There are also biological reasons: The *in vitro* growth and development is much weaker and slower in non-bolting material, and in respect to growth after meristem culture, it was observed that the plant material was slower than expected. This concerns especially the southern material, i.e. accessions from Italy and France.

A total number of 220 accessions were cryopreserved in liquid nitrogen (Annexes 11-12). Of this total number, cryopreservation was finalised in 182 bolting and 38 non-bolting accessions. The documentation about the distribution of the regeneration rates is covered in Annex 6.

• **Task 5:** Cryopreservation as a part of backbone storage of sound *Allium* accessions								
							Start date: Month 25 **End date**: Month 48	
No of participating partners	*P0*	*P1*	*P2*					

Preceding Years:
As characterized for the virus elimination (WP4), the development after meristem culture was much slower than expected. This influenced the establishment of the backbone accessions fundamentally. Therefore, in the first three years only one backbone accession could be completed.

Final Year:
Four backbone accessions are completely in cryopreservation (P2).
Again, cryopreservation of backbone subset suffered from the much weaker growth of regenerants than had been expected initially. This concerns mainly material from P5. Two of the accessions were sent to the partners by P3 in January 2011 only. Three accessions were lost on the postage. Repetition of the procedure with this material was not successful.

CONCLUSION: The initial aim of creating a "Backbone subset" was to demonstrate that the sequence of meristem culture → virus test → limited micropropagation → cryopreservation is a feasible strategy. This set was fixed to 25 accessions in order to be sure that we will have enough material to pass this sequence. We were successful in 4 accessions (see Annex 13). This means the task has been fulfilled in principle, though not with the number targeted, which is due to the slower than expected growth. The conclusion is that the sequence can be planned as earlier assumed.

• **Task 6:** Logistic transfer for safe duplication of cryopreserved *Allium* accessions in the partners' cryobanks								
							Start date: Month 25 **End date**: Month 48	
No of participating partners	*P0*	*P1*	*P2*					

Preceding Years:
For financial and organizational reasons, the consortium decided to transport all the material together in a final action following a black box regime (see Technical report of the third year).

Final Year :
The safety duplication action has been implemented on the base of own transportations. The action was performed, using a car from the Olomouc station of CRI.

This concerns the following material
- 185 cryotubes of 31 accessions to be consigned by P0 to P1;
- 175 cryotubes of 34 accessions to be consigned by P0 to P2;
- 200 cryotubes of 57 accessions to be consigned by P1 to P0;
- 150 cryotubes of 51 accessions to be consigned by P1 to P2;
- 165 cryotubes of 31 accessions to be consigned by P2 to P0;
- 145 cryotubes of 27 accessions to be consigned by P2 to P1;

The detailed lists of exchanged material are given in Annex 14.

A consignment agreement has been drafted which is added in Annex 15.

CONCLUSION: The task is fulfilled.

Work package number	WP 4	Start date 1-4-2007 End date 31-3-2011	Month 01 Month 48

Work package title: Virus elimination

No of lead partner	*P3*									
No of participating partners		*P0*	*P1*	*P2*	*P5*					
Total person-months	*61*									

- ***Main objectives***

- **Objective 1:** Coordinate and realise the work on virus elimination from garlic collections held by the genebanks of P0, P1, P2, P3, and P5.

- **Objective 2:** The aim is to have the most important material virus-free to constitute the Core-in-Core Collection.

- **Task 1:** Sampling and sending fresh garlic bulbs and bulbils of each participating partner

Start date: Month 01
End date: Month 12

No of participating partners	*P0*	*P1*	*P2*	*P3*	*P5*			

Preceding Years:
At the start of the Project, 5 Czech Republic and 5 Polish most appropriated accessions (MAA) were sent by P1 and P2 to UNIBAS (P3). The sampling and sending of MAA from the rest of the Partners to UNIBAS were completed by the end of July 2007. In total 25 MAA garlic were received by UNIBAS which constituted the Backbone subset. Due to the weak performance of some accessions changes needed to be done in special cases.

Final Year : -
Altogether 5 accessions have been exchanged in comparison to the initial list. The final composition of the backbone collection is given in Annex 16.

CONCLUSION: Since the performance of the special accessions can only be recognised during the implementation process and never completely predicted before, it will always be necessary to update accession lists of a collection until the final state, when a project will be finished.

- **Task 2** Preliminary ELISA Test on sent material

Start date: Month 06
End date: Month 22

No of participating partners	*P30*							

Preceding Years:
At the end of September 2007, the preliminary ELISA test were done on all material sent by partners to UNIBAS. At the end of November, the first ELISA test for each 5 important garlic viruses (OYDV, LYSV, GCLV, SLV and GarV A-B-C-D). The first material (acc. 1-5) for ELISA test on plantlets was prepared. The green parts of young growing plantlets were cut and than homogenised for ELISA test. The half basal parts of plantlets were transferred into new tubes.

Final Year: -

CONCLUSION: Completed in year 2.

• **Task 3:** Meristem culture for backbone subset of 25 accessions								
							Start date: Month 06 **End date**: Month 40	
No of participating partners	*P3*							

Preceding Years:
The main bulk had been completed in the third year. However, 3 accessions were lost on the transportation (see Task 4).

Final Year:
The meristem culture was continued in regard of some necessary changes of the accessions. For the 3 Czech accessions, lost during multiplication phase, it was needed to make again meristem culture and test the obtained plantlets by ELISA. No plantlet was virus-free.

CONCLUSION: Since it was found that the micropropagation (Task 4) was too slow immediately after meristem culture and, therefore, not enough material could be derived for sending, it was concluded to increase the frequency of meristem cultures in order to get more virus free material in the initial state.

• **Task 4:** Micropropagation and ELISA testing of the backbone accessions								
							Start date: Month 06 **End date**: Month 46	
No of participating partners	*P3*							

Preceding Years:
According to the results, the still virus-infected plantlets were eliminated and the virus-free plantlets were multiplied. Finally, the recovered plantlets were prepared for the second test ELISA. After micropropagation, the virus-free plants were sent to the partners for cryo-storage. The virus-free plants (acc. 09H0100056, 09H0100488 and 09H0100492 [total numbers of tubes 16]) were sent to P1 on March 28, 2008 for cryo-storage. The got lost during transportation due to breaking of the tubes. At the end of the second year the virus-free plants were sent for cryo-storage to partners as follows:

Acc. N.	Sent to	Date	Plant. N.
ALL 0852	P0	15.07.08	18
Ail 005	P1	01.10.08	15
CV100024	P2	03.12.08	6
225386 (69 K)*****	P2	03.12.08	15
ALL 0839	P0	02.04.09	8
225752 (419 K)	P2	02.04.09	15
225804 (438 K)*****	P2	02.04.09	15
225798 (1021 K)*	P2	02.04.09	9

*Polish accession included in the Backbone set because the plantlets obtained are virus-free for all 5 viruses (OYDV, LYSV, GCLV, SLV and GarV A-B-C-D).

At the end of the third year the virus-free plants were sent for cryo-storage to partners as following:

Acc. N.	Sent to	Date	Plant. N.
09H0101168	P1	25.05.09	15
ALL 0218	P0	25.05.09	11
225593 (0180 K)*	P2	20.10.09	17
Ail 011*	P2	09.11.09	12
ALL 0100*	P0	10.11.09	15
CV100003	P0	10.11.09	12
ALL 0754*	P0	24.02.10	11
09H0100781	P1	24.02.10	10
Ail 008	P1	24.02.10	13
225778 (1011 K)*	P2	01.03.10	8
Ail 020*	P2	01.03.10	11

* Accession temporarily included in the Backbone subset because the plantlets obtained are virus-free for only 4 viruses (OYDV, LYSV, SLV and GarV A-B-C-D).

Final Year :
The virus-free plants were sent for cryo-storage to partners as following:

Acc. N.	Sent to	Date	Plant. N.
ALL 0506	P0	14.09.10	15
ALL 0518	P0	20.01.11	3
CV100012	P0	14.09.10	7
CV100018	P0	14.09.10	12
CV100053	P0	14.09.10	8
Ail 001	P1	20.01.11	4

The final situation of Backbone subset is shown in Annex 16.

CONCLUSION: In 22 of 25 accessions virus-free material has been obtained. The loss of material of three accessions during transportation induced the recommendation not to send all material in one package but retain a part of the sample until the confirmation of safe arrival would have been sent from the consignee of the material. For the three Czech accessions, lost during multiplication phase (09H0100056, 09H0100488, 09H0100492), no plantlet could be made virus-free after meristem culture. Thus, they could not be re-installed in the frame of the project.

• **Task 5:** Meristem culture for routine virus elimination								
						Start date: Month 25 **End date**: Month 48		
No of participating partners	*P3*							

Preceding Years:
The routine virus elimination is confined on the 2 main viruses only (onion yellow dwarf virus [OYDV] and leek yellow stripe virus [LYSV]).
Batches 1-3: In total 25 accessions of the routine virus elimination were received by UNIBAS which constitute the batches 1-3 (30 accessions).
Batches 4-7: In total 27 accessions for routine virus elimination were received by UNIBAS which constitute the batches 4-7 (40 accessions).
Of the received accessions meristem cultures were initiated.

Final Year:
Batches 1-3: Of 30 planned accessions, meristem culture of 20 accessions has been established (67 %). Of 4 non-bolting accessions belonging to P0, no material could be sent. Of 6 accessions of P2, no meristem culture could be established (see Annex 17).
Batches 4-7: Of 40 planned accessions, meristem culture of 31 accessions has been established (77.5 %). Of 5 non-bolting accessions belonging to P0, no material could be sent (see Annex 18).
Batch 8: In total 7 of 10 accessions were received by P3. The meristems were excised from each bulbs or bulbils of all 7 accessions. The remaining 3 were not sent from P0 to P3 (70 %) (see Annex 19).

CONCLUSION: In total, of 58 accessions meristem cultures were freed from the 2 main viruses and have been sent to the partners.

• **Task 6:** Micropropagation of the routine virus elimination and ELISA testing.									
								Start date: Month 25 **End date**: Month 48	
No of participating partners	*P3*								

Preceding Years:
The earlier sending of material to the partner was implemented as follows

Acc. N.	Send to	Date	Plant. No.
225390 (70K)	P2	03.12.08	15
CV100038	P0	03.08.09	12
225420 (42 K)	P2	03.08.09	15
ALL 0493	P0	24.02.10	7
09H0100983	P1	24.02.10	11
09H0100784	P1	24.02.10	16
09H0100787	P1	04.03.10	12
09H0100788	P1	04.03.10	14

When it became obvious that not all accessions envisaged for the backbone subset could be totally freed from viruses, the strategy was changed to test all material for five viruses in order to find new accessions, which could be transferred into the backbone subset from the routine virus elimination. The treatments were the same as described in tasks 2 and 3.
Virus-free in vitro plants, which were found only free of OYDV and LYSV were transferred into the routine virus list. Then, they were sent to each partner.

Final Year:
Batches 1-3: Of 20 tested accessions, a number of 17 (= 85 %) had been successfully freed from viruses.The *in vitro* plants of all 17 accessions were sent for multiplication to the partners. The final situation of batches 1-3 is shown in Annex 17.
Batches 4-7: Of 25 tested accessions, a number 13 accessions (=52 %) were sent for multiplication to partners. Because of lack of test kits, 4 remaining accession could not be tested any more. The final situation of batches 4-6 is shown in Annex 18.
Batch 8: A number of 7 accessions were transferred to *in vitro* culture. However, the batch could not be finished. The final situation of batch 8 is shown in Annex 19.

CONCLUSION: As written in Task 3, the relations between frequency of meristem cultures and micropropagation should be changed in any future actions, since micropropagation is very slow in the first phases after regeneration from meristems. It is more useful to make more meristem cultures and reduce the micropropagation phases.

• **Task 7: Field performance tests of virus-free material**									
								Start date: Month 42 **End date**: Month 48	
No of participating partner	*P3*								

Preceding Years: The task 3 is not yet started.

Final Year:
The non-achievement of this task is due to the low number of available plantlets (only one Polish accession comprising 50 plantlets) and also because the acclimatization of the plantlets was not possible to start before February 2011 in open field under the Italian weather conditions (frost damages can frequently occur in early spring). The *in vitro* plantlets of Polish accession 225804, belonging to the Backbone subset, were sent by P2 to P3 on 21.09.10 and transferred to tubes as soon as the weather conditions sufficiently improved. The acclimatisation phase in the greenhouse was started on 20. February 2011, when the weather is generally better in Southern Italy. The medium was removed from roots of garlic plantlets with sterile water. The plantlets were put into fungicide solution. Thereafter, they were planted to small pots with sterile soil and kept in

greenhouse for the acclimatisation phase. After 20 days more (12 March 2011), each plantlet, which was in a good condition, was moved into an intermediate pot (20 cm upper diameter) filled with fertilized soil (nitrogen, phosphorus and potassium were added) and transferred into open field under a net to prevent aphid colonisation and new virus infection. So in the field, a block design was arranged consisting of 50 pots having 1-2 young plants each, which were observed during the growth phases.
At the end of the EURALLIVEG Project (31 March 2011), the plantlets were just moved into in open field. They were then in the establishment period showing a small growth ratio. During the growth phase good agronomic practices were followed (drip irrigation, fertilization, weed control etc.) and some observations and data were collected. Furthermore, some results (number of leaves per plant, plant height and leaf colour) were reported as presented in the in the following table. The trial will continue till bulb formation and maturation.

Traits observed in open field (15 July 2011)

Traits	Plant																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Leaves (n.)	5	9	9	6	6	10	8	8	9	7	5	9	8	9	8	10	6	5	7	6
Plant height (cm)	36	53	52	37	34	50	55	45	51	50	36	47	48	49	57	43	47	35	53	48
Leaves colour (1)																				

Traits	Plant																			
	21	22	23	24*	25*	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Leaves (n.)	10	9	7	8	8	11	9	8	5	12	9	7	8	15	7	5	5	5	10	8
Plant height (cm)	49	47	33	51	57	57	43	51	29	50	49	47	42	62	34	34	37	37	55	46
Leaves colour (1)																				

Traits	Plant									
	41	42	43	44	45	46	47	48	49	50*
Leaves (n.)	9	8	11	7	9	4	7	8	8	6
Plant height (cm)	40	46	52	34	41	29	41	55	43	45
Leaves colour (1)										

(*) Plant with stem
(1): green = 1, pale green = 2, very green = 3.

CONCLUSION: The task 4 is not completed. Further measures will be done on the own costs of UNIBAS. Preliminary results will be completed in the next summer (see Action plan for further managing, Annex 7).

Work package number	WP 5	Start date 1-4-2007 End date 31-3-2011	Month 01 Month 48

Work package title: Documentation										
No of lead partner	*P0*									
No of participating partners		*P1*	*P3*	*P4*						
Total person-months	*10*									

- ***Main objectives***

Objective 1: Effective management of the project.

- **Task 1:** Organization of project and WP meetings

Start date: Month 02
End date: Month 48

No of participating partners	*P0*	*P1*	*P2*	*P3*	*P4*	*P5*	*P6*	

Preceding Years:
The following meetings were performed

- 12.-13.4.2007 Startup meeting – Gatersleben, Germany
- 6. 3. 2008 WP leaders meeting – Wageningen, Netherlands
- 8. – 9. 7. 2008 Second Annual project meeting – Potenza, Italy
- 4. 12. 2008 Work Package 3 Meeting – Prague, Czech Republic
- 27. 1. 2009 Work Package 2 Meeting – Gatersleben, Germany
- 20. 10. 2009 Work Package 3 Meeting – Skierniewice, Poland
- 9. – 10. 3. 2010 Third Annual Project Meeting – Skierniewice, Poland

Final Year:
The final project coordination meeting including a press conference was organised in Prague at CRI on March 1, 2011 A workshop on the results and aspects interesting for other parties was held on March 2, also in CRI. All interested partners participated in both meetings. All topics were discussed intensively. Many suggestions for future developments were given in the various discussions.

CONCLUSION: Task 1 is completed.

- **Task 2:** Development and implementation of the project website

Start date: Month 01
End date: Month 48

No of participating partners	*P0*	*P1*	*P2*	*P3*				

Preceding Years:
The EURALLIVEG website http://euralliveg.ipk-gatersleben.de/ was already developed in the first three months and routinely updated especially on the internal site.

Final Year:
The website has been regularly updated.

CONCLUSION: The website will be continued at least for ten years (see Action plan for further managing).

• **Task 3:** Training courses								
							Start date: Month 01 **End date**: Month 13	
No of participating partners	*P0*	*P1*	*P2*					

Preceding Years:
The following training courses have been performed:
- 16. – 27. 4. 2007 Training of Marta Olas (P2) in the laboratory of P0. Subject: Basic techniques of cryopreservation
- 21.5. – 1.6. 2007 Training of Luciana Altieri (P3) in the laboratory of P0. Subject: Basic techniques of meristem culture and ELISA testing
- 31.3. – 4.4. 2008 Training of Renata Kotkova (P1) in the laboratory of P0. Subject: Basic techniques of cryopreservation

Final Year:
No training course performed.

CONCLUSION: Completed in years 1 and 2 according to schedule.

• **Task 4:** Promote information flow between partners and contacts with the Commission								
							Start date: Month 01 **End date**: Month 48	
No of participating partners	*P0*							

Preceding Years:
After the quick start of the project using the Start-up meeting, the progress of the project was slow in the beginning due to several technical and personnel problems as has been reported. Therefore additional meetings were organised (see Task 1), which was the reason to skip the travel activities of the coordinator to the various partners (as has been envisaged in the project document). The offer to use a forum part in the internal website was not used. Later on, intensive information exchange developed with most partners. This was especially useful in the case of problems with molecular markers analyses and the establishment of the EURALLIVEG draft catalogue, where sending of tables, schemes and detailed data were performed. All information channels were used especially emails and telephone. There was a helpful permanent contact with the EU Commission, especially with Mr. Olivier Diana and Mr. Peter Hirschfeld.

Final Year:
Mr. Diana participated in the final project meeting and gave valuable suggestions continuing the good contacts of the first years.
The final project meeting and workshop were well organised and fulfilled their function to bring the colleagues together for exchanging further impulses and adjustment of future strategies. A special website had been established for this final action.

CONCLUSION: The special feature of this project was the very high integration level due to the direct exchange of materiel on which several partner worked until the establishment of the EURALLIVEG Core Collection. This required a very high level of commitment and consequent and quick reactions.

Overview of deliverables

Deliverable number	*Planned completion*	*Description*	*Status*		
			Achieved	*Duration*	
				Start date	*End date*
D01	**Month 03**	**Prioritised structure documentation of the European garlic and shallot collections**	**x**	**Month 01**	**Month 03**
D02	**Month 18**	**European Garlic Core Collection**	**X**	**Month 03**	**Month 46**
D03	**Month 25**	**European Shallot Core Collection**	**X**	**Month 19**	**Month 46**
D04	**Month 44**	**Virus-free garlic Core-in-Core Collection**	**X**	**Month 37**	**Month 48**
D05	**Month 44**	**Field-performance documentation of virus-free garlic accessions**		Not achieved	
D06	**Month 46**	**Regeneration rates documentation of the cryopreservation treatments**	**X**	**Month 46**	**Month 48**
D07	**Month 48**	**Tripartite Cryo-Genebank of garlic documentation**	**X**	**Month 37**	**Month 48**
D08	**Month 48**	**Data contribution to the European *Allium* Database**	**X**	**Month 48**	**Month 48**
D09	**Month 48**	**Action plan for further managing the EU *Allium* collection in the years 2011-2021**	**X**	**Month 42**	**Month 48**
D10	**Month 09**	**Report (workshop) on the screening of ca. 800 garlic accessions for duplicate screening (first batch)**	Data obtained proved to be unreliable		
D11	**Month 12**	**Report on the screening of ca. 800 garlic accessions for duplicate screening (second batch)**	Data obtained proved to be unreliable		
D12	**Month 19**	**Report on the screening of ca. 550 shallot accessions for duplicate screening**	Data obtained proved to be unreliable		
D13	**Month 20**	**Paper on the rationalisation of EU vegetative *Allium* germplasm using molecular markers**	**-[1]**	**Month 29**	**Month 46**
D14	**Month 12**	**Report on cryopreservation of 45 accessions routine and 10 accessions cryo-knife**	**-[2]**	**Month 01**	**Month 24**

D15	**Month 24**	**Report on cryopreservation of 45 accessions routine**	**X**	**Month 18**	**Month 48**
D16	**Month 36**	**Report: cryopreservation of 20 accessions routine, 25 backbone subset, 10 acc. cryo-knife**	**-[2]**	**Month 36**	**Month 48**
D17	**Month 48**	**Report on cryopreservation of 45 accessions routine**	**X**	**Month 38**	**Month 48**
D18	**Month 48**	**Report on results of the cryo-knife method (20 accessions)**		**Month 01**	**Month 24[2]**
D19	**Month 48**	**Summarising contribution to the final project report provided**	**X**	**Month 48**	**Month 48**
D20	**Month 04**	**Documentation on the initial virus screening of the backbone subset**	**X**	**Month 06**	**Month 22**
D21	**Month 15**	**Virus-free material of the backbone collection identified and sent to the partners**	**X**	**Month 06**	**Month 46**
D22	**Month 24**	**Virus-free material of routine batches 1 to 3 identified and sent to the partners**	**X**	**Month 25**	**Month 43**
D23	**Month 36**	**Virus-free material of routine batches 4 to 7 identified and sent to the partners**	**X**	**Month 36**	**Month 46**
D24	**Month 39**	**Virus-free material of routine batch 8 identified and sent to the partners**	**-[3]**	**Month 36**	**Month 48**
D25	**Month 46**	**Report on field performance of virus-free material completed**	**-[3]**	**Month 42**	**Month 48**
D26	**Month 46**	**Documentation on the safety re-test of the backbone subset**		**Not achieved**	
D27	**Month 02**	**EURALLIVEG website started**	**X**	**Month 01**	**Month 01**
D28	**Month 13**	**First annual project report**	**X**	**Month 12**	**Month 14**
D29	**Month 25**	**Second annual project report**	**X**	**Month 26**	**Month 26**
D30	**Month 37**	**Third annual project report**	**X**	**Month 36**	**Month 38**
D31	**Month 48**	**Final annual project report, final project report and workshop**	**X**	**Month 48**	**Month 51**

Remarks: 1: Partly achieved: Since SNP data proved to be unreliable, later analyses by AFLP were used to describe the collection assembled on the base of morphological and passport data**. 2:** Partly achieved: Cryo-knife terminated after obtention of unsufficient rates **3:** Partly achieved

Overview of milestones

Milestone number	*Planned completion*	*Description*	*Status*		
			Achieved	*Duration*	
				Start date	*End date*
M01	**Month 01**	**Selection of the data sets of the European *Allium* Database with respect to known duplications completed**	**X**	**Month 01**	**Month 01**
M02	**Month 02**	**Definition of the Most Appropriate Accession conditions and their definition in the collection agreed**	**X**	**Month 01**	**Month 02**
M03	**Month 10**	**Documentation of the Garlic Bolting Core Collection completed**	**X**	**Month 10**	**Month 46**
M04	**Month 14**	**Documentation of the Garlic Non-bolting Core Collection completed**	**X**	**Month 10**	**Month 46**
M05	**Month 24**	**Documentation of the Shallot Core Collection completed**	**X**	**Month 19**	**Month 46**
M06	**Month 43**	**Documentation of the virus-free garlic Core-in-Core Collection completed**	**X**	**Month 37**	**Month 48**
M07	**Month 45**	**Documentation on field performance of virus-free garlic completed**		**Not achieved**	
M08	**Month 45**	**Documentation on genotype-dependent regeneration from cryopreservation completed**	**X**	**Month 46**	**Month 48**
M09	**Month 47**	**Documentation of the Tripartite Garlic Cryobank including safety duplication completed**	**X**	**Month 37**	**Month 48**
M10	**Month 48**	**Final update information for the European *Allium* Database**	**X**	**Month 48**	**Month 48**
M11	**Month 48**	**Action plan for further *Allium* management completed**	**X**	**Month 42**	**Month 48**
M12	**Month 01**	50 unique garlic accessions sent to the partners	**-**[1]	**Month 01**	**Month 01**
M13	**Month 05**	**20 highly informative SNP markers available for garlic screening**	**X**	**Month 02**	**Month 08**
M14	**Month 07**	**Fingerprinting 800 garlic accessions using SNP micro-array technology (first batch)**	**X**	**Month 09**	**Month 15**

M15	**Month 08**	**Duplicate screening/Cluster analysis on first 800 fingerprinted garlic accessions**	**X**	**Month 20**	**Month 22**
M16	**Month 09**	**Fingerprinting 800 garlic accessions using SNP micro-array technology (second batch)**	**X**	**Month 17**	**Month 20**
M17	**Month 11**	**Duplicate screening/Cluster analysis on second 800 fingerprinted garlic accessions**		**Not achieved[2]**	
M18	**Month 15**	**20 highly informative SNP markers available for shallot screening**	**X**	**Month 13**	**Month 18**
M19	**Month 17**	**Fingerprinting 550 shallot accessions using SNP micro-array technology**	**X**	**Month 19**	**Month 27**
M20	**Month 18**	**Duplicate screening/Cluster analysis on 550 fingerprinted shallot accessions**		**Not achieved[2]**	
M21	**Month 21**	**Final documentation on the core collections distributed to the partners**	t	**Not achieved[2]**	
M22	**Month 05**	**Cryopreservation of 10 accessions for virus eradication by cryo-knife completed**		**Month 01**	**Month 24[3]**
M23	**Month 06**	**Cryopreservation of 30 accessions of bolting garlic completed**	**X**	**Month 01**	**Month 24**
M24	**Month 07**	**15 accessions propagated *in vitro* of non-bolting garlic for cryopreservation**	**X**	**Month 03**	**Month 12**
M25	**Month 12**	**Cryopreservation of 15 accessions non-bolting garlic completed**	**X**	**Month 20**	**Month 38**
M26	**Month 18**	**Cryopreservation of 20 accessions of bolting garlic completed**	**X**	**Month 25**	**Month 30**
M27	**Month 19**	**25 accession propagated *in vitro* of non-bolting garlic for cryopreservation**	**X**	**Month 13**	**Month 25**
M28	**Month 24**	**Cryopreservation of 25 accessions non-bolting garlic completed**	**X**	**Month 38**	**Month 48**
M29	**Month 24**	**Safety duplication of first set of accessions completed, number dependent on regeneration results**	**X**	**Month 25**	**Month 48[4]**
M30	**Month 26**	**Cryopreservation of 10 accessions for virus eradication by cryo-knife completed**		**Not achieved[3]**	
M31	**Month 27**	**Cryopreservation of 12 accessions of the backbone subset completed**	**-[1]**	**Month 40**	**Month 48**
M32	**Month 30**	**Cryopreservation of 10 accessions of bolting garlic completed**	**X**	**Month 28**	**Month 34**

M33	**Month 31**	**10 accessions propagated *in vitro* of non-bolting garlic for cryopreservation**	**X**	**Month 25**	**Month 48**
M34	**Month 36**	**Cryopreservation of 13 accessions of the backbone subset completed**		**Not achieved**	
M35	**Month 36**	**Cryopreservation of 10 accessions non-bolting garlic**		**Not achieved**	
M36	**Month 41**	**Cryopreservation of 20 accessions for virus eradication evaluated**		**Not achieved[3]**	
M37	**Month 42**	**Cryopreservation of 30 accessions of bolting garlic completed**	**X**	**Month 36**	**Month 48**
M38	**Month 43**	**15 accessions propagated *in vitro* of non-bolting garlic for cryopreservation**	**X**	**Month 25**	**Month 48**
M39	**Month 47**	**Cryopreservation of 15 accessions of non-bolting garlic completed**		**Not achieved**	
M40	**Month 47**	**Safety duplication of second set of accessions completed, number dependent on regeneration results**	**X**	**Month 48**	**Month 48**
M41	**Month 48**	**Cryopreservation course offered to partners interested in cryopreservation (e.g. P5)**		**Not achieved**	
M42	**Month 02**	**Introductory training course of technical staff finished**	**X**	**Month 01**	**Month 13**
M43	**Month 03**	**Initial virus test of 25 backbone accessions completed**	**X**	**Month 01**	**Month 22**
M44	**Month 08**	**Meristem culture for backbone subset of 25 accessions completed**	**X**	**Month 06**	**Month 40**
M45	**Month 12**	**Meristem culture for routine virus elimination batches 1-3 completed (30 accessions)**	**-[1]**	**Month 06**	**Month 43**
M46	**Month 14**	**Backbone subset virus screening of 25 accessions completed**	**X**	**Month 06**	**Month 48**
M47	**Month 23**	**Virus screening for routine virus elimination batches 1-3 completed (30 accessions)**	**X**	**Month 19**	**Month 43**
M48	**Month 24**	**Meristem culture for routine virus elimination batches 4-7 completed (40 accessions)**	**X**	**Month 34**	**Month 37**
M49	**Month 27**	**Meristem culture for routine virus elimination batch 8 completed (10 accessions)**	**X**	**Month 44**	**Month 47**
M50	**Month 35**	**Virus screening for routine virus elimination batches 4-7 completed (40 accessions)**		**Month 01**	**Month 46**
M51	**Month 38**	**Virus screening for routine virus elimination batch 8 completed (10 accessions)**		**Not achieved**	

M52	**Month 43**	**Field performance tests of virus-free material completed (40 accessions)**		**Not achieved**	
M53	**Month 45**	**Report on results of the field performance of virus-free indigenous material completed**		**Not achieved**	
M54	**Month 45**	**Virus re-test of the backbone collection completed (25 accessions)**		**Not achieved**	
M55	**Month 47**	**Summarising contribution to the final project report provided**	**X**	**Month 48**	**Month 48**
M56	**Month 01**	**Detailed workplan of the project defined at the start-up meeting of the project**	**X**	**Month 01**	**Month 01**
M57	**Month 02**	**Project website implemented**	**X**	**Month 01**	**Month 01**
M58	**Month 12**	**First annual project report implemented via internet and mailing contacts**	**X**	**Month 12**	**Month 14**
M59	**Month 13**	**First annual project report submitted to the European Commission**	**X**	**Month 14**	**Month 14**
M60	**Month 18**	**Annual project meeting performed**	**X**	**Month 17**	**Month 17**
M61	**Month 24**	**Second annual project report implemented via internet and mailing contacts**	**X**	**Month 24**	**Month 26**
M62	**Month 25**	**Second annual project report submitted to the European Commission**	**X**	**Month 26**	**Month 26**
M63	**Month 34**	**Annual project meeting performed**	**X**	**Month 36**	**Month 36**
M64	**Month 36**	**Third annual project report implemented via internet and mailing contacts**	**X**	**Month 36**	**Month 38**
M65	**Month 37**	**Third annual project report submitted to the European Commission**	**X**	**Month 38**	**Month 38**
M66	**Month 45**	**Final project meeting and workshop presenting the results of the project connected to this meeting to disseminate information of the project to interested parties**	**X**	**Month 48**	**Month 48**
M67	**Month 48**	**Fourth annual project report and the final overall report submitted to the European Commission**	**X**	**Month 51**	**Month 51**

Remarks:

1: partly achieved

2: Screening not performed because of the negative results of the first garlic screening.

3: Cryo-knife terminated after obtention of unsufficient rates

4: According to the consortium's decision, the safety duplications were merged to one action at the end of the project.

Detailed comparison of the milestones & deliverables foreseen and the achieved milestones & deliverables

WP 1

Deliverables:
Deliverable D05 cannot be achieved during the project period, because the field test will be performed after the project by the own costs of P3.

Milestones
Milestone M07 could not be completed in the project period. It will be finalized by P3 on own costs of UNIBAS.

WP2

Deliverables:
Deliverables D12 and D13 will never be achieved as no reliable SNP fingerprinting data have been obtained.

Milestones:
Milestones M20 and M21 can not be performed as any reliable SNP fingerprinting data have been obtained.

WP3

Deliverables:
Since the cryo-knife method has been terminated early (see report year 3), because of too weak results, a report about success of the method could not be provided.

Milestone:
The cryo-knife method revealed to be too weak for getting results in the project. Therefore, it has been terminated after the first tests. This concerns Milestones M22, M30 and M36.
Due to the weak growth of the plantlets, the non-bolting accessions were only partly fulfilled. This concerns a part of M27 and M28 and, entirely, M33 and M36 as well as M38 and M39.
Also the backbone set has been influenced by this weak growth. This concerns partly M31 and, entirely, M34.

WP4

Deliverables:
Deliverable D25 cannot be achieved during the project period, because the field test will be performed after the project by the own costs of P3.
Deliverable D26 could not be provided. The reason for that is the very weak growth of the regenerants after meristem culture as reported in task 4 of WP 3. This forced us to sample all the material for multiplication followed by cryopreservation, and no additional material left for a final re-rest.

Milestones:
Milestones M52 and M53 could not be completed in the project period. It will be finalized by P3 on own costs of UNIBAS.
Milestone M54: Because all material was concentrated on cryopreservation, due to the low number of plantlets obtained, the re-test could not be performed.

4. TECHNICAL PROBLEM(S) ENCOUNTERED (IF ANY)

- **Technical problem(s) and solution(s)**

Preceding Years:

WP2: Fatal technical problems have occurred which resulted in the failure of this WP. The technical problems occurred at the two subcontractors of this WP, namely Array-On and Gen-X-Pro, both located in Germany. Due to the tight financial budget of the project it was not possible anymore to perform a second round of developing SNPs and micro-array screening at another company. Strong efforts to rescue at least a part of the results influenced also the implementation of the other workpackages.

WP3: P0 was influenced by a change of the garlic field within the long years fixed schedule to rotate ever forth year, which reduced the available source material. In P1 start of employing technical personnel was delayed because of changes in the structure and affiliation of the institute which brought about budget problems. There was the need to improve the *in vitro* multiplication phase preceding cryopreservation. Therefore, additional training was necessary to improve the situation. Complication appeared with respect to the cryo-knife technology in several aspects: virus detection problems of RT-PCR, solved by the switch to ELISA technique, and finally too weak growth of plantlets *in vitro*, which did not reach the prescribed success rates. This led to the conclusion to terminate this parameter. In P2, ordering and purchasing basic laboratory material and technical equipment necessary for cryopreservation needed more time than expected in the beginning. A general problem was the existence of covert bacteria, which influenced all steps and the final results of cryopreservation. This was especially prominent in non-bolting material. Reduction in the duration of the alternating temperature preculture was decided to speed up the procedure and, therefore, reduce the accumulation of bacteria. Cases of dormancy, especially in southern accessions influenced both this WP and also WP4.

WP4: P3 was faced by technical problems of the running equipment (growth chamber) and suffered from non-optimal laboratory conditions. New laboratory rooms were available from the second year only. The various virus were differently easy to freed of. Thus, the allexi virus group was so persistent that it could not be eliminated in many cases. A change of the strategy was decided with respect to the routine and the backbone subsets. A flexible approach was followed first to test on all viruses and then to arrange the products with either routine or backbone after receiving the virus test results. This was necessary to obtain sufficient material for the backbone subset. Furthermore, the relation between the number of meristems isolated and the subsequent micropropagation was changed in favour of the meristem amount (see WP4, Task 6).
The danger of destruction on the postage way, having occurred in one of the sendings, led to the conclusion to split the accessions into two sets preserving a number of about three plantlets to be sent after receipt of the message, that the first set would have been intact, and to be multiplied further, when the first set had been destroyed upon sending. As a further consequence of the delay in virus elimination, it was not possible to conduct field tests on performance of virus-free material with the envisaged number of accessions. Only one Polish accession could be introduced into a test which will be performed by P3's own expenses in the next years (see Further action plan of managing – Annex 7).

Final Year:

WP2: Two different small analyses could be performed with the remaining budget. The first one, using AFLP markers, included 214 garlic and 62 shallot accessions and gave an overview over the general grouping and relations in this limited set. Whereas the distribution of the shallots was rather uniform, the heterogeneous density in the garlic grouping showed at least a possible way where duplicates could be expected. The second analysis was performed to prove the reliability of SNP analyses in a small set of 24 accessions confirming the usefulness of this kind of markers for further analyses. This caused an additional workload to the personnel, which had not been envisaged before.

WP3: Despite strong efforts to regain the backlog caused by the starting problems the number of non-bolting accessions could not be attained by any of the partners. This is mainly due to the unexpectedly slow growth of non-bolting material, which was clearly weaker than the bolting one. This weakness was also a possible reason for higher covert contamination levels in this material or the result of it. Therefore, the planned number of 200 accessions for the cryopreserved collection could only be reached by including more bolting material.
WP4: The problems characterised for the preceding years perpetuated also in the year 4.

CONCLUSION:

The most important factor was the delay of all the technical work steps caused by the failure of the molecular analyses due to inappropriate work of the external assistance laboratory. The second problem was the significantly weaker development of non-bolting garlic accessions, which was not foreseen. Two components were reasons for this weakeness: presence of covert bacteria and growth patterns, which included a higher level of dormancy. This weakness resulted in lower regrowth rates, which caused the need to isolate 200 instead of 100 explants in much more cases than expected.

5. SUMMARY OF THE MANAGEMENT OF THE ACTION

Meetings, workshops and seminars organised by the coordinator and the partners

Preceding Years:
The first meeting for the project start up was held in Gatersleben (Germany) on April, 12-13 2007.
A meeting of work package leaders took place in Wageningen (Netherlands) on March, 6 2008.
The second meeting for the project was organised in Potenza (Italy) on July, 8-9 2008.
Three WP meetings were held at Prague on December 4, 2008 (WP3), at Gatersleben on January 27, 2009 (WP2) and at Skierniewice on October 20, 2009 (WP3).
The third meeting for the project was organised in Skierniewice (Poland) on March, 9-10 2010.
In month 6, the project coordinator visited P1 in order to improve cooperation, especially with respect to support the clearing of some organisational problems. Furthermore, technical details of WP3 were discussed.
The leader of WP 3 (P1) visited the cryo-laboratory of P2 in month 11. During this visit the discussion was focused mainly on achievements and experience with the *Allium* cryoprotocol.

Final Year :
The fourth meeting for the project was performed at Prague on March 1, 2011. A workshop of aspects of germplasm preservation of *Allium* at CRI, Prague on March 2, 2011.

CONCLUSION:
Information has been intensively exchanged. Especially during the workshop, new ideas arose and were discussed for further activities beyond the project termination, e.g. in the frame of the ECPGR Allium Working Group.
A further conclusion needs to be drawn: Due to the highly integrated nature of this management project the amount of management actions needed had been underestimated initially. In any of such kind of projects a higher workload to manage all the concerted actions needs to be envisaged. A special aspect is the tripartite cryocollection, in which three institutions of three different countries collaborate very closely. This will need sustainability also in future

- **Changes in the action's management structure (If any)**

No changes in the management structure have been performed.

6. SUMMARY OF THE DISSEMINATION OF ALL THE RESULTS

Preceding Years:

The coordinator Joachim Keller presented the project in the following lectures held in various conferences:

Keller, E.R.J.: Cryopreservation for maintenance of plant germplasm in Germany. Meeting of COST Action 871. CRYOPLANET. Technology, application and validation of plant cryopreservation, Florence, May 11.-12, held on May 11, 2007.

Keller, E.R.J., A. Kaczmarczyk & K. J. Dehmer: On the impact of cryopreservation on genetic resources conservation of the two most advanced temperate crops - potato and garlic. 18th EUCARPIA Resources Section Meeting, Piešťany, Slovakia, May 22-25, held on May 24, 2007.

Keller, E.R.J., A. Kaczmarczyk & A. Senula: Cryopreservation for plant genebanks. A matter between high expectations and cautious reservation. Annual Scientific. Meeting of the Society for Low Temperature Biology: Validation, Safety and Ethical Issues Impacting the Low Temperature Storage. Derby, UK, September 13-14, held on September 13, 2007.

Keller, E.R.J., H. Stavělíková, J. Zámečník, T. Kotlińska, V. Miccolis, C. Kik, F. Esnault, A. Kolodinska Brantestam, D. Fischer & D. Astley: First steps of integrating Europe's genetic resources in garlic and shallot in a new GenRes project. 5th International ISHS Symposium. On Edible Alliaceae. Dronten, Netherlands, October 29-31, held on October 30, 2007.

Keller, E.R.J., A. Senula, D. Büchner, M. Grübe, A. Kaczmarczyk & C. Zanke: Different protocols – different situations – different genotypes. From the research laboratory to application in genebanks. Some subjects of discussion. Meeting of COST Action 871. CRYOPLANET. Fundamental Aspects of Cryopreservation / Cryoprotection and Genetic Stability. Technology, Application and Validation of Plant Cryopreservation .Oulu, Finland. February 21-23, held on February 23, 2008.

Further oral presentations:

Altieri L., I. Camele & V. Miccolis. Aspetti diagnostici e risanamento di una collezione di aglio (Diagnostic aspects of virus sanitation within a garlic collection). National Meeting Potenza: Ricerca, Innovazione e Sviluppo nelle Biotecnologie Agro-alimentari ("Research, innovation and development in biotechnology, agro-food"), October 27, 2009.

Kotlińska, T., M. Olas & E. Kapusta: Ochrona zasobów genetycznych roślin warzywnych i spokrewnionych dzikich gatunków przed zaginięciem i zabezpieczenie ich w banku genów (Conservation of vegetable germplasm and their relatives in gene bank). Ogólnopolskiej Konferencji „Ochrona Zasobów Genowych Roślin Użytkowych" (national symposium related to conservation of plant genetic resources) IHAR, Radzików, Poland, January 2008, 2009, 2010, 2011.

Miccolis, V. Oral communication Workshop: Tecnologie *in vitro* applicate alle piante ("*In vitro* technologies applied to plants") – in Milan, October 22, 2009

Olas, M. & T. Kotlińska: Przechowywanie zasobów genetycznych czosnku pospolitego (*Allium sativum* L.) w ciekłym azocie (Long term storage of garlic germplasm in liquid nitrogen. Workshop „Ochrona Zasobów Genowych Roślin Uprawnych" (Conservation of plant genetic resources), Zakopane, Poland, September 2009.

Posters about the project were presented:

Altieri L., I. Camele & V. Miccolis. Aspetti diagnostici del risanamento da virus in accessioni di aglio locale. National Meeting. Foggia: "Orticoltura di qualità per un mercato in evoluzione" (Vegetable crops of quality for a market in evolution), April 30, 2009.

Altieri L., I. Camele, V. Miccolis & G.L. Rana: Indagini virologiche su una collezione di aglio mediante ELISA e RT-PCR. National Meeting on Biodiversity. Lecce: "The biodiversity – source for multifunctional systems" April 21-23, 2008.

Miccolis V., L. Altieri L. & V. Candido V EURALLIVEG: un progetto europeo per la valorizzazione dell'aglio e dello scalogno. National Meeting on Biodiversity, Lecce: "The biodiversity – source for multifunctional systems" April 21-23, 2008.

Zanke, C.D., D. Fischer & E.R.J. Keller: A new EU project for better maintenance of the garlic and shallot diversity in Europe. Conference of the Deutsche Gesellschaft für Qualitätsforschung (DGQ). Quedlinburg, Germany. March 17-18, 2008.

Zanke, C.D., D. Fischer, C. Kik & E. R. J. Keller: Molecular duplicate search in European Genebanks by SNP Markers – The Garlic Example. IPK Institutstag, Gatersleben, 29.09.2008.

Zanke, C.D., E.R.J. Keller, J. Zámečník, T. Kotlińska & M. Olas: Cryopreservation of vegetative garlic for the establishment of a European Core Collection. 1st International Conference on Cryopreservation organised by ISHS in Leuven on Cryopreservation in Horticultural Species, April 5-8, 2009.

Online presentation:
Keller, E.R.J. *Allium* WG experience on MAAs. Report of a network Coordination meeting, direct citation from ECPGR's website
(http://www.ecpgr.cgiar.org/Networks/Vegetables/VEGNET_3_%20Catania_revised_full_report.pdf) and
(http://www.ecpgr.cgiar.org/Networks/Vegetables/presentations/MAA_Allium_Keller.pdf)

The following publications inform about the project, its aims and structure as well as first results:
Altieri L., 2009. Aspetti diagnostici e risanamento di una collezione di aglio. Atti del Convegno Ricerca, Innovazione e Sviluppo nelle Biotecnologie Agro-alimentari. pp. 110-111.
Keller, E. R. J. 2007. Cryopreservation for Maintenance of Plant Germplasm in Germany. Advances in Horticultural Sciences 21: 228-231.
Keller E. R. J., A. Kaczmarczyk & K.J. Dehmer 2007. Proc. 18th EUCARPIA Genetic Resources Section Meeting, 23-26 May, 2007, Piešťany, Slovak Republic, p 39.
Keller, E.R.J, A. Kaczmarczyk & A. Senula 2008. Cryopreservation for plant genebanks - a matter between high expectations and cautious reservation. CryoLetters 29: 53-62.
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Press release:
Lotzmann, R. (2007) Knoblauch wird jetzt auch international. EU-Projekt startet. Institut mit weltgrößter Spezialsammlung. Mitteldeutsche Zeitung March 1, p. 13.

Website:
http://euralliveg.ipk-gatersleben.de/

Final Year:

Presentations:
E. R. J. Keller, C. Zanke: The EURALLIVEG project - achievements and problems. Leibniz Institute of Plant Genetics and Crop Plant Research, Institute's Day, Gatersleben, Germany. October 4, 2010.

Poster:
Altieri, L. & V. Miccolis: Aspetti diagnostici e risanamento di una collezione di aglio. Workshop "In vitro culture applied to the conservation and the promotion of plant biodiverity", Aquila. September 30–October 1, 2010
Zanke C.D., E.R.J. Keller, H. Staveliková, J. Zámečník, T. Kotlinska, V. Miccolis, C. Kik, F. Esnault & S. Solberg. EURALLIVEG: Establishment of a European Core collection by cryopreservation and virus elimination in garlic. The 6th International Symposium on Edible Alliaceae (ISEA2011). Fukuoka, Japan; May 16-19, 2011 (Abstract). (abstract accepted – Symposium postponed to 2012 due to the reactor catastrophe in Japan).

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Altieri L., I. Camele & V. Miccolis. 2010. Virosi e fitoplasmosi dell'aglio (*Allium* spp.) e possibilità di risanamento. Ricerca di base e innovazione nelle biotecnologie agro-alimentari: il corso di Dottorato di Ricerca in Biologia e Biotecnologie dell' Università degli Studi della Basilicata. pp. 88-94.
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***CONCLUSION*:**
In total there were 10 oral presentations, 1 online presentation, 8 posters, and 16 written publications (submitted and already published).

The website http://euralliveg.ipk-gatersleben.de/ has been uptdated and will be conducted until 2021 (see Final action plan of managing). The website contains also the fact sheet of the project covering the executive summary of it.

6. INPUT FOR THE COORDINATOR'S WEB SITE

Executive summary for the dissemination of the final results on the coordinator's web site

Leibniz Institute of Plant Genetics and Crop Plant Research (IPK)
EURALLIVEG AGRI GEN RES action 050

co-funded by the European Commission

under Council Regulation (EC) N° 870/2004[1]

euralliveg.ipk-gatersleben.de

[1] Council Regulation (EC) No 870/2004 of 24 April 2004 establishing a Community programme on the conservation, characterisation, collection and utilisation of genetic resources in agriculture. Official Journal L 162 , 30/04/2004 P. 0018 – 0028

1. Background

The genus *Allium* is a very diverse botanical taxon with several important crops and a high number of potentially very interesting wild species which are also used either in semi-culture or taken from the wild. Onion, shallot, garlic, leek, chives, Chinese chives, and bunching onion are the most important crops. They are used as vegetable and spices, but their medicinal application is recently strongly increasing. Furthermore, there are many nice ornamental species in this genus. Some of them are so showy that they are well presented in large garden exhibitions everywhere in Europe and elsewhere. As of many cultivated plants and their wild relatives, the future of their diversity is endangered by genetic erosion either through habitat devastation, over-collection or monoculture of some genotypes of the crops. This danger is real for most *Allium* species, but it gets an economic dimension especially in case of vegetatively propagated forms, the maintenance of which is especially expensive. Therefore in the present project, the focus was set on garlic and shallot with the expectation that its benefit will also be valid for the other vegetatively propagated alliums and further on the whole genus.

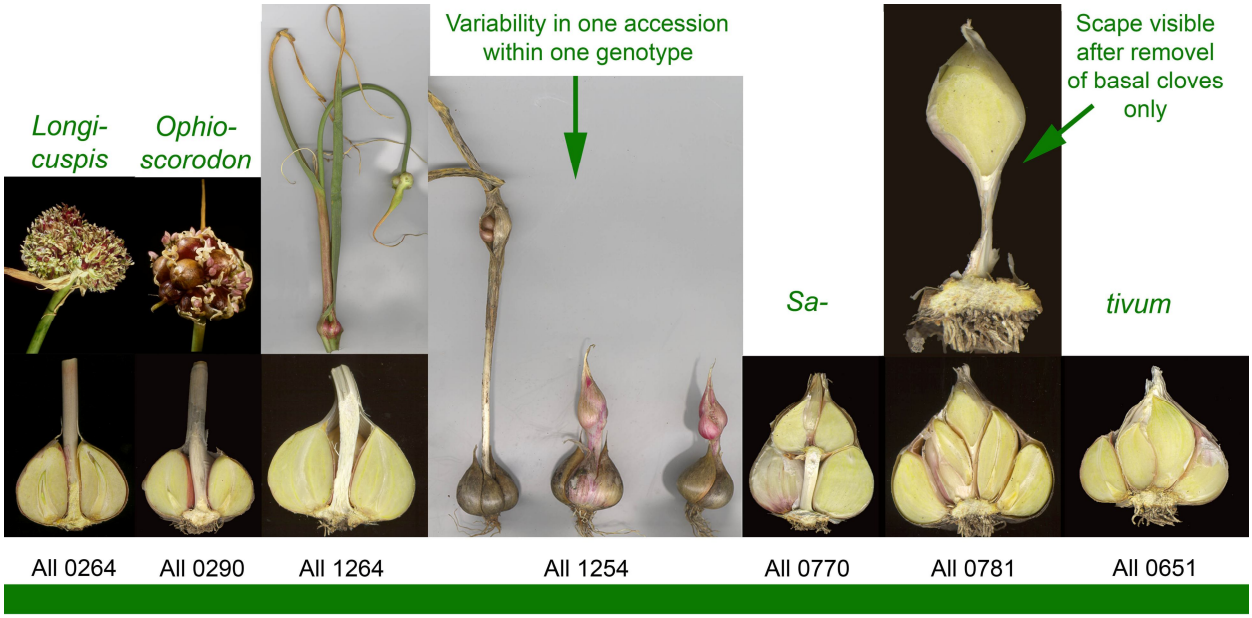
1. The crops and the threats they face

Garlic: Garlic is a multipurpose crop of high importance. It is used as vegetable, spice and in increasing extent, also as medicinal plant (Koch and Lawson, 1996). The production of garlic worldwide is 22.28 million t (2009 – FAOSTAT), only 773,209 t of it in Europe (3.47 %), although Europe maintains the highest diversity of this crop. Garlic production has a long tradition, reports on its culture date back to the antique period (Rabinowich and Currah, 2002). Spreading out from its centre of origin in Central Asia, the introduction into Europe in ancient times led to a very high diversity of this crop, which is caused by the high extent of geographic diversity on this continent and many different cultures and traditions in its populations. This is reflected by the existence of different subgroups in this species, which are termed by many specific folk names in the various countries.

As an example, how the infraspecific grouping of garlic corresponds to its phylogeny, the bolting behaviour of the plants is described here. It is thought that garlic, during the history of its cultivation, lost gradually its generative reproduction strategy by permanent positive selection of the vegetatively most productive plants which are clearly those with smaller or no inflorescence stalk.

The inflorescence itself changed from structures with flowers and many small bulbils to a lower number of larger bulbils accompanied by total loss of flowers. Then, the stalk shortened more and more, ending finally in an inclusion of the inflorescence into the bulb. The bulbils appeared more and more clove-like. The resulting structure is then an irregular compound bulb with no separable inflorescences at all. One of the intermediate types of this evolutionary line is forming even bulbils in several, more than one, levels of the stalk.

At present, this diversity is extremely endangered by invading low-price garlic produced by some dominating countries. The FAO statistics present these figures clearly. The highest production is in China and India which dominate the world production by 80.64 % and 4.80 %, respectively. Europe is faced by the danger to lose its diversity due to reduction in income from trading the own material (Anonymous, 1998). This is a serious justification to protect and safe Europe's high genetic diversity by most appropriate methods. The danger of a worldwide production of only some types within a crop species, the monoculture, has been experienced in the history already several times as, e.g., in potato and maize. A safe bank of most representative garlic germplasm is an essential tool to counteract this danger.



Infraspecific groups of garlic and their bolting characters.

Shallot: Shallot, botanically representing the vegetatively propagated part of the species onion, has also high impact as vegetable and spice worldwide. The world production is 3.74 million t, production in Europe 355,824 t corresponding to 9.51 %. Though not so extremely, the endangerment of shallot's germplasm is similar to that of garlic, the market is dominated by such countries like China (23.72 %) and Japan (15.24 % of the world production, respectively - Figures given for 2009 by FAOSTAT for onion [incl. shallots], green). Due to the smaller production scale in comparison to garlic, also the state of research is behind that for garlic. This is the reason for the limitation of this project to characterization only. The well-characterized European shallot Core collection is so far maintained in de-centralized way by the various partners as a field collection. But it will undergo the AEGIS designation process like it is envisaged for other crops in the AEGIS process as well. Holding a well-structured core collection in permanent maintenance, its introduction into the activities of cryopreservation and virus elimination is well-prepared and easy to implement, as soon as the techniques for shallot will be, in future, at a comparable stage to garlic today.

A part of the garlic core collection cultivated in the fields of the Gatersleben genebank

1.2. Cryopreservation and virus elimination of well-characterized material – a prerequisite of future genebanking

Three aspects are important for maintaining germplasm for future: We must be sure about its identity, the material must be healthy and the material must be kept safely. The project integrated substantial initial steps to build up a core collection to which more and more material may be joined in future.
Characterization is done on various levels. It is not only to describe the material; it is also to exclude redundancy from the various individual collections. Morphological characters are recorded by using descriptors formulated in the IPGRI descriptor list (IPGRI et al., 2001). Comparing of passport data and considering past documents of material exchange between genebanks, a number of 81 duplicates were excluded from the collection. Finally AFLP markers were used to describe the diversity of the core collection. Passport and characterization data, infraspecific classification and images are provided to the public in a specific garlic and shallot database and the EURALLIVEG accession catalogue.
Vegetatively propagated plant collections are usually most endangered by accumulation of viruses. Five viruses and virus groups are present in garlic: onion yellow dwarf virus (OYDV), leek yellow stripe virus (LYSV), garlic common latent virus (GCLV), shallot latent virus (SLV), and the allexi virus group. They are differently harmful, and their elimination is also differently easy. Most important is to free the material from the first two viruses (OYDV and LYSV). Therefore, focus was laid on them. Among the accessions of garlic forming the core collection 24 accessions are free of all five viruses. The development of virus-free plantlets is slow in the first phases. Thus, the main aim was introduction of the method. It was successfully introduced and may be used also in future for new material.
Finally, cryopreservation is the method to store the valuable material (Keller 2002, 2005). For this the shoot tips of garlic, derived from bulbils or *in vitro* plants, were trimmed to small explants of about 1 mm in diameter, dehydrated by osmotically effective and glass-forming substances (cryoprotectants) and placed in tubes containing the cryoprotectant solutions. These tubes were then quickly transferred into liquid nitrogen and stored in cryo-containers. A representative number of explants were rewarmed as control samples shortly after that in order to record the regeneration ability of the respective plant material.

1.3. The cryopreserved genebank collection – the best way to maintain the genetic diversity of garlic and shallot

An integrated system of germplasm safety storage was urgently needed in order to protect the endangered material (Keller and Senula, 2003). Because of the very expensive field culture of vegetatively propagated crops, such a germplasm bank needs to be based on cost-efficient methods as well as high characterization and sanitary standards. At the same time, it connects a certain degree of centralization with a multi-local safety duplication system, which allows the access to the whole collection also after damage, destruction or closure of one storage site. This is provided by the Tripartite Cryopreservation Genebank, which is the main outcome of the present project. This collection is closely embedded into the European germplasm integration policy which is explained in the document of the European AEGIS system, for which *Allium* was one of the model crops in the first period.
The elimination of duplicates is thought for the Tripartite Cryobank only, which will be labelled as AEGIS collection. It will, however, not touch any interests of the partner countries to keep their own germplasm in their own countries for their own interests. However, the well structured and characterized germplasm, which forms the core of

Europe's garlic diversity, will also be the core subject for all further protection measures.
Whereas the time limit and the power of the project will allow characterizing the whole germplasm of the participants, it is not the case for cryopreservation and virus elimination, because the time frame for these treatments is longer than the possible duration of any projects. Therefore, for these methods the most valuable part of the germplasm is envisaged forming a virus-free core-in-core collection. This part will be then the nucleation point for further activities using the management experience derived from this first step and aggregating all the next charges of germplasm to this primary core.

1.4. Exploitation of the genebank material

Due to the above explained different state of the art in garlic and shallot, the exploitation is also on a different level. It will be completely possible in garlic, but it will also be drastically improved in shallot.
In garlic, better exploitation will be possible by a permanent holding of the germplasm in cryopreservation. As resulted from former research, the availability of cryopreserved germplasm is in a similar timeframe like germplasm disseminated in form of bulbils. This ensures access to all germplasm in a feasible manner. The main advantage of cryopreserved material is, that once held in cryopreservation, it will be recovered through *in vitro* culture and can be sent as *in vitro* sample, which facilitates extremely all mailing and transfer procedures, because the material has been separated completely from soil, thus, reducing all endangerments by soil-borne pathogens.
The highest exploitation advantage is, finally, the use of virus-free material from the core collection, because this enables the user to rely on certified material, fully usable without additional cleaning needs. As the project is designed to build up the fundament for future activities in the same direction, it will lay the background for a drastic improvement of the germplasm health and, insofar, its implementation will have impact also in the further germplasm development strategy.

2. Communicating value

The EURALLIVEG project improved collaboration and consolidated the knowledge about the diversity of garlic and shallot in Europe. Through the implementation and further maintenance of the Tripartite Garlic Collection stored in liquid nitrogen a fundament was created which can be enlarged in further time, also by joining of other European collections. The collection will be presented for common use in the EURALLIVEG catalogue and on the image database of the EURALLIVEG Garlic and Shallot Core Collection
http://www.ipk-gatersleben.de/databases/genetic_resources/gscc.
This website, which was implemented by the Bioinformatics and Information Technology Group together with the Genebank Documentation and *In vitro* Storage and Cryopreservation groups of IPK, containing the IPK priority accessions, will include all the material of the EURALLIVEG collection in near future. It will serve as the basic data source for all those that are interested to find out material with special characters for further utilization. A manuscript about this database has been submitted (Colmsee et al., submitted). Furthermore, the website of the EURALLIVEG project will be maintained for the next 10 years, in which all information on the material and its preservation will be available for all users.
Further publications are in press or will be prepared about the results of the project.

The experience gained in the EURALLIVEG project has been and will be further discussed in the *Allium* Working Group of the Vegetable Network within the European Cooperative Programme of Plant Genetic resources ECPGR. The EURALLIVEG label will be attached to the accessions in the European *Allium* Database.


Cryopreservation tanks of the genebank at IPK (left) and first regeneration stage of an explant after rewarming from cryopreservation (right)


Discussion on correct preparation of explants (left) and training course on *in vitro* plant preculture (right)

3. The Action and the Partners

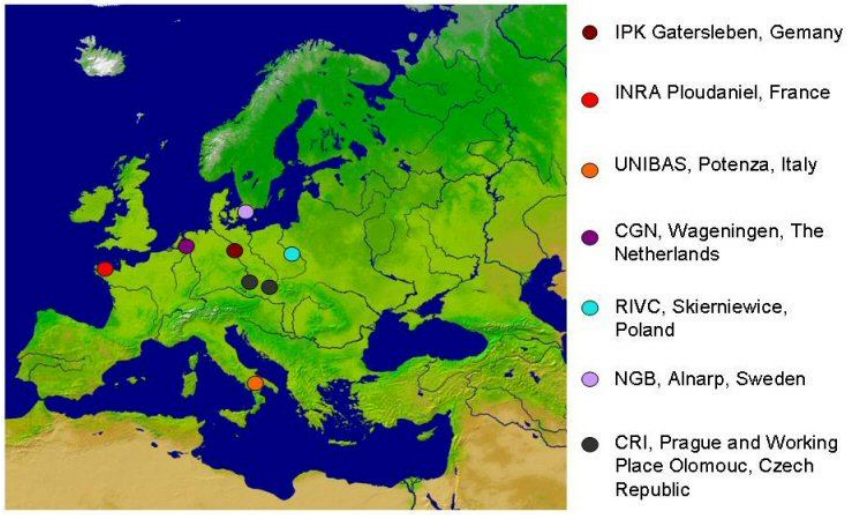
3.1. Action details

EURALLIVEG was awarded 544.500 euros from the EU, towards a total project cost for the GENRES project of 1.089.000 euros. The project started on 1 April 2007. The end-date was 31 March 2011. We, the Leibniz Institute of Plant Genetics and Crop Plant Research Gatersleben, Germany, coordinated the action. Our partners were specialists from organisations located in five EU Member State institutions – in the Czech Republic, Poland, Italy, the Netherlands, France and with the genebank system of the Nordic countries (NordGen).

First meeting of the partners at Gatersleben

The action was implemented in close collaboration and discussed and coordinated in four meetings of all participants, in four smaller and special meetings of work package related groups and three training courses. The resulting cryopreserved garlic collection was safety-duplicated between the cryo-genebanks of Czech Republic, Germany and Poland.

3.2. Partner details



Location of the partner institutions

Coordinator Leibniz Institute of Plant Genetics and Crop Plant Research (IPK)
Dr. E. R. Joachim Keller
Dr. Christine Zanke
Correnssstrasse 3
06484 Gatersleben
GERMANY
E-Mail: keller@ipk-gatersleben.de,
zanke@ipk-gatersleben.de

Partner 01 Crop Research Institute (CRI)
Dr. Jirí Zámečník
Drnovska 507
161 06 Prague
CZECH REPUBLIC
E-Mail: zamecnik@vurv.cz

Crop Research Institute (CRI), Workplace Olomouc
Dr. Helena Stavělíková
Slechtitelu 11
78371 Olomouc-Holice
CZECH REPUBLIC
E-Mail: stavelikova@genobanka.cz

Partner 02 Research Institute of Vegetable Crops (RIVC)
Dr. Teresa Kotlinska; Marta Olas-Sochacka
Konstytucji 3 Maja 1/3
96-100 Skierniewice
POLAND
E-Mail: tkotlin@inwarz.skierniewice.pl; molas82@interia.pl

Partner 03 Dipartimento di Scienze dei Sistemi Colturali, Forestali e dell´Ambiente
Prof. Dr. Vito Miccolis; Luciana Altieri
Università degli Studi della Basilicata (UNIBAS)
Viale dell´Ateneo Lucano, 10
ITALY
E-Mail: miccolis@unibas.it; altlucy@yahoo.it

Partner 04 Centre for Genetic Resources, the Netherlands (CGN)
Dr. Chris Kik
PO Box 16
6700 AA Wageningen
THE NETHERLANDS
E-Mail: chris.kik@wur.nl

Partner 05 National Institut for Agricultural Research (INRA)
INRA UMR-APBV 0118
Florence Esnault
Domaine de Keraïber
29260 Ploudaniel
FRANCE
E-Mail: Florence.Esnault@rennes.inra.fr

Partner 06 NordGen
Dr. Agnese Kolodinska Brantestam; Dr. Svein Solberg
Smedjevägen 3
230 53 Alnarp
SWEDEN
E-Mail: agnese.kolodinska@nordgen.org; svein.solberg@nordgen.org

4. Links

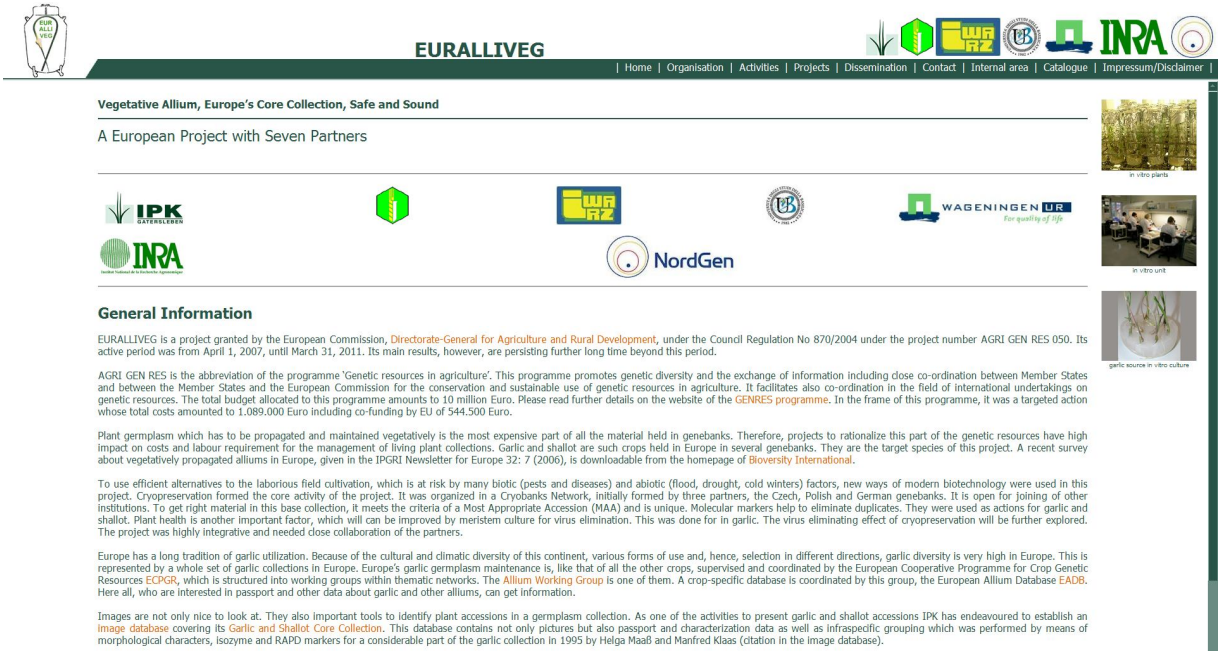
This section lets you know how to find out more about the "outputs" of the EURALLIVEG project.

4.1. The genetic resources

If you want to know more about preservation methods of garlic and shallot, we will be glad to hear from you and give you more information. For this, please, contact one of the email addresses given above in the partners' list or look at our websites.

4.2. The database

The main advantage will be for both crops that, with a finally updated and complete database for both crops, the users worldwide, but especially in Europe will have immediately access to the information about the distribution of the desired germplasm within the partners' countries, its passport and characterization data, without getting confused by undesired redundancy. Another product facilitating exploitation is a much better knowledge about the genetic structure of both crops allowing identification of gaps for future germplasm collecting activities, for research on the crops and for further breeding activities.

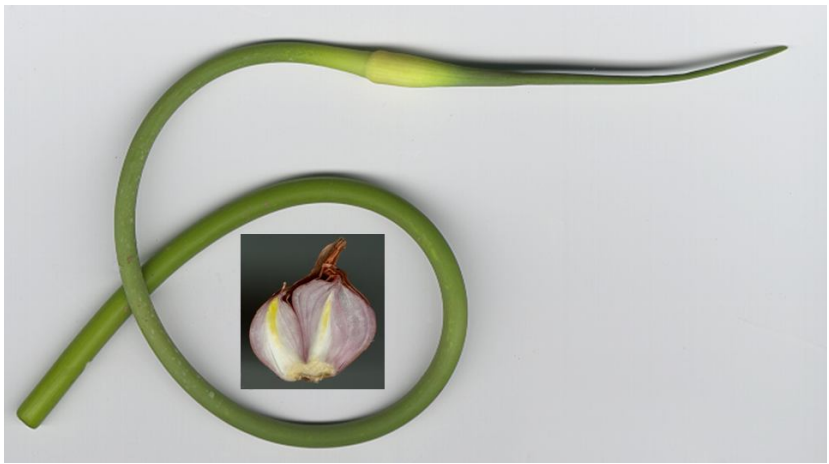


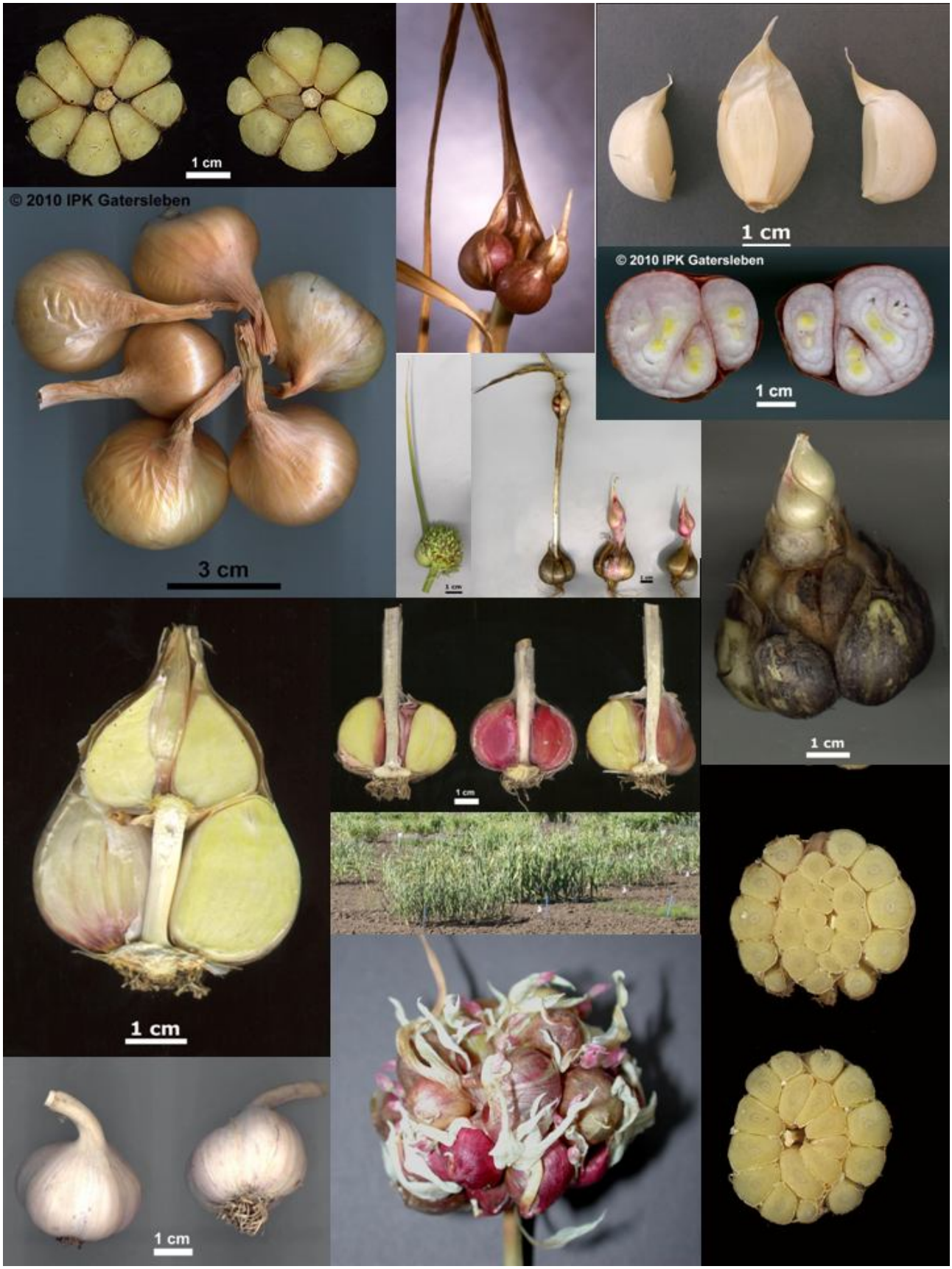
Screenshot of our database

http://euralliveg.ipk-gatersleben.de/
http://www.ipk-gatersleben.de/databases/genetic_resources/gscc

4.3. Publications

We are writing technical, scientific and policy reports and publications. Publications that were already available at the time of writing and links, see the list on the project website
http://euralliveg.ipk-gatersleben.de/dissemination/Relevant-Publications.pdf
Other actions co-funded by the European Commission's Community Programme on the conservation, characterisation, collection and utilisation of genetic resources in agriculture can be found at
http://ec.europa.eu/agriculture/envir/biodiv/genres/index_en.htm


Young inflorescence of bolting garlic and longitudinal cut of violet-flesh shallot



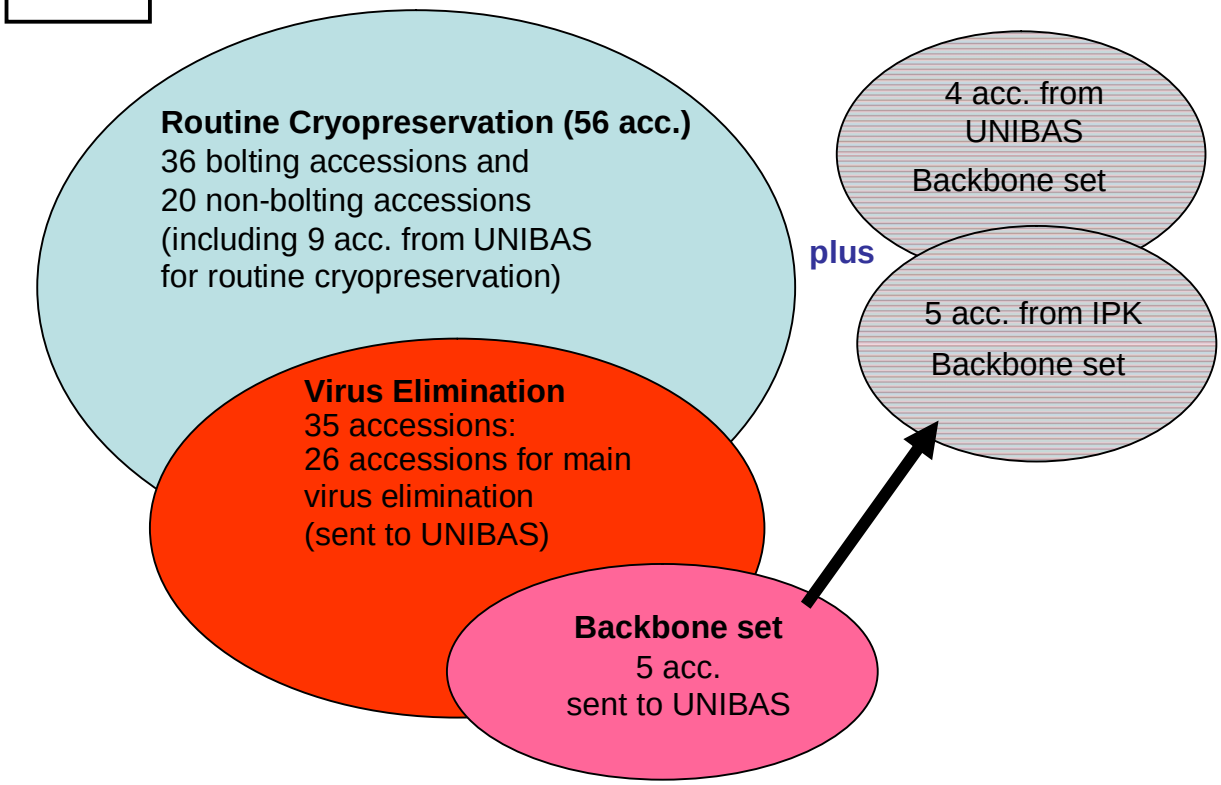
Photographs: © E.R. Joachim Keller, IPK Gatersleben

8. ANNEXES

ANNEX 1: SURVEY ON THE GARLIC COLLECTION STRUCTURES PER PROJECT PARTNER (WP 1, TASK 3)

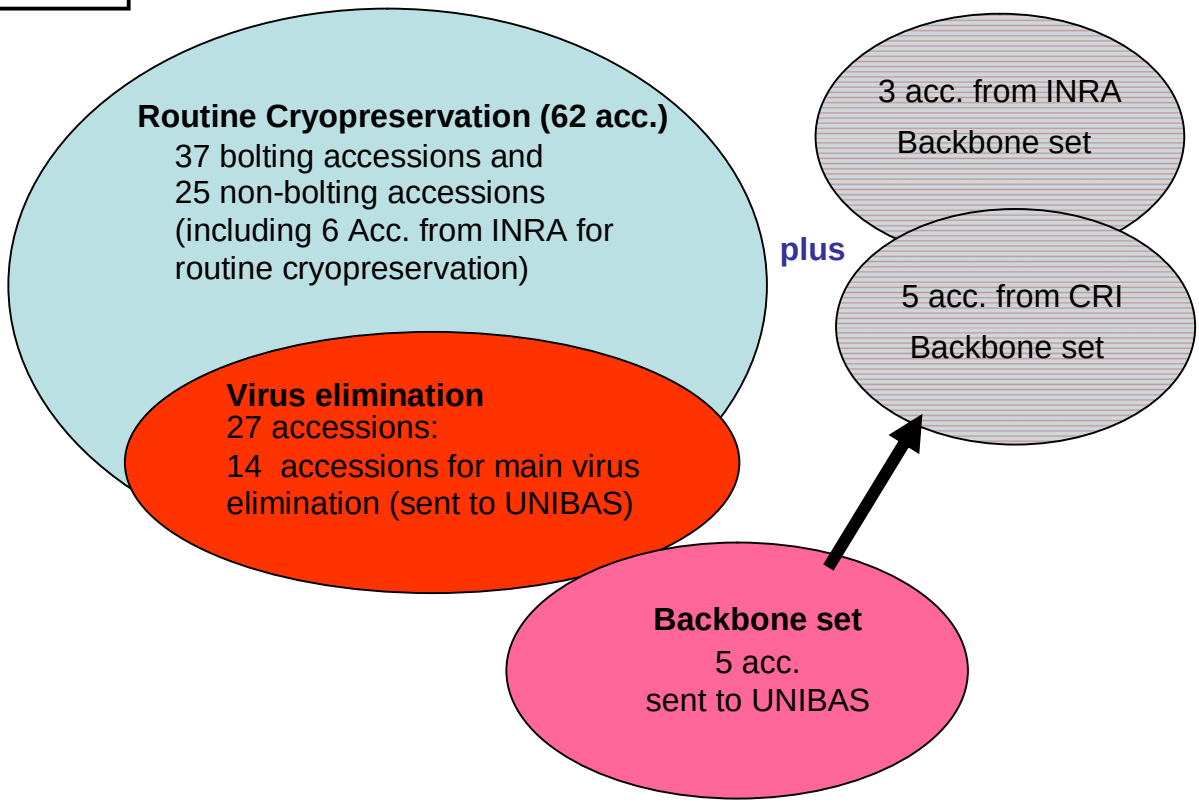
P0 IPK

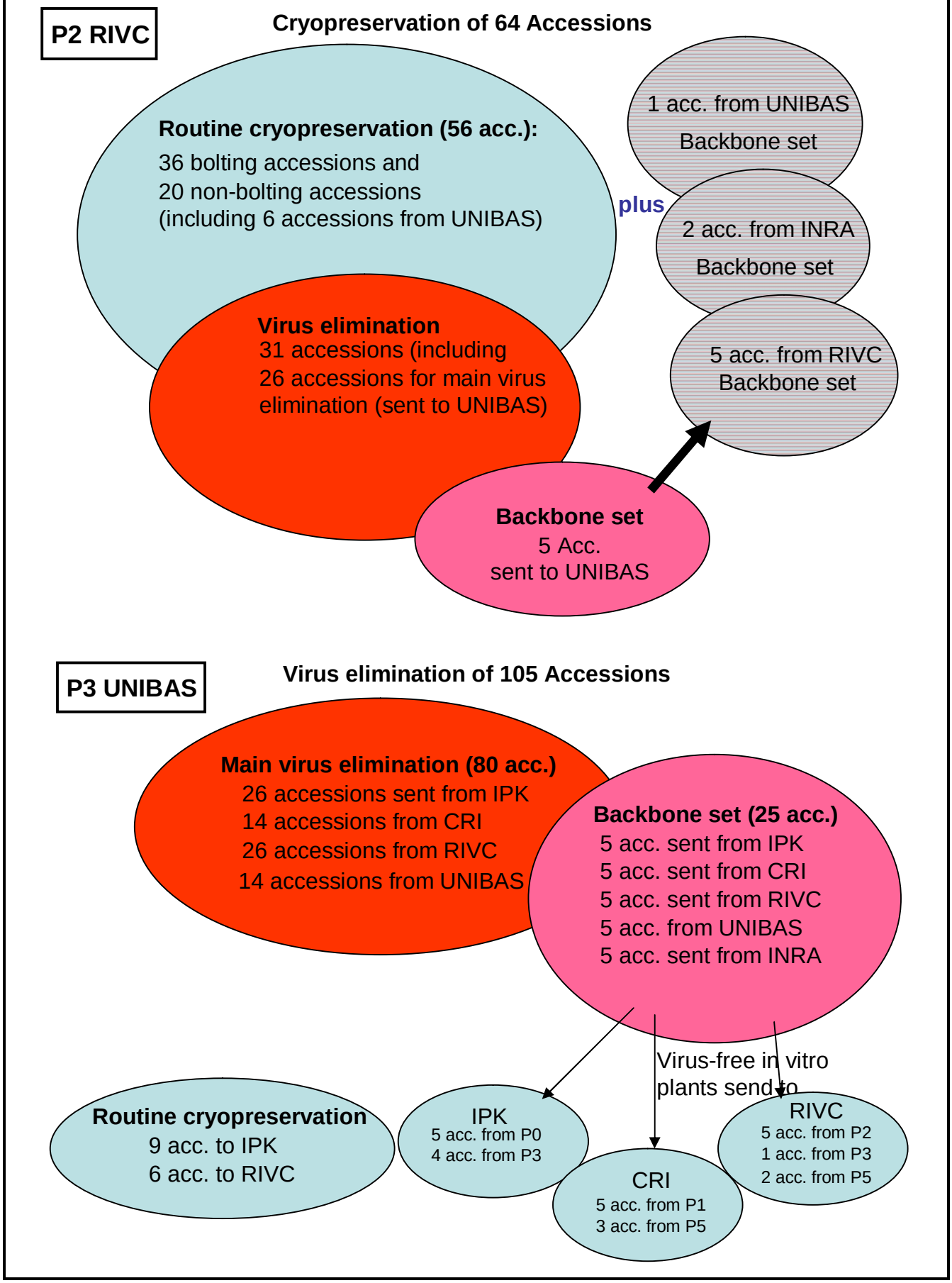
Cryopreservation of 65 Accessions



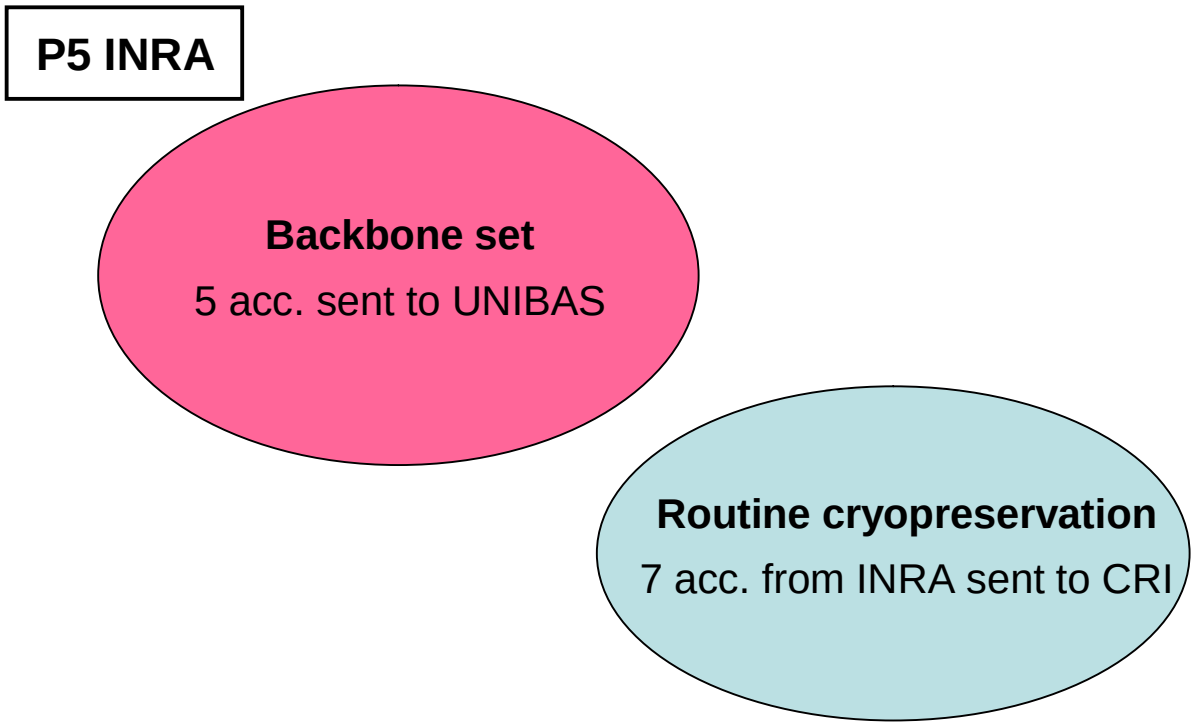
P1 CRI

Cryopreservation of 70 Accessions




P2 RIVC
Cryopreservation of 64 Accessions
Routine cryopreservation (56 acc.):
36 bolting accessions and
20 non-bolting accessions
(including 6 accessions from UNIBAS)
plus
1 acc. from UNIBAS
Backbone set
2 acc. from INRA
Backbone set
5 acc. from RIVC
Backbone set
Virus elimination
31 accessions (including
26 accessions for main virus
elimination (sent to UNIBAS)
Backbone set
5 Acc.
sent to UNIBAS
P3 UNIBAS
Virus elimination of 105 Accessions
Main virus elimination (80 acc.)
26 accessions sent from IPK
14 accessions from CRI
26 accessions from RIVC
14 accessions from UNIBAS
Backbone set (25 acc.)
5 acc. sent from IPK
5 acc. sent from CRI
5 acc. sent from RIVC
5 acc. from UNIBAS
5 acc. sent from INRA
Virus-free in vitro
plants send to
Routine cryopreservation
9 acc. to IPK
6 acc. to RIVC
IPK
5 acc. from P0
4 acc. from P3
CRI
5 acc. from P1
3 acc. from P5
RIVC
5 acc. from P2
1 acc. from P3
2 acc. from P5

ANNEX 1: SURVEY ON THE GARLIC COLLECTION STRUCTURES PER PROJECT PARTNER (WP 1, TASK 3 – CONTINUED)



ANNEX 2: FINAL GARLIC CORE COLLECTION LIST, BOLTING AND NON-BOLTING, (WP 1, TASK 3), LIST 1: MAIN CRYOPRESERVATION (P0, Part 1). BG = originated from botanic gardens

Parti-cipant	Accession number	Bolting / Non-bolting	Other number	Country of origin	Acquisition year	Analysed by AFLP (see WP2, Task7)
P0	All 0100	B	-	BG	1953	x
P0	All 0116	B	K 1001	CHN	1961	x
P0	All 0232	B	K 267	BG	1957	
P0	All 0263	NB	K 4561	GEO	1975	x
P0	All 0264	B	-	DEU	1975	x
P0	All 0275	B	K 4735	SVK	1977	x
P0	All 0291	B	K 4713	FRA	1977	
P0	All 0292	B	K 4736	SVK	1978	x
P0	All 0493	B	190	DEU	1975	x
P0	All 0494	B	125	DEU	1975	x
P0	All 0495	B	159	DEU	1975	x
P0	All 0499	B	-	DEU	1975	
P0	All 0501	B	83	DEU	1975	x
P0	All 0503	B	120	DEU	1975	x
P0	All 0504	B	158	DEU	1975	x
P0	All 0505	B	168	DEU	1975	x
P0	All 0506	B	211	DEU	1975	x
P0	All 0508	B		DEU	1975	
P0	All 0510	B	265	DEU	1975	x
P0	All 0511	B	275	DEU	1975	x
P0	All 0514	B	326	DEU	1975	x
P0	All 0518	B	-	DEU	1975	x
P0	All 0522	B		DEU	1975	
P0	All 0523	B	298	DEU	1975	x
P0	All 0524	B	410	DEU	1975	x
P0	All 0525	B		POL	1978	
P0	All 0649	B	K 5615	DEU	1982	
P0	All 0684	B	-	BLR	1982	x
P0	All 0685	B	-	DEU	1982	x
P0	All 0762	NB	K 5876	GEO	1982	x
P0	All 0763	NB	K 5878	GEO	1982	x
P0	All 0768	NB	K 6019	GEO	1983	x
P0	All 0769	NB	K 6022	GEO	1983	x
P0	All 0771	B	K 6024	GEO	1983	
P0	All 0774	B	K 6028	GEO	1983	x
P0	All 0785	B	K 6801	PRK	1986	x
P0	All 0786	B	K 6802	PRK	1986	x
P0	All 0787	B	K 6803	GEO	1986	x
P0	All 0788	NB	K 6805	GEO	1986	x
P0	All 0790	B	K 6811	GEO	1986	x
P0	All 0791	B	K 6819	GEO	1986	x

ANNEX 2: FINAL GARLIC CORE COLLECTION LIST, BOLTING AND NON-BOLTING, (WP 1, TASK 3), LIST 2: MAIN CRYOPRESERVATION (P0, Part 2). BG = originated from botanic gardens

Parti-cipant	Accession number	Bolting / Non-bolting	Other number	Country of origin	Acquisition year	Analysed by AFLP (see WP2, Task7)
P0	All 0792	B	K 6820	GEO	1986	x
P0	All 0813	B	K 7012	ROM	1986	
P0	All 0816	B	K 7015	ROM	1986	x
P0	All 0817	B	K 7016	ROM	1986	x
P0	All 0819	B	K 7041	PRK	1986	x
P0	All 0835	B	K 7099	GEO	1986	x
P0	All 0843	B	K 7111	GEO	1986	
P0	All 0937	B	K 7806	PRK	1988	x
P0	All 1161	B	TAX 546	BG	1996	
P0	All 1166	B	TAX 1575	BG	1996	
P0	All 1251	NB	K 7996	GEO	1989	x
P0	All 1264	B	K 8831	JPN	1992	
P0	All 1272	B	K 9139	TKM	1993	x
P0	All 1276	B	K 9143	CHN	1993	x
P0	All 1277	B	K 9144	TJK	1993	
P0	All 1279	B	K 9146	RUS	1993	x
P0	All 1453	B	K 8916	DEU	1998	
P0	All 1837	B	TAX 0452	JPN	1985	x
P0	All 1838	B	TAX 1125	UZB	----	
P0	All 1839	B	TAX 1337	TJK	1984	

ANNEX 2: FINAL GARLIC CORE COLLECTION LIST, BOLTING AND NON-BOLTING, (WP 1, TASK 3), LIST 3: MAIN CRYOPRESERVATION (P1, Part 1)

Parti-cipant	Accession number	Bolting / Non-bolting	Other number	Country of origin	Acquisition year	Analysed by AFLP (see WP2, Task7)
P1	09H0100025	NB	1007	ROM	1965	x
P1	09H0100035	B	1028	CHN	1966	x
P1	09H0100036	B	1029	SUN	1954	
P1	09H0100041	B	1035	SUN	1954	x
P1	09H0100042	B	1036	SUN	1954	x
P1	09H0100043	B	1037	SUN	1954	x
P1	09H0100049	B	1205	CZE	1982	
P1	09H0100053	B	1041	SUN	1954	x
P1	09H0100056	B	1044	CZE	1966	x
P1	09H0100059	NB	1018	YUG	1983	x
P1	09H0100063	B	1047	SUN	1983	x
P1	09H0100066	B	1048	SUN	1983	x
P1	09H0100080	B	1057	CZE	1973	
P1	09H0100211	B	1053	SUN	1986	x
P1	09H0100212	B	1209	SUN	1986	x
P1	09H0100214	B	1210	KAZ	1986	
P1	09H0100215	B	1211	SUN	1986	x
P1	09H0100222	B	1216	SUN	1986	x
P1	09H0100223	B	1217	SUN	1986	x
P1	09H0100225	B	1218	ROM	1986	
P1	09H0100226	NB	1090	ROM	1986	x
P1	09H0100233	NB	1093	ROM	1986	x
P1	09H0100239	B	1222	CZE	1986	x
P1	09H0100244	B	1054	CZE	1960	x
P1	09H0100245	B	1055	CZE	1960	x
P1	09H0100249	B	1226	FRA	1986	x
P1	09H0100251	B	1228	CZE	1986	
P1	09H0100252	B	1229	CSK	1986	
P1	09H0100255	B	1230	CZE	1986	x
P1	09H0100258	B	1056	CZE	1986	x
P1	09H0100260	B	1233	BGR	1986	
P1	09H0100261	B	1234	BGR	1986	
P1	09H0100292	B	1244	AUT	1987	x
P1	09H0100315	B	1247	SUN	1983	x
P1	09H0100316	B	1248	SUN	1986	x
P1	09H0100322	B	1254	ESP	1987	x
P1	09H0100357	B	1265	HUN	1987	
P1	09H0100358	B	1266	HUN	1987	
P1	09H0100421	B	1291	SUN	1987	x
P1	09H0100422	B	1292	SUN	1987	x
P1	09H0100424	B	1294	SUN	1987	x

ANNEX 2: FINAL GARLIC CORE COLLECTION LIST, BOLTING AND NON-BOLTING, (WP 1, TASK 3), LIST 4: MAIN CRYOPRESERVATION (P1, Part 2)

Parti-cipant	Accession number	Bolting / Non-bolting	Other number	Country of origin	Acquisition year	Analysed by AFLP (see WP2, Task7)
P1	09H0100426	B	1296	SUN	1987	x
P1	09H0100484	B	1299	CSK	1987	
P1	09H0100485	B	1300	CSK	1987	
P1	09H0100487	B	1302	CSK	1987	x
P1	09H0100488	B	1303	CZE	1987	x
P1	09H0100489	B	1304	CZE	1987	x
P1	09H0100492	B	1307	CZE	1987	x
P1	09H0100494	B	1309	CSK	1987	x
P1	09H0100495	B	1310	CSK	1987	
P1	09H0100496	B	1321	CSK	1987	x
P1	09H0100498	B	1323	CSK	1987	x
P1	09H0100500	B	1325	CSK	1987	x
P1	09H0100502	B	1326	CZE	1988	x
P1	09H0100505	B	1328	CZE	1988	x
P1	09H0100511	B	1341	CZE	1988	x
P1	09H0100517	B	1426	SVK	1988	x
P1	09H0100533	B	1353	SUN	1988	
P1	09H0100536	B	1356	SUN	1988	
P1	09H0100780	B	1386	SVK	1988	x
P1	09H0100781	B	1387	SVK	1988	x
P1	09H0100787	B	1391	SVK	1988	
P1	09H0100788	B	1392	SVK	1988	
P1	09H0100790	B	1394	SVK	1988	x
P1	09H0100791	B	1395	SVK	1989	x
P1	09H0100792	B	1396	SVK	1989	
P1	09H0100794	B	1397	SVK	1989	
P1	09H0100795	B	1398	SVK	1989	
P1	09H0100796	B	1399	SVK	1989	
P1	09H0100797	B	1400	SVK	1989	
P1	09H0100798	B	1401	SVK	1989	
P1	09H0100804	B	1406	SVK	1989	
P1	09H0100807	B	1408	SVK	1989	
P1	09H0100808	B	1409	SVK	1989	
P1	09H0100925	B	1442	UZB	1988	
P1	09H0100940	B	1462	SUN	1988	
P1	09H0100983	B	2681	CZE	1995	
P1	09H0100984	B	2682	CZE	1995	
P1	09H0100985	B	2683	CZE	1995	
P1	09H0101052	B	2655	CZE	1995	
P1	09H0101093	B	2804	CZE	2000	
P1	09H0101169	B	2806	CZE	1999	

ANNEX 2: FINAL GARLIC CORE COLLECTION LIST, BOLTING AND NON-BOLTING, (WP 1, TASK 3), LIST 5: MAIN CRYOPRESERVATION (P2 Part 1)

Parti-cipant	Accession number	Bolting / Non-bolting	Other number	Country of origin	Acquisition year	Analysed by AFLP (see WP2, Task7)
P2	225311	NB	0101K	RUS	1980	x
P2	225330	NB	0014K	POL	1986	x
P2	225346	NB	0023K	POL	1986	x
P2	225351	NB	0035K	UKR	1980	x
P2	225386	NB	0069K	POL	1981	x
P2	225423	NB	0072K	POL	1982	x
P2	225438	NB	0050K	POL	1983	x
P2	225539	B	0232K	POL	1991	x
P2	225540	B	0233K	POL	1991	x
P2	225543	B	0236K	POL	1991	x
P2	225551	B	0244K	POL	1991	
P2	225586	B	0159K	CZE	1989	x
P2	225588	B	0168K	LTU	1990	x
P2	225590	B	0171K	RUS	1990	x
P2	225593	B	0180K	RUS	1990	x
P2	225594	B	0183K	RUS	1990	x
P2	225599	B	0190K	RUS	1990	x
P2	225600	B	0192K	RUS	1990	
P2	225604	B	0256K	POL	1994	x
P2	225653	B	0303K	TJK	1988	x
P2	225671	B	0333K	UKR	1997	x
P2	225685	B	0347K	POL	1997	x
P2	225688	B	0350K	POL	1997	x
P2	225690	B	0352K	POL	1997	x
P2	225692	B	0354K	POL	1997	x
P2	225693	B	0355K	POL	1997	x
P2	225695	B	0357K	POL	1997	x
P2	225696	B	0358K	POL	1997	x
P2	225697	B	0359K	POL	1997	x
P2	225698	B	0360K	POL	1997	x
P2	225721	B	0385K	POL	1998	x
P2	225722	NB	0386K	POL	1998	x
P2	225729	B	0393K	POL	1998	x
P2	225732	B	0396K	POL	1998	x
P2	225749	B	0416K	POL	1999	x
P2	225750	B	0417K	POL	1999	x
P2	225753	B	0420K	POL	1999	x
P2	225779	NB	1012K	POL	1999	x
P2	225798	NB	1021K	POL	2001	x
P2	225800	NB	0445K	POL	2002	

ANNEX 2: FINAL GARLIC CORE COLLECTION LIST, BOLTING AND NON-BOLTING, (WP 1, TASK 3), LIST 6: MAIN CRYOPRESERVATION (P2 Part 2)

Parti-cipant	Accession number	Bolting / Non-bolting	Other number	Country of origin	Acquisition year	Analysed by AFLP (see WP2, Task7)
P2	225804	B	0438K	POL	2003	x
P2	225810	B	0444K	POL	2002	x
P2	225815	B	0230K	JPN	1991	x
P2	225817	NB	0413K	POL	1999	x
P2	225831	B	0463K	POL	2005	x
P2	225849	B	0481K	UKR	2006	x
P2	225866	B	0509K	UKR	2006	x
P2	225891	B	0534K	UKR	2006	x
P2	225894	B	0499K	POL	2006	x
P2	225896	B	0501K	POL	2006	x

ANNEX 2: FINAL GARLIC CORE COLLECTION LIST, BOLTING AND NON-BOLTING, (WP 1, TASK 3), LIST 7: MAIN CRYOPRESERVATION (P3)

Parti-cipant	Accession number	Bolting / Non-bolting	Other number	Country of origin	Acquisition year	Analysed by AFLP (see WP2, Task7)
P3	CV100004	NB	CV90-4	ITA	1995	x
P3	CV100007	NB	CV90-7	ITA	1995	x
P3	CV100013	NB	CV90-13	ITA	1995	x
P3	CV100023	NB	CV90-23	ITA	1997	x
P3	CV100037	NB	CV90-37	ITA	1997	x
P3	CV100061	NB	CV90-61	ITA	2001	x

ANNEX 3: GARLIC ACCESSIONS CRYOPRESERVED BUT NOT SAFETY-DUPLICATED OR PARTLY CRYOPRESERVED (PART 1)

Parti-cipant	Accession number	Bolting / Non-bolting	Other number	Country of origin	Acquisition year	Sum of stored explants	No. of control explants SUM	Regrown plants after 10 weeks SUM	Regrowth (%)	Safety duplicates sent to	Already partly in cryo-preservation	Analysed by AFLP (see WP2, Task7)
P0	All 0754	NB	K 5862	GEO	1982	50	10	3	30.0		x	
P0	All 0755**)	NB	K 5865	GEO	1982	200	99	14	14.1			
P0	All 0759**)	NB	K 5873	GEO	1982	200	107	14	13.1			x
P0	All 0779	NB	K 6037	GEO	1983	70	20	4	20.0		x	x
P0	All 0825	NB	K 7085	GEO	1986	130	52	15	28.8		x	x
P0	All 0839	NB	K 7106	GEO	1986	40	19	6	31.6		x	x
P0	All 0852	B	K 7536	GEO	1987	70	27	14	51.9		x	x
P1	09H0100228	B	1220	ROM	1986	120	40	7	17.5	RIVC	x	
P1	09H0100290	B	1243	AUT	1987	120	39	11	28.2	IPK	x	
P1	09H0100317	B	1249	SUN	1986	120	40	5	12.5	RIVC	x	
P1	09H0100482	B	1297	CSK	1987	120	40	6	15.0	RIVC	x	
P1	09H0101168	B	2805	CZE	1999	120	40	6	15.0	IPK	x	
P2	225331**)	NB	0015K	POL	1986	100	50	17	34.0	RIVC		
P3	CV100003*)	NB	CV90-3	ITA	1995							x
P3	CV100005	NB	CV90-5	ITA	1995	40	15	2	13.3		x	x
P3	CV100010	NB	CV90-10	ITA	1995	110	64	14	21.9		x	x
P3	CV100012*)	NB	CV90-12	ITA	1995							x
P3	CV100016	NB	CV90-16	ITA	1997	130	55	10	18.2			x
P3	CV100018	NB	CV90-18	ITA	1997	40	8	0	0.0		x	x
P3	CV100022**)	NB	CV90-22	ITA	1997	200	96	13	13.5	RIVC	x	x

ANNEX 3: GARLIC ACCESSIONS CRYOPRESERVED BUT NOT SAFETY-DUPLICATED OR PARTLY CRYOPRESERVED (PART 2)

Parti-cipant	Accession number	Bolting / Non-bolting	Other number	Country of origin	Acquisition year	Sum of stored explants	No. of control explants SUM	Regrown plants after 10 weeks SUM	Regrowth (%)	Safety duplicates sent to	Already partly in cryo-preservation	Analysed by AFLP (see WP2, Task7)
P3	CV100024[§])	NB	CV90-24	ITA	1997	100	50	1	2.0			
P3	CV100026**)	NB	CV90-26	ITA	1997	100	50	16	32.0	RIVC	x	
P3	CV100053*)	NB	CV90-53	ITA	2000							x
P3	CV100054	NB	CV90-54	ITA	2000	70	23	1	4.3		x	x
P3	CV100060**)	NB	CV90-60	ITA	2001	100	50	17	34.0	RIVC	x	
P3	CV100062	NB	CV90-62	ITA	2001	60	18	5	27.8		x	x
P3	CV100063	NB	CV90-63	ITA	2001	80	43	2	4.7		x	x
P5	AIL011*)	NB	Bretagne 1	FRA	1996							x
P5	AIL020*)	NB	Rouge de Vendée	FRA	1997							x

*) *In vitro* material existing, will be cryopreserved later, see Action plan for further managing (Annex 7)
**) Accession already completely in cryopreservation. Safety duplication pending.
***) Accessions completely in cryopreservation, but the regrowth results of the control pending.
[§]) Regrowth in the first lot was too low, new plant material will be introduced, see Action plan for further managing (Annex 7)

ANNEX 4*:* FINAL SHALLOT CORE COLLECTION LIST, (WP 1, TASK 4), PART 1: P0, P1, P2

Partner	Accession number	Collecting number / other number	Accession name	Country of origin	Acquisition year
P0	ALL 0591	571		DEU	1975
P0	ALL 0587	529		DEU	1975
P0	ALL 0597	127		DEU	1975
P0	ALL 0607	283		DEU	1975
P0	ALL 0609	286		DEU	1975
P0	ALL 0620	84		DEU	1975
P0	ALL 0627	377		DEU	1975
P0	ALL 0705	196 / K 5695		SVK	1983
P0	ALL 0719	1774 / K 6872	'alpadzugi' (national name)	GEO	1986
P0	ALL 0726	1900 / K 7080	'chandakura' (national name)	GEO	1987
P1	09H0200004	3013	Milka orig.	CZE	1966
P1	09H0200006	3023	Schalotte Gelbe	AUT	1961
P1	09H0200008	3018	Zluta	CZE	1952
P1	09H0200010	3027	Dunn's Giant	GBR	1958
P1	09H0200013	3011	Sibirskij Skorospelyj	SUN	1981
P1	09H0200015	3010	landrace (Trebonska)	CZE	1981
P1	09H0200018	3005	landrace (ROM 1)	ROM	1984
P1	09H0200276	3008	landrace (Minnesund)	NOR	1986
P1	09H0200282	3035	landrace (Flesberg)	NOR	1986
P1	09H0200304	3004	landrace (Chodska 1)	CZE	1986
P1	09H0200306	3042	landrace (Vestnes 2)	NOR	1986
P1	09H0200576	3053	landrace (Oravska Polhora	SVK	1988
P1	09H0200578	3046	landrace (Zazriva 2)	SVK	1988
P1	09H0200634	3054	landrace (V850783)	FIN	1988
P1	09H0200958	3093	Landrace (Chodska)	CZE	1990
P1	09H0200961	3096	Sibirskij Zoltyj	SUN	1990
P2	233887	POLSOK-52		POL	2000
P2	233892	POLSOK-98		POL	2000
P2	233819	POLBIA98-68		POL	1998
P2	233762	PV201		POL	1991
P2	233816	POLBIA98-35		POL	1998
P2	233772	PV077		POL	1991
P2	233893	POLSOK-100		POL	2000
P2	233885	POLSOK-42		POL	2000
P2	233894	POLSOK-110		POL	2000
P2	233900	POLSOK-1154		POL	2000
P2	233877	P029		POL	1999
P2	233881	POLSOK 005	Dymka	POL	2000
P2	233886	POLSOK 046		POL	2000
P2	233890	POLSOK 088		POL	2000
P2	233891	POLSOK 096	Dymka	POL	2000
P2	233896	POLSOK 130	Dymka	POL	2000
P2	233903	POLAUG 01-004		POL	2001
P2	233937	POLBIA 98-034A		POL	1998
P2	233976	WIG09-03		POL	2009
P2	233906	POLAUG01-50		POL	2001
P2	233897	POLSOK-1542		POL	2000
P2	233918	POLMRO-54		POL	2002

ANNEX 4: FINAL SHALLOT CORE COLLECTION LIST, (WP 1, TASK 4), PART 2: P5 and P6

Partner	Accession number	Collecting number / other number	Accession name	Country of origin	Acquisition year
P5	ECH004		L6	FRA	1977
P5	ECH005		Tendre Anjou	FRA	1977
P5	ECH021		DLGK3	FRA	1977
P5	ECH024		Perpétuelle	FRA	1977
P5	ECH036		Ronde bretonne	FRA	1997
P6	NGB16537	DKALLALAS4		DNK	2004
P6	NGB16547	DKALLALAS14		DNK	2004
P6	NGB17975	NOALLAS18	Lünteviga	NOR	2001
P6	NGB17764	NOALLAS3	Kavlsøyslatta	NOR	2001
P6	NGB17775	NOALLAS14	Stord 2	NOR	2001
P6	NGB17774	NOALLAS13	Kjeller	NOR	2001
P6	NGB8312	HY89		FIN	2001
P6	NGB8315	HY92		FIN	2001
P6	NGB17932	POM 108	Bodatorp	SWE	2007
P6	NGB17927	SVALLSO4	Malvina	SWE	2008

Remark: All accessions included into the AFLP analysis (see WP 2, Task 7).

ANNEX 5: VIRUS-FREE GARLIC CORE-IN-CORE COLLECTION LIST, (WP 1, TASK 5), RVE = accession belongs to the Routine virus elimination set; BB =accession belongs to the Backbone subset; vf =accession had been provided to the project in an already virus-free state.

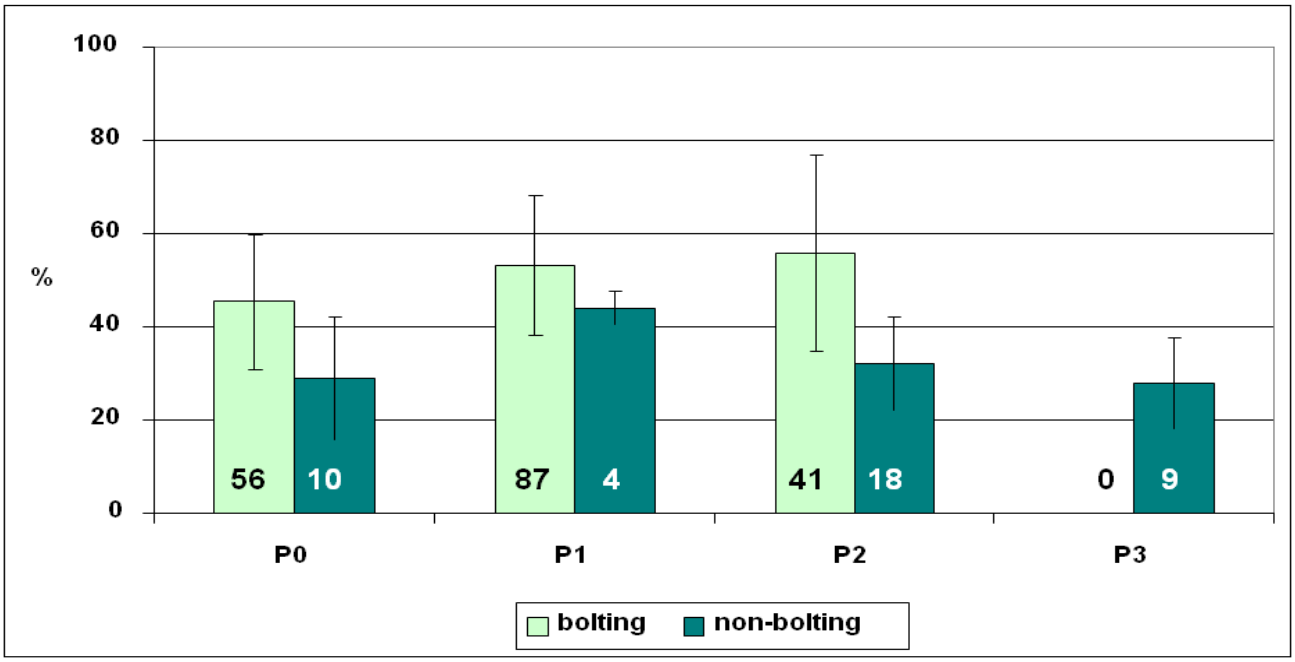
Parti-cipant	Accession number	Bolting / Non-bolting	Other number	Country of origin	Acquisition year	Analysed with AFLP	Comments
P0	All 0100*)	B	-	BG	1953	x	RVE
P0	All 0232	B	K 267	BG	1957		vf
P0	All 0264	B	-	DEU	1975	x	vf
P0	All 0291	B	K 4713	FRA	1977		vf
P0	All 0506	B	211	DEU	1975	x	vf
P0	All 0511	B	275	DEU	1975	x	vf
P0	All 0522	B		DEU	1975		vf
P0	All 0524	B	410	DEU	1975	x	vf
P0	All 0649	B	K 5615	DEU	1982		vf
P0	All 0786	B	K 6802	PRK	1986	x	vf
P0	All 0813	B	K 7012	ROM	1986		vf
P0	All 0843	B	K 7111	GEO	1986		vf
P0	All 1161	B	TAX 546	BG	1996		vf
P0	All 1166	B	TAX 1575	BG	1996		vf
P0	All 1264	B	K 8831	JPN	1992		vf
P0	All 1272	B	K 9139	TKM	1993	x	vf
P0	All 1276	B	K 9143	CHN	1993	x	vf
P0	All 1277	B	K 9144	TJK	1993		vf
P0	All 1279	B	K 9146	RUS	1993	x	vf
P0	All 1837	B	TAX 452	JPN	1985	x	vf
P2	225386	NB	0069K	POL	1981	x	BB
P2	225593	B	0180K	RUS	1990	x	BB
P2	225798	NB	1021K	POL	2001	x	BB
P2	225804	B	0438K	POL	2003	x	BB

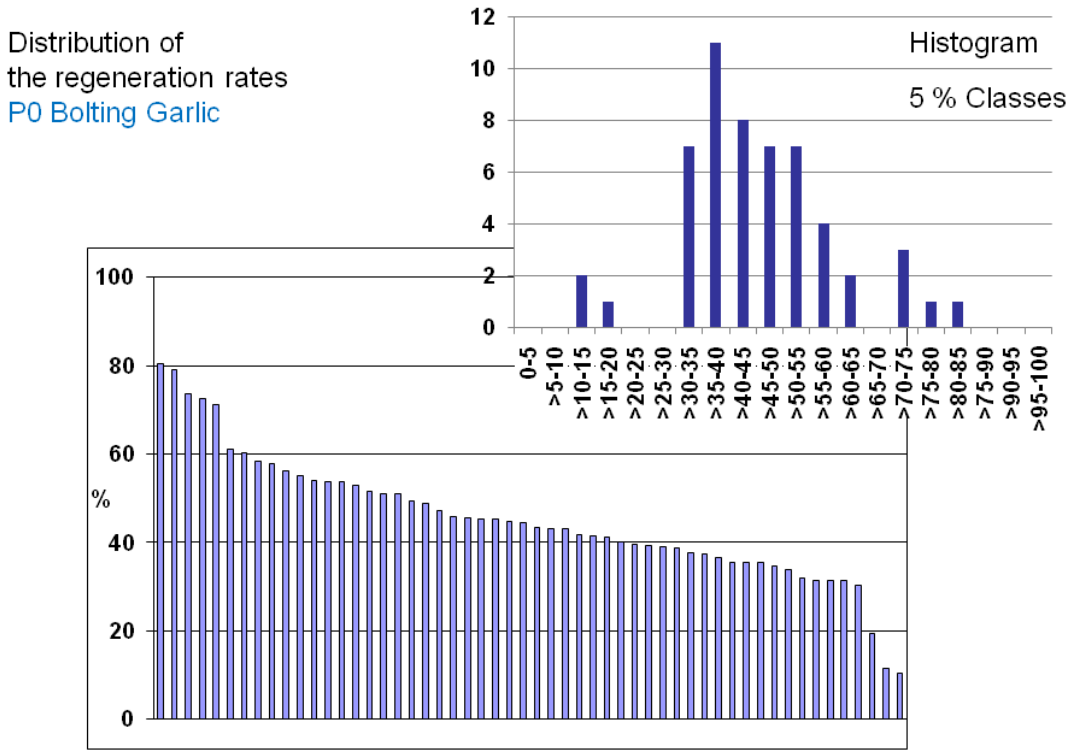
*) Complete set not virus-free, additionally a smaller set (40 explants) stored in virus-free conditions.

ANNEX 6: DOCUMENTATION OF THE DISTRIBUTIONS OF THE REGENERATION RATES FROM CRYOPRESERVATION IN THE GARLIC CORE COLLECTION, PART 1

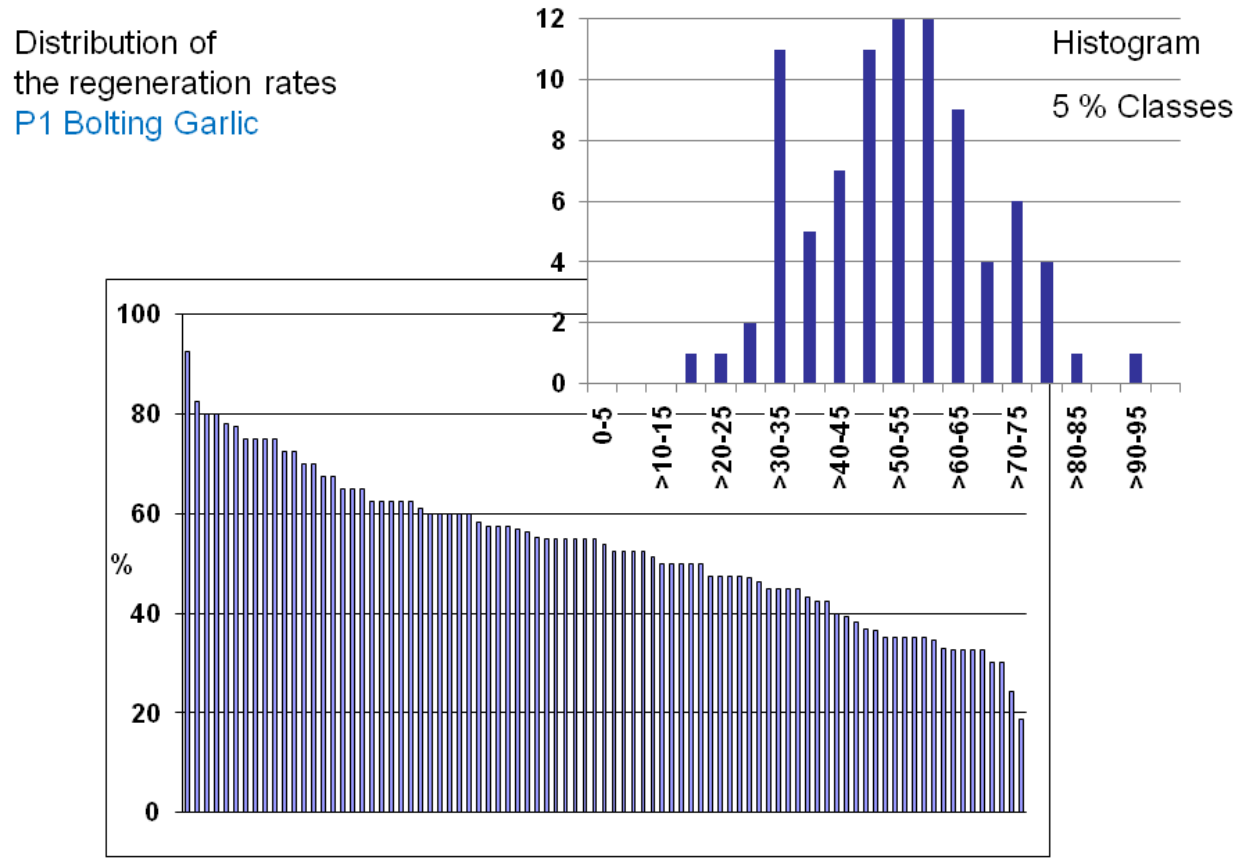
OVERALL DIAGRAM

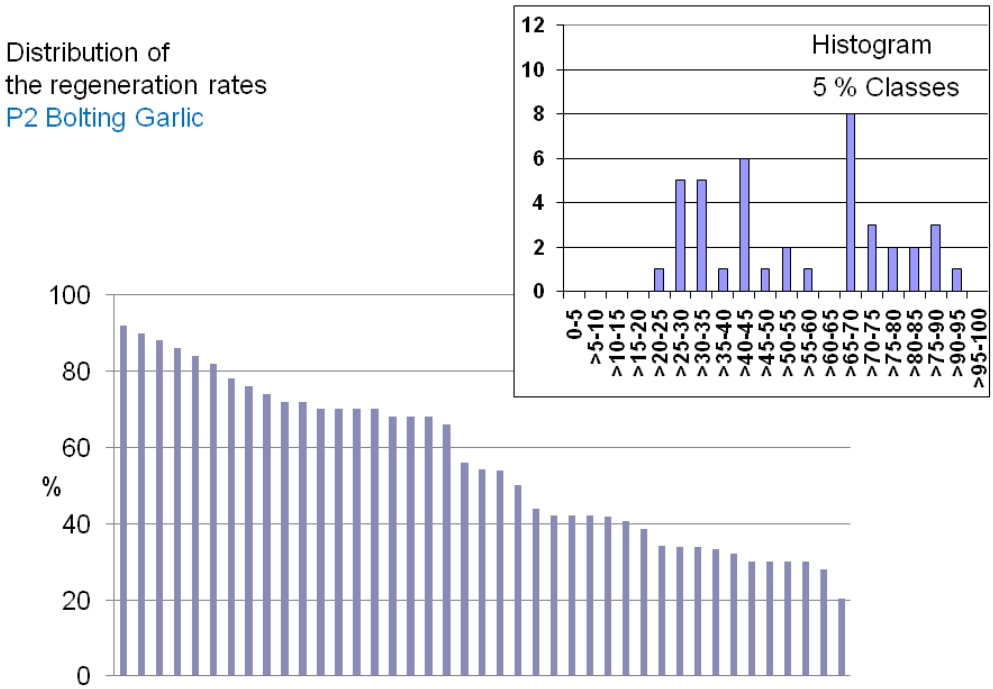
The means of bolting and non-bolting accessions calculated per partner. Bars mark the standard deviations of the means. The figures inserted iun the columns show the numbers of accession per garlic group and partner**.**





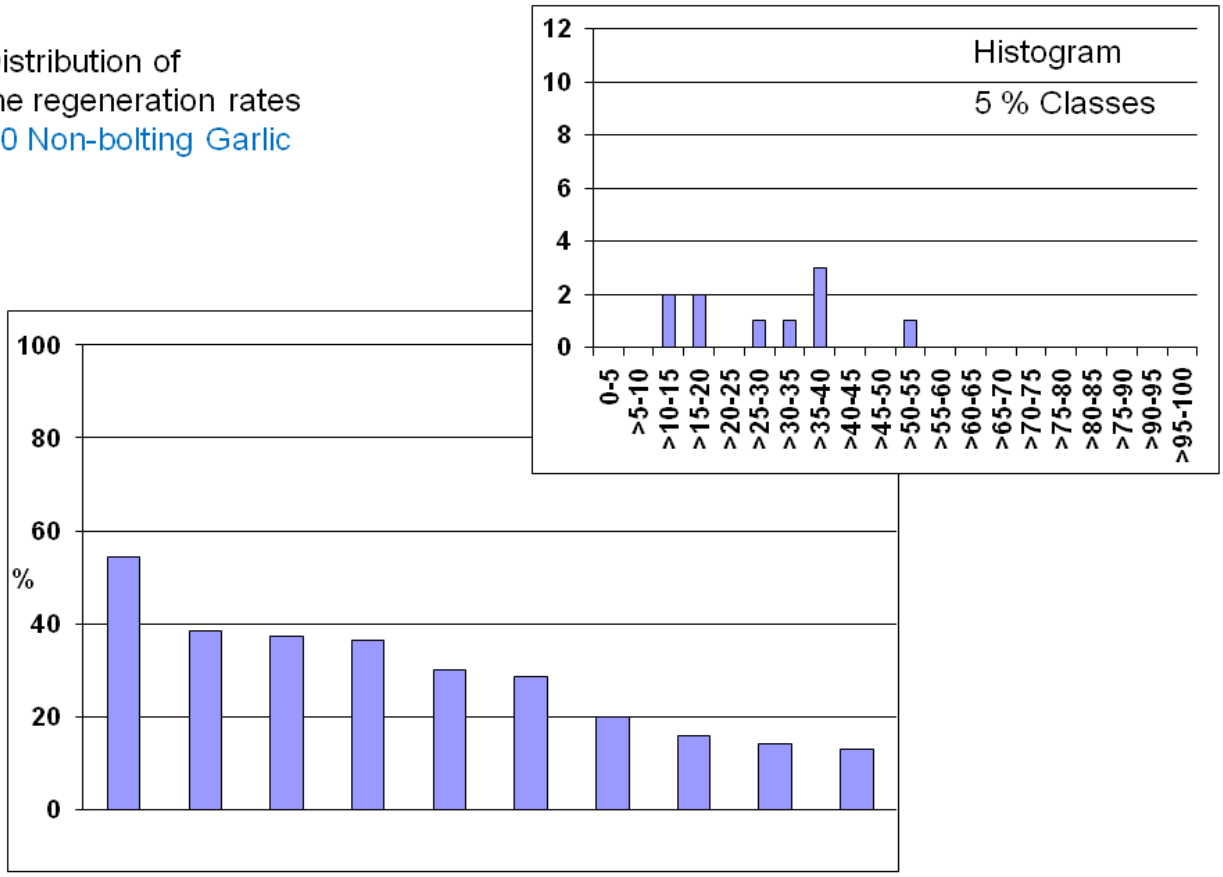
ANNEX 6: DOCUMENTATION OF THE DISTRIBUTIONS OF THE REGENERATION RATES FROM CRYOPRESERVATION IN THE GARLIC CORE COLLECTION, PART 2



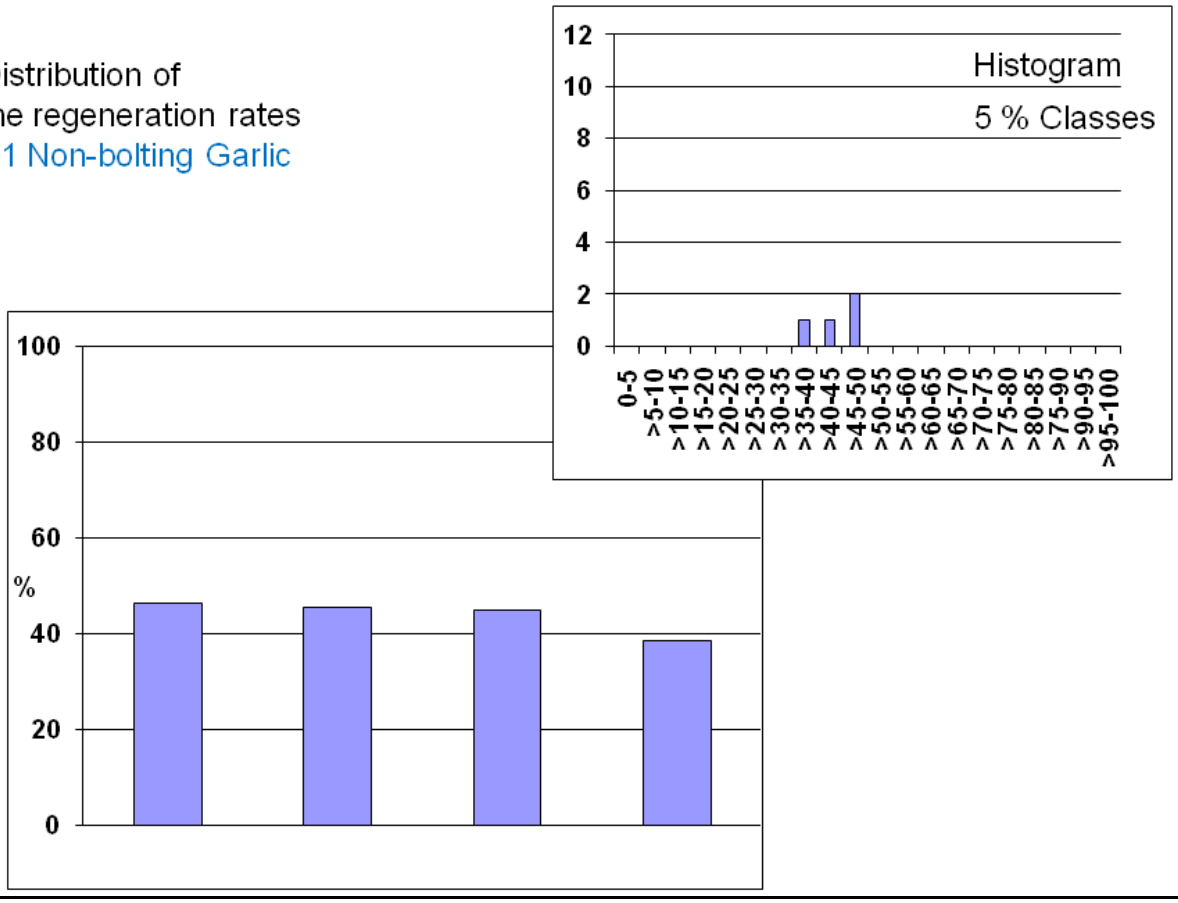


ANNEX 6: DOCUMENTATION OF THE DISTRIBUTIONS OF THE REGENERATION RATES FROM CRYOPRESERVATION IN THE GARLIC CORE COLLECTION, PART 3

Distribution of
the regeneration rates
P0 Non-bolting Garlic

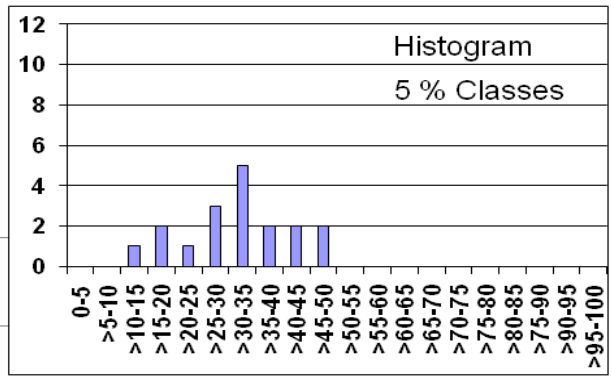


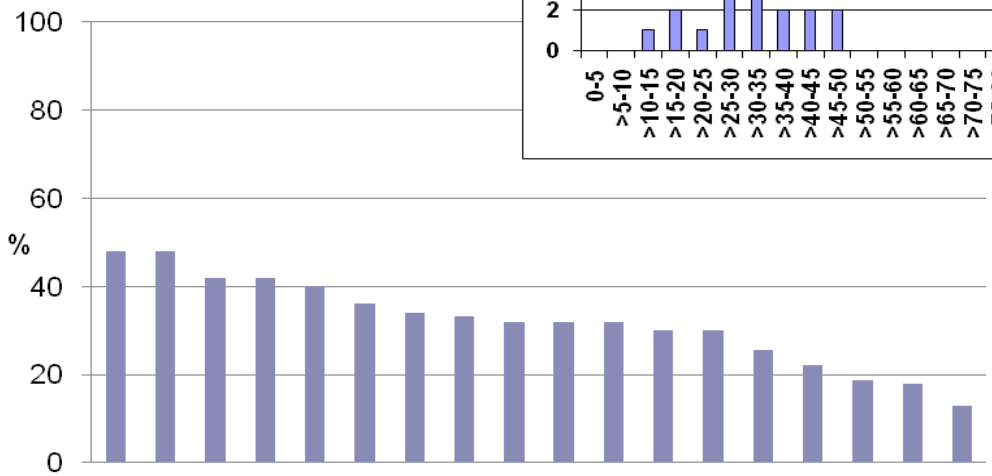
Distribution of
the regeneration rates
P1 Non-bolting Garlic



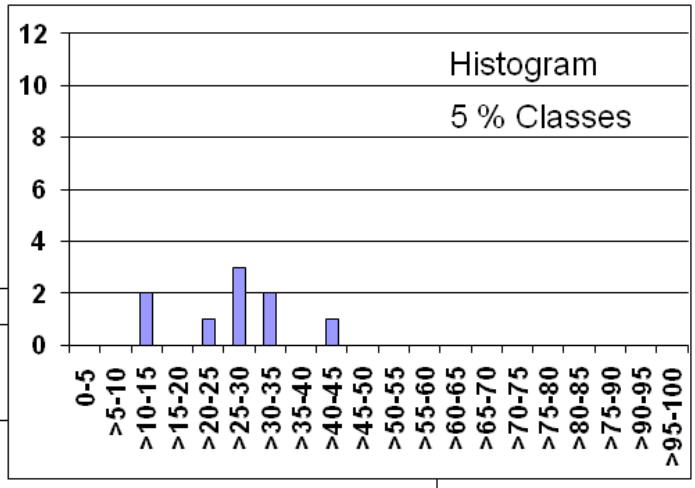
ANNEX 6: DOCUMENTATION OF THE DISTRIBUTIONS OF THE REGENERATION RATES FROM CRYOPRESERVATION IN THE GARLIC CORE COLLECTION, PART 4

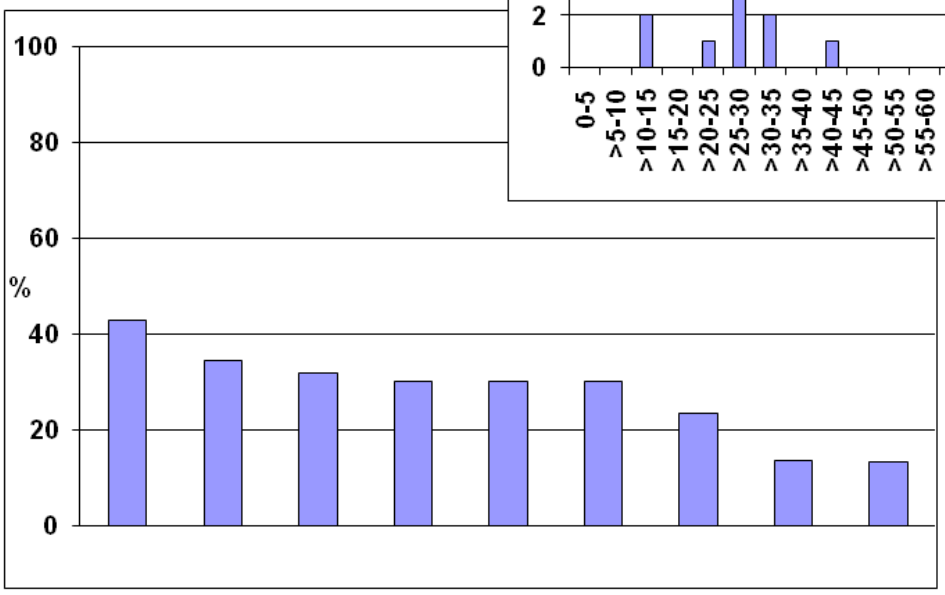
Distribution of
the regeneration rates
P2 Non-bolting Garlic





Distribution of
the regeneration rates
P3 Non-bolting Garlic





ANNEX 7: ACTION PLAN FOR FURTHER MANAGING THE EU ALLIUM COLLECTION IN THE YEARS 2011-2021

Preamble

The actions envisaged here will be performed at the own costs of the respective participants or using funds which need to be applied for, coming from other sources.

1) Steps immediately after the project termination until end of 2012

Part 1 - Actions to fulfil Deliverables not finalized in the project period

WP3:

- Soil transfer of the in vitro material of the former backbone and non-bolting accessions, especially those of Italy and France, in order to improve their multiplication on the basis of the fact learned during the EURALLIVEG implementation phase that these materials grow too slowly in vitro -- end of 2011.
- Establishment of the round-bulb phases of this field material --- August 2012
- Similar treatments in already virus-free material with special consideration of their needs to be planted in isolation caches not to lose their virus-free status --- August 2012

WP4 (D05):

- Implementation of the field performance test of the backbone accession from Poland by P3 and reporting of results --- October 2012
- Field-performance documentation of virus-free garlic accessions by P3 --- December 2012

Part 2 - New actions

WP1:

- For the safety-duplicated garlic accessions: replacing the duplicates still maintained in the fields of the respective consignee partners by the cryopreserved duplicates - December 2011.
- Passing the procedure to label the EURALLIVEG garlic accessions as European accessions (in the sense of AEGIS) in the EURISCO database (the Manager of EADB will send the EURALLIVEG accession list to the National Coordinators of the respective countries who will flag the accessions in EURISCO) – December 2012.
- Based on the already expressed agreement of the partners, the images, together with the respective passport and characterisation data of all EURALLIVEG accessions will be introduced into and further hosted on the Garlic and Shallot Core collection database of IPK, which afterwards will get a new name - December 2012.
- Finalization of the safety duplication of the shallots within the core collection – end of 2012.

WP2:

- Application of a new project or project part with the aim at analysing European garlic accessions as complete as possible by SNP markers – end of 2012

WP5:

- Introducing the final report into the EURALLIVEG website --- December 2011
- Transferring the key results of final report from the internal to the public domain of the website --- April 2012.

2) Further activities until 2016

Part 1 - Actions to fulfil Deliverables not finalized in the project period

- Complete field multiplication of the weak former backbone and non-bolting material as well as virus-free clones as a prerequisite to cryopreservation --- end of 2016.
- Parallel to the former action successive inclusion of all clones into cryopreservation, of which suffient numbers of field-grown bulbs could be harvested --- first part until end of 2016.

Part 2 - New actions

- In case of approval of the above-mentioned SNP marker project collection of leaf samples by the already involved and new partners of the European Allium collections and implementation of the new SNP marker analysis including conclusions and its documentation – End of 2015
- Exploration and adoption of additional methods to initiate cryopreservation, such as use of young inflorescence bases, pollen and embryogenic tissue cultures - 2016,
- Maintainance and updating of the project website,
- Invitation of new collection curators to introduce material into the cryopreserved collection.
- Training courses for new partners to enable them performing cryopreservation.
- Depending on the results of the planned marker analyses, inclusion of additional unique germplasm into cryopreservation – 40 accessions until 2016.

3) Scope until 2021

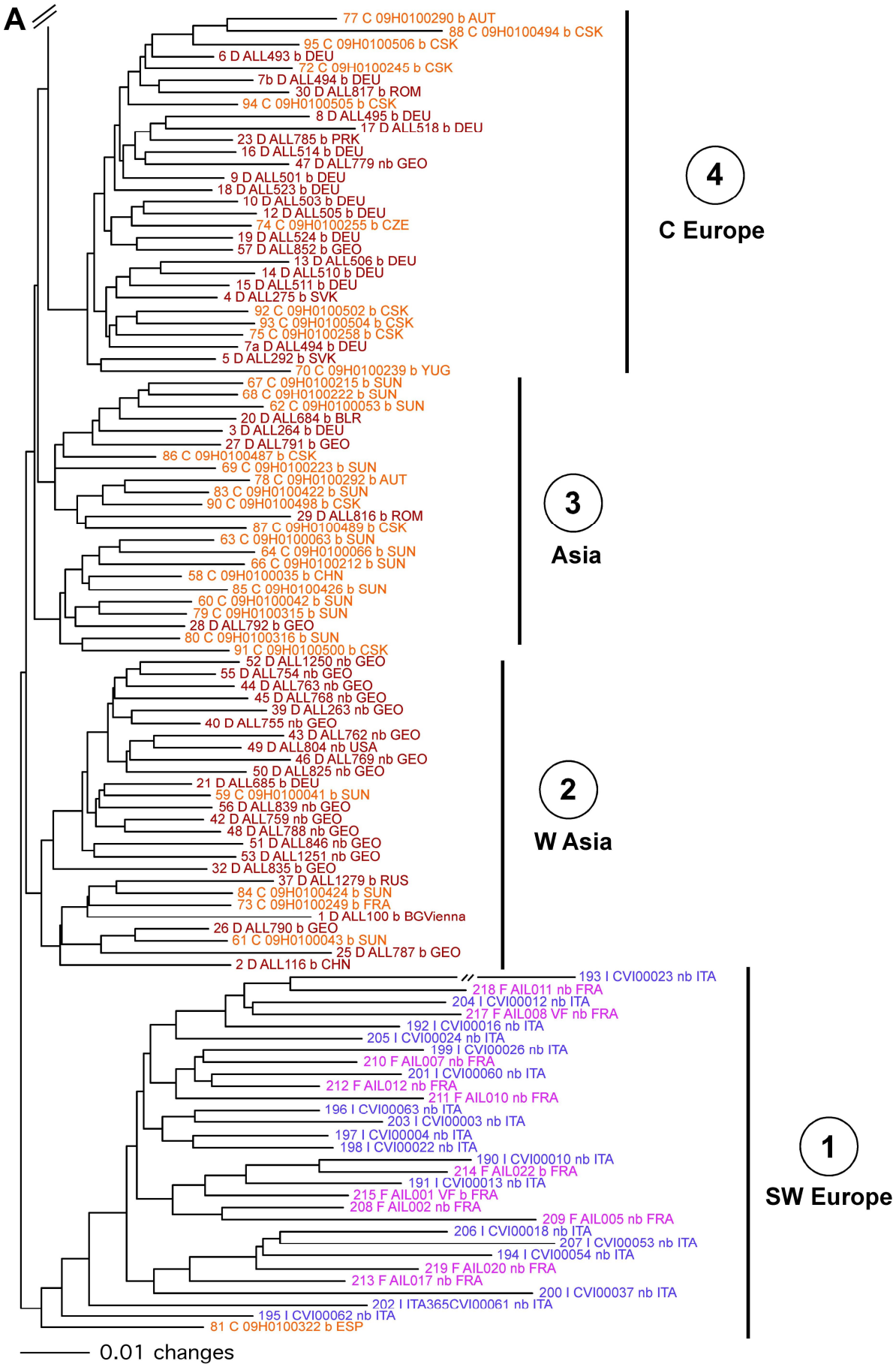
Part 1 - Actions to fulfil Deliverables not finalized in the project period

- Finalisation of cryopreservation of weak plant material as found in the EURALLVEG project.

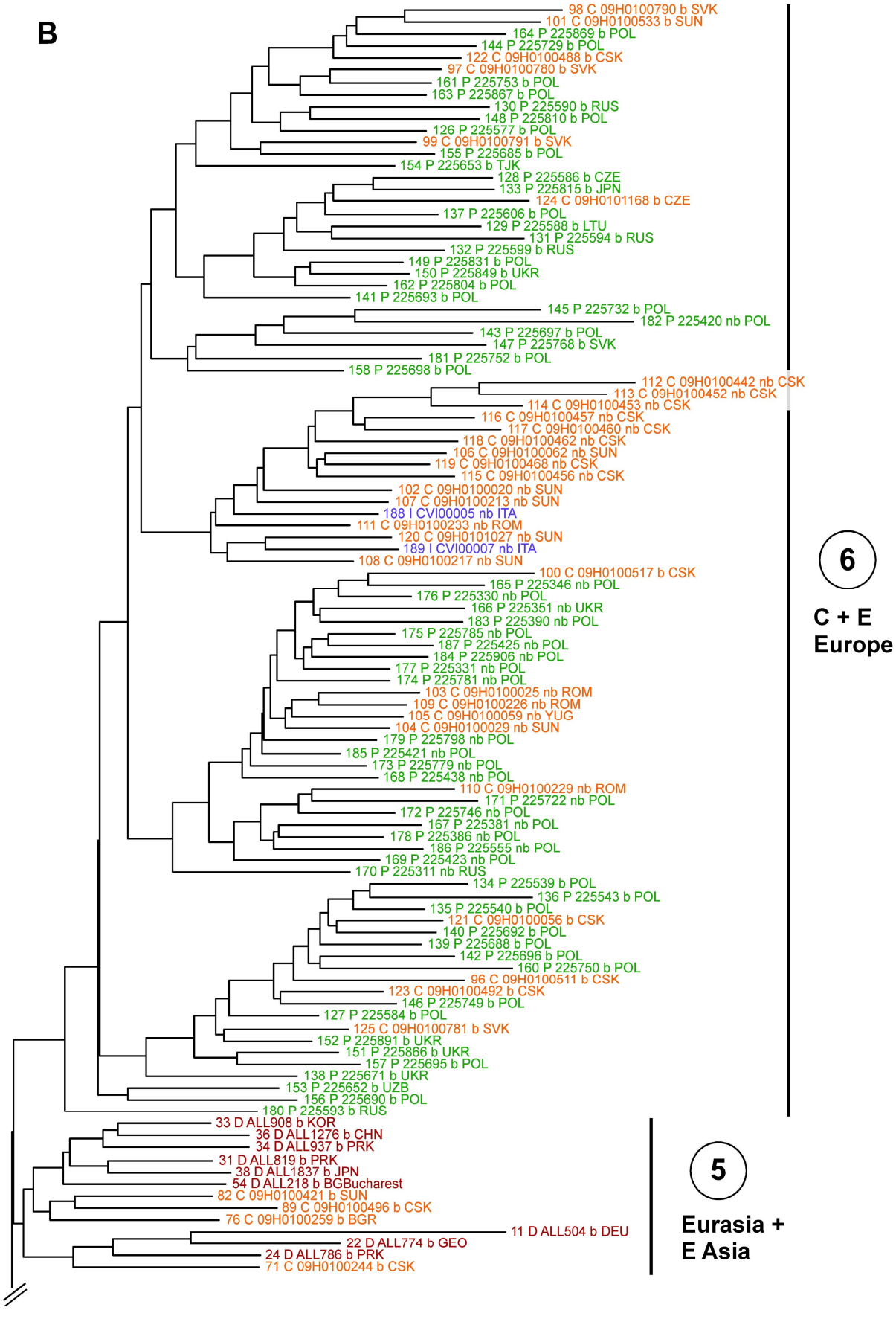
Part 2 - New actions

- Inclusion of germplasm of other Allium crop species into cryopreservation: shallot, seed-sterile leek, other material of the secondary genepool of the most important Allium crops (onion, garlic, leek) that are difficult to maintain in field genebanks.
- Further exploration and application of additional methods to initiate cryopreservation.
- Maintenance and updating of the project website.

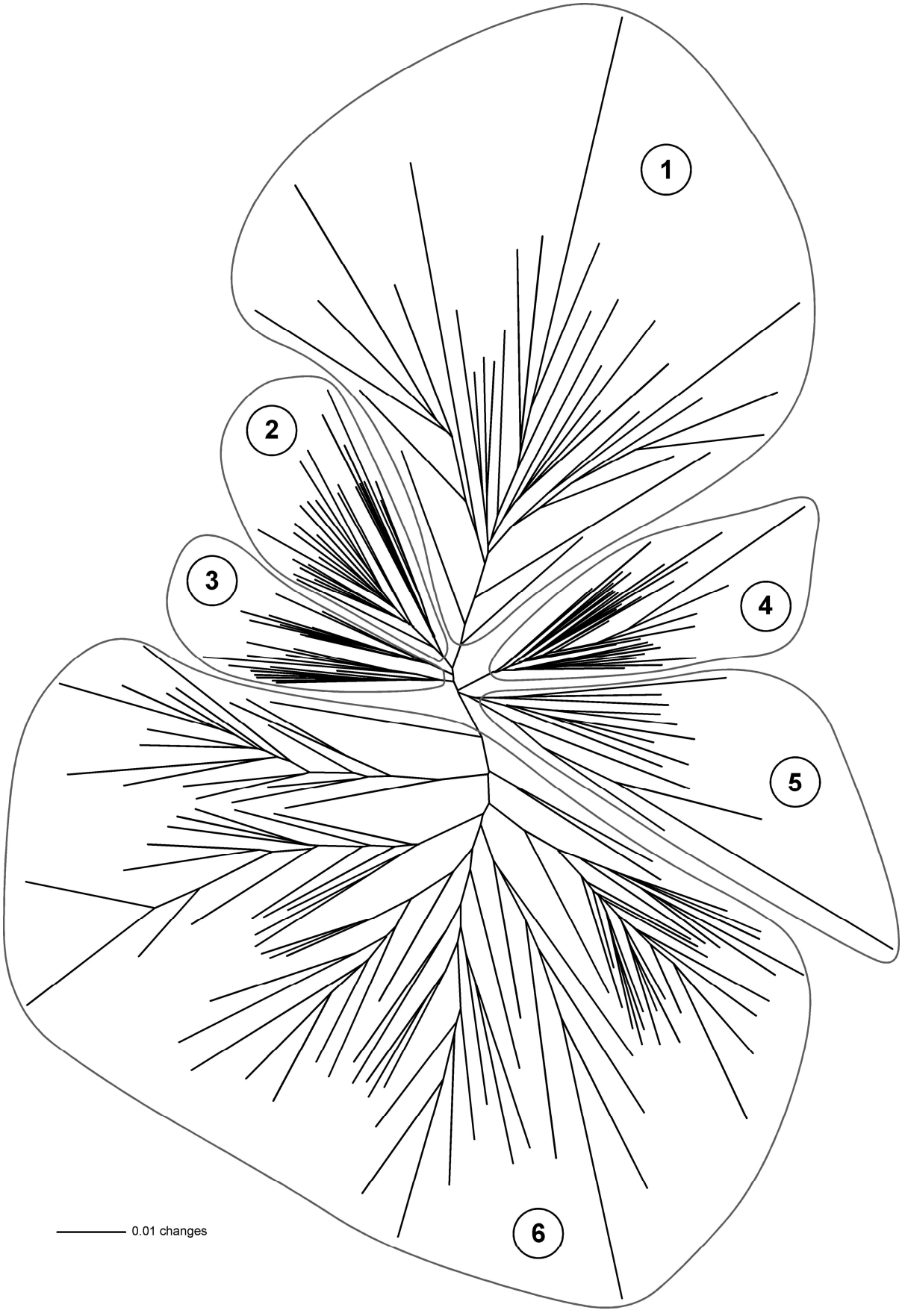
ANNEX 8: ROOTED TREE OF AFLP ANALYSIS OF THE GARLIC CORE COLLECTION (PART 1)



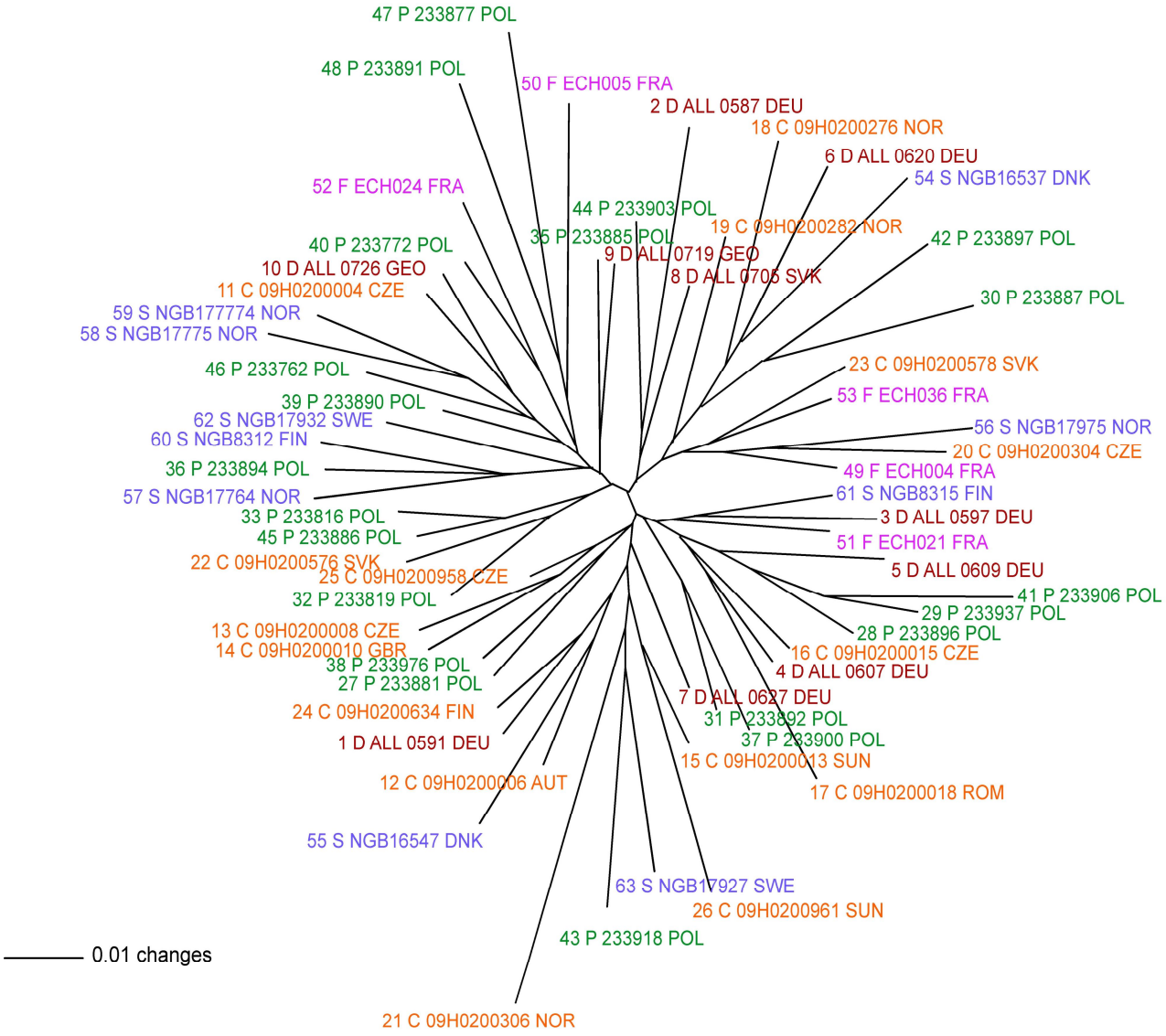
ANNEX 8: ROOTED TREE OF AFLP ANALYSIS OF THE GARLIC CORE COLLECTION (PART 2)



ANNEX 9: UNROOTED TREE OF AFLP ANALYSIS OF THE GARLIC CORE COLLECTION



ANNEX 10: UNROOTED TREE OF AFLP ANALYSIS OF THE SHALLOT CORE COLLECTION



ANNEX 11, PART 1: THE BOLTING GARLIC ACCESSIONS CRYOPRESERVED

Parti-cipant	Accession number	Bolting / Non-bolting	Other number	Countr y of origin	Acquisition year	Sum of stored explants	No. of control explants SUM	Regrown plants after 10 weeks SUM	Regrowth (%)	Safety duplicates sent to	No. of sent cryovials	No. of sent explants	Included in the core collection documentati on
P0	All 0100	B	-	BG	1953	200	131	79	60.3	CRI	5	50	x
P0	All 0116	B	K 1001	CHN	1961	130	64	25	39.1	RIVC	5	50	x
P0	All 0232*)	B	K 267	BG	1957	100	53	16	30.2	RIVC	5	50	x
P0	All 0264*)	B	-	DEU	1975	200	132	74	56.1	RIVC	5	50	x
P0	All 0275	B	K 4735	SVK	1977	130	63	23	36.5	RIVC	5	50	x
P0	All 0291*)	B	K 4713	FRA	1977	110	45	23	51.1	RIVC	5	50	x
P0	All 0292	B	K 4736	SVK	1978	100	54	24	44.4	RIVC	5	50	x
P0	All 0493	B	190	DEU	1975	200	112	13	11.6	CRI	10	100	x
P0	All 0494	B	125	DEU	1975	180	87	43	49.4	RIVC	5	50	x
P0	All 0495	B	159	DEU	1975	160	77	26	33.8	RIVC	5	50	x
P0	All 0499	B	-	DEU	1975	110	53	21	39.6	CRI	5	50	x
P0	All 0501	B	83	DEU	1975	200	109	43	39.4	CRI	5	50	x
P0	All 0503	B	120	DEU	1975	120	52	28	53.8	RIVC	5	50	x
P0	All 0504	B	158	DEU	1975	130	72	25	34.7	CRI	5	50	x
P0	All 0505	B	168	DEU	1975	200	93	33	35.5	CRI	5	50	x
P0	All 0506*)	B	211	DEU	1975	240	121	86	71.1	RIVC	5	50	x
P0	All 0508	B		DEU	1975	110	44	17	38.6	CRI	5	50	x
P0	All 0510	B	265	DEU	1975	110	53	28	52.8	RIVC	5	50	x
P0	All 0511*)	B	275	DEU	1975	200	128	103	80.5	RIVC	5	50	x
P0	All 0514	B	326	DEU	1975	200	105	33	31.4	RIVC	5	50	x
P0	All 0518	B	-	DEU	1975	130	61	33	54.1	CRI	5	50	x
P0	All 0522*)	B		DEU	1975	120	42	19	45.2	RIVC	5	50	x
P0	All 0523	B	298	DEU	1975	100	52	30	57.7	CRI	5	50	x
P0	All 0524*)	B	410	DEU	1975	100	51	26	51.0	CRI	5	50	x
P0	All 0525	B		POL	1978	100	30	13	43.3	RIVC	5	50	x
P0	All 0649*)	B	K 5615	DEU	1982	100	45	22	48.9	RIVC	5	50	x
P0	All 0684	B	-	BLR	1982	240	132	71	53.8	CRI	5	50	x
P0	All 0685	B	-	DEU	1982	220	145	15	10.3	CRI	10	100	x

ANNEX 11, PART 2: THE BOLTING GARLIC ACCESSIONS CRYOPRESERVED, CONTINUED

Parti-cipant	Accession number	Bolting / Non-bolting	Other number	Country of origin	Acquisition year	Sum of stored explants	No. of control explants SUM	Regrown plants after 10 weeks SUM	Regrowth (%)	Safety duplicates sent to	No. of sent cryovials	No. of sent explants	Included in the core collection documentation
P0	All 0771	B	K 6024	GEO	1983	120	48	20	41.7	CRI	5	50	
P0	All 0774	B	K 6028	GEO	1983	100	56	25	44.6	CRI	5	50	x
P0	All 0785	B	K 6801	PRK	1986	160	72	42	58.3	RIVC	5	50	x
P0	All 0786*)	B	K 6802	PRK	1986	100	64	20	31.3	RIVC	5	50	x
P0	All 0787	B	K 6803	GEO	1986	130	96	34	35.4	RIVC	5	50	x
P0	All 0790	B	K 6811	GEO	1986	180	93	44	47.3	CRI	5	50	x
P0	All 0791	B	K 6819	GEO	1986	360	198	74	37.4	CRI	5	50	x
P0	All 0792	B	K 6820	GEO	1986	130	66	21	31.8	CRI	5	50	x
P0	All 0813*)	B	K 7012	ROM	1986	150	51	22	43.1	RIVC	5	50	x
P0	All 0816	B	K 7015	ROM	1986	120	73	30	41.1	CRI	5	50	x
P0	All 0817	B	K 7016	ROM	1986	100	54	33	61.1	CRI	5	50	x
P0	All 0819	B	K 7041	PRK	1986	140	65	27	41.5	CRI	5	50	x
P0	All 0835	B	K 7099	GEO	1986	200	125	54	43.2	RIVC	5	50	x
P0	All 0843*)	B	K 7111	GEO	1986	100	40	15	37.5	RIVC	5	50	x
P0	All 0937	B	K 7806	PRK	1988	130	67	53	79.1	CRI	5	50	x
P0	All 1161*)	B	TAX 546	BG	1996	120	50	20	40.0	RIVC	5	50	
P0	All 1166*)	B	TAX 1575	BG	1996	200	103	20	19.4	RIVC	10	100	x
P0	All 1264*)	B	K 8831	JPN	1992	100	48	17	35.4	RIVC	5	50	x
P0	All 1272*)	B	K 9139	TKM	1993	150	87	63	72.4	RIVC	5	50	x
P0	All 1276*)	B	K 9143	CHN	1993	120	51	16	31.4	RIVC	5	50	x
P0	All 1277*)	B	K 9144	TJK	1993	100	49	27	55.1	RIVC	5	50	x
P0	All 1279*)	B	K 9146	RUS	1993	100	62	32	51.6	RIVC	5	50	x
P0	All 1453	B	K 8916	DEU	1998	100	59	27	45.8	CRI	5	50	x
P0	All 1837*)	B	TAX 452	JPN	1985	200	118	87	73.7	RIVC	5	50	x
P0	All 1838	B	TAX 1125	UZB	----	100	42	19	45.2	CRI	5	50	x
P0	All 1839	B	TAX 1337	TJK	1984	100	44	20	45.5	CRI	5	50	x

*) Accessions virus-free (see Annex 5).

ANNEX 11, PART 3: THE BOLTING GARLIC ACCESSIONS CRYOPRESERVED, CONTINUED:

Parti-cipant	Accession number	Bolting / Non-bolting	Other number	Country of origin	Acquisition year	Sum of stored explants	No. of control explants SUM	Regrown plants after 10 weeks SUM	Regrowth (%)	Safety duplicates sent to	No. of sent cryovials	No. of sent explants	Included in the core collection documentation
P1	09H0100035	B	1028	CHN	1966	120	40	22	55.0	IPK	3	60	x
P1	09H0100036	B	1029	SUN	1954	120	40	24	60.0	RIVC	3	60	x
P1	09H0100041	B	1035	SUN	1954	120	40	22	55.0	IPK	3	60	x
P1	09H0100042	B	1036	SUN	1954	120	40	32	80.0	IPK	4	80	x
P1	09H0100043	B	1037	SUN	1954	120	40	31	77.5	IPK	4	80	x
P1	09H0100049	B	1205	CZE	1982	120	40	21	52.5	RIVC	3	60	x
P1	09H0100053	B	1041	SUN	1954	120	40	14	35.0	IPK	4	80	x
P1	09H0100056	B	1044	CZE	1966	120	40	22	55.0	RIVC	3	60	x
P1	09H0100063	B	1047	SUN	1983	120	40	29	72.5	IPK	3	60	x
P1	09H0100066	B	1048	SUN	1983	120	40	20	50.0	IPK	4	80	x
P1	09H0100070	B	1050	BEL	1975	120	40	21	52.5	IPK	3	60	
P1	09H0100080	B	1057	CZE	1973	120	40	20	50.0	RIVC	3	60	
P1	09H0100081	B	1058	CSK	1985	120	40	12	30.0	IPK	3	60	
P1	09H0100211	B	1053	SUN	1986	240	80	38	47.5	IPK	4	80	x
P1	09H0100212	B	1209	SUN	1986	120	56	22	39.3	IPK	3	60	x
P1	09H0100214	B	1210	KAZ	1986	120	40	24	60.0	RIVC	3	60	
P1	09H0100215	B	1211	SUN	1986	120	37	19	51.4	RIVC	3	60	x
P1	09H0100222	B	1216	SUN	1986	120	16	10	62.5	IPK	3	60	x
P1	09H0100223	B	1217	SUN	1986	120	40	32	80.0	IPK	3	60	x
P1	09H0100225	B	1218	ROM	1986	240	78	19	24.4	IPK	4	80	x
P1	09H0100239	B	1222	CZE	1986	120	40	23	57.5	IPK	3	60	x
P1	09H0100244	B	1054	CZE	1960	120	40	17	42.5	IPK	3	60	x
P1	09H0100245	B	1055	CZE	1960	120	40	26	65.0	RIVC	3	60	x
P1	09H0100249	B	1226	FRA	1986	120	40	22	55.0	IPK	6	120	x
P1	09H0100250	B	1227	SUN	1987	120	40	33	82.5	RIVC	3	60	
P1	09H0100251	B	1228	CZE	1986	120	58	32	55.2	RIVC	3	60	
P1	09H0100252	B	1229	CSK	1986	120	40	21	52.5	RIVC	3	60	x
P1	09H0100255	B	1230	CZE	1986	120	40	18	45.0	IPK	3	60	x
P1	09H0100258	B	1056	CZE	1986	120	40	14	35.0	IPK	3	60	x

ANNEX 11, PART 4: THE BOLTING GARLIC ACCESSIONS CRYOPRESERVED, CONTINUED:

Parti-cipant	Accession number	Bolting / Non-bolting	Other number	Country of origin	Acquisition year	Sum of stored explants	No. of control explants SUM	Regrown plants after 10 weeks SUM	Regrowth (%)	Safety duplicates sent to	No. of sent cryovials	No. of sent explants	Included in the core collection documentation
P1	09H0100260	B	1233	BGR	1986	120	40	24	60.0	RIVC	3	60	x
P1	09H0100261	B	1234	BGR	1986	120	40	19	47.5	RIVC	3	60	x
P1	09H0100288	B	1241	AUT	1987	120	40	26	65.0	IPK	4	80	
P1	09H0100292	B	1244	AUT	1987	120	40	30	75.0	IPK	3	60	x
P1	09H0100315	B	1247	SUN	1983	120	40	25	62.5	IPK	3	60	x
P1	09H0100316	B	1248	SUN	1986	240	60	26	43.3	IPK	3	60	x
P1	09H0100322	B	1254	ESP	1987	120	34	16	47.0	IPK	3	60	x
P1	09H0100357	B	1265	HUN	1987	120	40	27	67.5	RIVC	3	60	x
P1	09H0100358	B	1266	HUN	1987	120	60	35	58.3	RIVC	3	60	x
P1	09H0100419	B	1289	SUN	1987	120	26	9	34.6	RIVC	3	60	
P1	09H0100421	B	1291	SUN	1987	120	40	14	35.0	IPK	3	60	x
P1	09H0100422	B	1292	SUN	1987	120	40	13	32.5	IPK	3	60	x
P1	09H0100424	B	1294	SUN	1987	120	40	30	75.0	IPK	6	120	x
P1	09H0100426	B	1296	SUN	1987	120	40	28	70.0	IPK	6	120	x
P1	09H0100484	B	1299	CSK	1987	240	80	15	18.8	RIVC	6	120	x
P1	09H0100485	B	1300	CSK	1987	120	40	16	40.0	RIVC	3	60	x
P1	09H0100487	B	1302	CSK	1987	120	37	21	56.8	IPK	3	60	x
P1	09H0100488	B	1303	CZE	1987	120	40	21	52.5	RIVC	3	60	x
P1	09H0100489	B	1304	CZE	1987	120	40	20	50.0	RIVC	3	60	x
P1	09H0100492	B	1307	CZE	1987	100	40	13	32.5	RIVC	2	40	x
P1	09H0100494	B	1309	CSK	1987	120	41	22	53.7	RIVC	3	60	x
P1	09H0100495	B	1310	CSK	1987	120	40	23	57.5	RIVC	3	60	x
P1	09H0100496	B	1321	CSK	1987	120	39	18	46.2	IPK	3	60	x
P1	09H0100498	B	1323	CSK	1987	120	55	21	38.2	IPK	6	120	x
P1	09H0100500	B	1325	CSK	1987	120	40	19	47.5	IPK	3	60	x
P1	09H0100502	B	1326	CZE	1988	120	40	22	55.0	IPK	3	60	x
P1	09H0100505	B	1328	CZE	1988	140	64	21	32.8	IPK	3	60	x
P1	09H0100511	B	1341	CZE	1988	180	60	22	36.7	IPK	3	60	x
P1	09H0100517	B	1426	SVK	1988	120	11	4	36.4	IPK	3	60	x

ANNEX 11, PART 5: THE BOLTING GARLIC ACCESSIONS CRYOPRESERVED, CONTINUED

Parti-cipant	Accession number	Bolting / Non-bolting	Other number	Country of origin	Acquisition year	Sum of stored explants	No. of control explants SUM	Regrown plants after 10 weeks SUM	Regrowth (%)	Safety duplicates sent to	No. of sent cryovials	No. of sent explants	Included in the core collection documentation
P1	09H0100519	B	1347	SVK	1988	120	40	14	35.0	RIVC	3	60	
P1	09H0100533	B	1353	SUN	1988	120	32	18	56.3	IPK	3	60	x
P1	09H0100536	B	1356	SUN	1988	120	40	27	67.5	RIVC	3	60	
P1	09H0100780	B	1386	SVK	1988	120	40	14	35.0	IPK	6	120	x
P1	09H0100781	B	1387	SVK	1988	120	40	100	30.0	RIVC	3	60	x
P1	09H0100787	B	1391	SVK	1988	120	40	17	42.5	RIVC	3	60	x
P1	09H0100788	B	1392	SVK	1988	120	40	25	62.5	RIVC	3	60	x
P1	09H0100790	B	1394	SVK	1988	120	40	18	45.0	IPK	6	120	x
P1	09H0100791	B	1395	SVK	1989	120	40	13	32.5	IPK	6	120	x
P1	09H0100792	B	1396	SVK	1989	120	40	25	62.5	RIVC	3	60	x
P1	09H0100794	B	1397	SVK	1989	120	40	30	75.0	IPK	3	60	x
P1	09H0100795	B	1398	SVK	1989	120	40	24	60.0	RIVC	3	60	x
P1	09H0100796	B	1399	SVK	1989	120	40	20	50.0	RIVC	3	60	x
P1	09H0100797	B	1400	SVK	1989	120	40	22	55.0	RIVC	3	60	x
P1	09H0100798	B	1401	SVK	1989	120	40	19	47.5	RIVC	3	60	x
P1	09H0100803	B	1405	SVK	1989	120	40	18	45.0	IPK	3	60	
P1	09H0100804	B	1406	SVK	1989	120	40	18	45.0	RIVC	3	60	x
P1	09H0100807	B	1408	SVK	1989	120	40	13	32.5	RIVC	3	60	x
P1	09H0100808	B	1409	SVK	1989	120	40	29	72.5	RIVC	3	60	x
P1	09H0100919	B	1436	SUN	1988	120	40	20	50.0	RIVC	3	60	
P1	09H0100925	B	1442	UZB	1988	120	40	25	62.5	IPK	3	60	
P1	09H0101037	B	2015	SUN	1992	120	40	23	57.5	IPK	3	60	
P1	09H0100940	B	1462	SUN	1988	120	41	32	78.0	RIVC	3	60	
P1	09H0100983	B	2681	CZE	1995	120	40	24	60.0	RIVC	2	40	x
P1	09H0100984	B	2682	CZE	1995	120	40	37	92.5	RIVC	3	60	
P1	09H0100985	B	2683	CZE	1995	120	40	28	70.0	RIVC	3	60	
P1	09H0101052	B	2655	CZE	1995	120	40	26	65.0	RIVC	3	60	
P1	09H0101093	B	2804	CZE	2000	120	40	30	75.0	IPK	3	60	
P1	09H0101169	B	2806	CZE	1999	120	41	25	61.0	IPK	6	120	

ANNEX 11, PART 6: THE BOLTING GARLIC ACCESSIONS CRYOPRESERVED, CONTINUED

Parti-cipant	Accession number	Bolting / Non-bolting	Other number	Country of origin	Acquisition year	Sum of stored explants	No. of control explants SUM	Regrown plants after 10 weeks SUM	Regrowth (%)	Safety duplicates sent to	No. of sent cryovials	No. of sent explants	Included in the core collection documentation
P2	225539	B	0232K	POL	1991	100	64	26	40.6	IPK	5	50	x
P2	225540	B	0233K	POL	1991	100	79	27	34.2	IPK	5	50	x
P2	225543	B	0236K	POL	1991	100	30	15	50.0	IPK	5	50	x
P2	225551	B	0244K	POL	1991	100	50	37	74.0	CRI	5	50	
P2	225586	B	0159K	CZE	1989	100	50	15	30.0	IPK	5	50	x
P2	225588	B	0168K	LTU	1990	100	50	21	42.0	IPK	5	50	x
P2	225590	B	0171K	RUS	1990	100	50	34	68.0	IPK	5	50	x
P2	225593*)	B	0180K	RUS	1990	100	50	15	30.0	IPK	5	50	x
P2	225594	B	0183K	RUS	1990	100	50	17	34.0	IPK	5	50	x
P2	225599	B	0190K	RUS	1990	200	100	28	28.0	IPK	5	50	x
P2	225600	B	0192K	RUS	1990	100	50	27	54.0	IPK	5	50	
P2	225604	B	0256K	POL	1994	200	89	18	20.2	IPK	10	100	x
P2	225653	B	0303K	TJK	1988	100	50	22	44.0	IPK	5	50	x
P2	225671	B	0333K	UKR	1997	110	82	64	78.0	IPK	5	50	x
P2	225685	B	0347K	POL	1997	100	50	45	90.0	IPK	5	50	x
P2	225688	B	0350K	POL	1997	100	50	36	72.0	IPK	5	50	x
P2	225690	B	0352K	POL	1997	100	50	34	68.0	IPK	5	50	x
P2	225692	B	0354K	POL	1997	100	50	36	72.0	IPK	5	50	x
P2	225693	B	0355K	POL	1997	100	66	22	33.3	IPK	5	50	x
P2	225695	B	0357K	POL	1997	100	40	28	70.0	IPK	5	50	x
P2	225696	B	0358K	POL	1997	100	50	41	82.0	IPK	5	50	x
P2	225697	B	0359K	POL	1997	100	52	20	38.5	CRI	5	50	x
P2	225698	B	0360K	POL	1997	100	50	15	30.0	CRI	5	50	x
P2	225721	B	0385K	POL	1998	100	50	38	76.0	CRI	5	50	x
P2	225729	B	0393K	POL	1998	200	100	42	42.0	CRI	5	50	x
P2	225732	B	0396K	POL	1998	100	50	42	84.0	CRI	5	50	x
P2	225749	B	0416K	POL	1999	200	98	41	41.8	CRI	5	50	x
P2	225750	B	0417K	POL	1999	100	50	21	42.0	CRI	5	50	x

ANNEX 11, PART 7: THE BOLTING GARLIC ACCESSIONS CRYOPRESERVED, CONTINUED

Parti-cipant	Accession number	Bolting / Non-bolting	Other number	Country of origin	Acquisition year	Sum of stored explants	No. of control explants SUM	Regrown plants after 10 weeks SUM	Regrowth (%)	Safety duplicates sent to	No. of sent cryovials	No. of sent explants	Included in the core collection documentation
P2	225753	B	0420K	POL	1999	100	50	16	32.0	CRI	5	50	x
P2	225768	B	0435K	SVK	1999	100	50	43	86.0	CRI	5	50	x
P2	225804*)	B	0438K	POL	2003	100	50	35	70.0	CRI	5	50	x
P2	225810	B	0444K	POL	2002	100	50	46	92.0	CRI	5	50	x
P2	225815	B	0230K	JPN	1991	100	50	28	56.0	CRI	5	50	x
P2	225831	B	0463K	POL	2005	100	50	44	88.0	CRI	5	50	x
P2	225849	B	0481K	UKR	2006	100	48	26	54.2	CRI	5	50	x
P2	225866	B	0509K	UKR	2006	100	50	34	68.0	CRI	5	50	x
P2	225891	B	0534K	UKR	2006	100	50	33	66.0	CRI	5	50	x
P2	225894	B	0499K	POL	2006	100	50	17	34.0	CRI	5	50	x
P2	225896	B	0501K	POL	2006	100	50	35	70.0	CRI	5	50	x

*) Accessions virus-free (see Annex 5).

ANNEX 12, PART 1: NON-BOLTING GARLIC ACCESSIONS CRYOPRESERVED

Parti-cipant	Accession number	Bolting / Non-bolting	Other number	Country of origin	Acquisition year	Sum of stored explants	No. of control explants SUM	Regrown plants after 10 weeks SUM	Regrowth (%)	Safety duplicates sent to	No. of sent cryovials	No. of sent explants	vf	Included in the core collection documentation
P0	All 0263	NB	K 4561	GEO	1975	100	53	16	30.2	CRI	5	50		x
P0	All 0755*)	NB	K 5865	GEO	1982	200	99	14	14.1					x
P0	All 0759*)	NB	K 5873	*GEO*	*1982*	200	107	14	13.1					x
P0	All 0762	NB	K 5876	GEO	1982	130	44	16	36.4	CRI	5	50		x
P0	All 0763	NB	K 5878	GEO	1982	110	44	24	54.5	RIVC	5	50		x
P0	All 0768	NB	K 6019	GEO	1983	170	65	25	38.5	RIVC	5	50		x
P0	All 0769	NB	K 6022	GEO	1983	230	138	22	15.9	CRI	10	100		x
P0	All 0788	NB	K 6805	GEO	1986	140	78	29	37.2	RIVC	5	50		x
P0	All 0825**)	NB	K 7085	GEO	1986	130	52	15	28.8					x
P0	All 1251	NB	K 7996	GEO	1989	200	85	17	20.0	CRI	10	100		x
P1	09H0100025	NB	1007	ROM	1965	120	52	20	38.5	RIVC	3	60		x
P1	09H0100059	NB	1018	YUG	1983	120	43	20	46.5	RIVC	3	60		x
P1	09H0100226	NB	1090	ROM	1986	120	60	27	45.0	IPK	3	60		x
P1	09H0100233	NB	1093	ROM	1986	120	44	20	45.5	IPK	3	60		x
P2	225311	NB	0101K	RUS	1980	100	50	15	30.0	IPK	5	50		x
P2	225331	NB	0015K	POL	1986	100	50	17	34,0	RIVC	10	100		
P2	225330	NB	0014K	POL	1986	100	50	20	40.0	IPK	5	50		x
P2	225346	NB	0023K	POL	1986	110	48	16	33.3	IPK	5	50		x
P2	225351	NB	0035K	UKR	1980	100	50	18	36.0	IPK	5	50		x
P2	225381	NB	0038K	POL	1981	200	99	22	22.1	CRI	10	100		x
P2	225386***)	NB	0069K	POL	1981	100	50	24	48.0	IPK	5	50	BB	x
P2	225423	NB	0072K	POL	1982	100	50	15	30.0	IPK	5	50		x
P2	225438	NB	0050K	POL	1983	100	50	16	32.0	CRI	5	50		x
P2	225722	NB	0386K	POL	1998	100	50	16	32.0	CRI	5	50		x
P2	225779	NB	1012K	POL	1999	200	90	16	17.8	CRI	5	50		x
P2	225781	NB	1014K	POL	2000	200	97	18	18.6	IPK	10	100		x
P2	225785	NB	1018K	POL	2000	200	200	23	25.6	CRI	10	100		x
P2	225798***)	NB	1021K	POL	2001	100	50	21	42.0	CRI	5	50	BB	x

ANNEX 12, PART 2: NON-BOLTING GARLIC ACCESSIONS CRYOPRESERVED, CONTINUED

Parti-cipant	Accession number	Bolting / Non-bolting	Other number	Country of origin	Acquisition year	Sum of stored explants	No. of control explants SUM	Regrown plants after 10 weeks SUM	Regrowth (%)	Safety duplicates sent to	No. of sent cryovials	No. of sent explants	vf	Included in the core collection documentation
P2	225800	NB	0445K	POL	2002	100	50	16	32.0	CRI	5	50		
P2	225817	NB	0413K	POL	1999	208	100	13	13.0	CRI	5	50		x
P3	CV100004	NB	CV90-4	ITA	1995	100	50	15	30.0	RIVC/IPK	5	50		x
P3	CV100007	NB	CV90-7	ITA	1995	140	93	32	34.4	IPK/RIVC	5	50		x
P3	CV100013	NB	CV90-13	ITA	1995	200	132	31	23.5	IPK/CRI	10	100		x
P3	CV100022	NB	CV90-22	ITA	1997	200	96	13	13.5	RIVC/IPK	10	100		x
P3	CV100023	NB	CV90-23	ITA	1997	200	91	12	13.2	IPK/CRI	10	100		x
P3	CV100026	NB	CV90-26	ITA	1997	100	50	16	32.0	RIVC/IPK	10	100		
P3	CV100037	NB	CV90-37	ITA	1997	100	50	15	30.0	RIVC/IPK	5	50		x
P3	CV100060	NB	CV90-60	ITA	2001	100	50	17	43.0	RIVC/IPK	10	100		x
P3	CV100061	NB	CV90-61	ITA	2001	100	50	15	30.0	RIVC/IPK	5	50		x

*) Accession already completely in cryopreservation. Safety duplication pending.
**) Material incompletely cryopreserved, will be completed later, see Action plan for further managing (Annex 7)
***) Accession belongs to the backbone subset (virus-free).

ANNEX 13: BACKBONE SUBSET COMPLETELY CRYOPRESERVED

Parti-cipant	Accession number	Bolting / Non-bolting	Other number	Country of origin	Acquisition year	Sum of stored explants	No. of control explants SUM	Regrown plants after 10 weeks SUM	Regrowth (%)	Safety duplicates sent to	No. of sent cryovials	No. of sent explants
P2	225593	B	0180K	RUS	1990	100	50	15	30.0	IPK	5	50
P2	225804	B	0438K	POL	2003	100	50	35	70.0	CRI	5	50
P2	225386	NB	0069K	POL	1981	100	50	24	48.0	IPK	5	50
P2	225798	NB	1021K	POL	2001	100	50	21	42.0	CRI	5	50

ANNEX 14, PART 1: SAFETY DUPLICATED ACCESSIONS SENT FROM P0 TO P1

ACCENUMB	COLLNUMB	SUBTAXA	ACQDATE	ORIGCTY	OTHER NUMB	NO OF CRYO-VIALS	NO. OF SENT EXPLANTS
ALL 0100		Ophioscorodon group	1953	AUT		5	50
ALL 0263	501	Sativum group, non-bolting	1975	GEO	K 4561	5	50
ALL 0493	190	Ophioscorodon group	1975	DEU		10	100
ALL 0499	10	Ophioscorodon group	1975	DEU		5	50
ALL 0501	83	Ophioscorodon group	1975	DEU		5	50
ALL 0504	158	Ophioscorodon group	1975	DEU		5	50
ALL 0505	168	Ophioscorodon group	1975	DEU		5	50
ALL 0508	244	Ophioscorodon group	1975	DEU		5	50
ALL 0518	291	Ophioscorodon group	1975	DEU		5	50
ALL 0523	298	Ophioscorodon group	1975	DEU		5	50
ALL 0524	410	Ophioscorodon group	1975	DEU		5	50
ALL 0684		Longicuspis Group	1982	BLR		5	50
ALL 0685		Sativum group, bolting	1982	DEU		10	100
ALL 0762	514	Sativum group, non-bolting	1982	GEO	K 5876	5	50
ALL 0769	779	Sativum group, non-bolting	1983	GEO	K 6022	10	100
ALL 0771	792	Longicuspis Group	1983	GEO	K 6024	5	50
ALL 0774	851	Longicuspis Group	1983	GEO	K 6028	5	50
ALL 0790	1432	Longicuspis Group	1986	GEO	K 6811	5	50
ALL 0791	1470	Longicuspis Group	1986	GEO	K 6819	5	50
ALL 0792	1471	Longicuspis Group	1986	GEO	K 6820	5	50
ALL 0816		Sativum group, bolting	1986	ROM	K 7015	5	50
ALL 0817		Ophioscorodon group	1986	ROM	K 7016	5	50
ALL 0819		Pekinense group	1986	PRK	K 7041	5	50
ALL 0937	29	Pekinense group	1988	PRK	K 7806	5	50
ALL 1251	2722	Sativum group, non-bolting	1989	GEO	K 7996	10	100
ALL 1279		Longicuspis Group	1993	RUS	K 9146	5	50
ALL 1453		Ophioscorodon group	1998	ROM	K 8916	5	50
ALL 1838		Longicuspis Group	1984	UZB	TAX 1125	5	50
ALL 1839	T 44	Longicuspis Group	1984	TJK	TAX 1337	5	50
CV100013	CV90-13	Sativum group, non-bolting	1995	ITA		10	100
CV100023	CV90-23	Sativum group, non-bolting	1997	ITA		10	100

ANNEX 14, PART 2: SAFETY DUPLICATED ACCESSIONS SENT FROM P0 TO P2

ACCENUMB	COLL NUMB	SUBTAXA	ACQDATE	ORIGCTY	OTHERNUMB	NO OF CRYO-VIALS	NO. OF SENT EXPLANTS
ALL 0116		Sativum group, bolting	1961	CHN	K 1001	5	50
ALL 0232		Allium sativum L. Ophioscorodon Group	1957	BEL	K 267	5	50
ALL 0264		Longicuspis Group	1975	DEU		5	50
ALL 0275	46	Ophioscorodon group	1977	SVK	K 4735	5	50
ALL 0291		Allium sativum L. Ophioscorodon Group	1977	FRA	K 4713	5	50
ALL 0292	259	Ophioscorodon group	1978	SVK	K 4736	5	50
ALL 0494	125	Ophioscorodon group	1975	DEU		5	50
ALL 0495	159	Ophioscorodon group	1975	DEU		5	50
ALL 0503	120	Ophioscorodon group	1975	DEU		5	50
ALL 0506	211	Ophioscorodon group	1975	DEU		5	50
ALL 0510	265	Ophioscorodon group	1975	DEU		5	50
ALL 0511	275	Ophioscorodon group	1975	DEU		5	50
ALL 0514	326	Ophioscorodon group	1975	DEU		5	50
ALL 0522	136	Ophioscorodon group	1975	DEU		5	50
ALL 0525	69	Ophioscorodon group	1978	POL		5	50
ALL 0649		Ophioscorodon group	1982	ROM	K 5615	5	50
ALL 0763	591	Sativum group, non-bolting	1982	GEO	K 5878	5	50
ALL 0768	752 , 753	Sativum group, non-bolting	1983	GEO	K 6019	5	50
ALL 0785	49	Pekinense group	1986	PRK	K 6801	5	50
ALL 0786	74	Pekinense group	1986	PRK	K 6802	5	50
ALL 0787	1361	Longicuspis Group	1986	GEO	K 6803	5	50
ALL 0788	1374	Sativum group, non-bolting	1986	GEO	K 6805	5	50
ALL 0813		Allium sativum L. Ophioscorodon Group	1986	ROM	K 7012	5	50
ALL 0835	1995	Longicuspis Group	1986	GEO	K 7099	5	50
ALL 0843	2099	Ophioscorodon group	1986	GEO	K 7111	5	50
ALL 1161		Allium sativum L. Longicuspis Group	1996	KAZ	TAX 546	5	50
ALL 1166		Allium sativum L. Longicuspis Group	1996	HUN	TAX 1575	10	100
ALL 1264	5	Pekinense group	1993	JPN	K 8831	5	50
ALL 1272		Allium sativum L. Ophioscorodon Group	1993	TKM	K 9139	5	50
ALL 1276		Pekinense group	1993	CHN	K 9143	5	50
ALL 1277		Allium sativum L. Ophioscorodon Group	1993	TJK	K 9144	5	50
ALL 1279		Allium sativum L. Longicuspis Group	1993	RUS	K 9146	5	50
ALL 1837		Allium sativum L. Longicuspis Group	1985	JPN	TAX 452	5	50
CV100007	CV90-7	Allium sativum L., non bolting	1995	ITA		5	50

ANNEX 14, PART 3: SAFETY DUPLICATED ACCESSIONS SENT FROM P1 TO P0

ACCENUMB	ACCENAME	ACQDATE	ORIGCTY	OTHERNUMB	NO OF CRYO-VIALS	NO. OF SENT EXPLANTS
09H0100035	Cinsky Obrovsky	1966	CHN	1028	3	60
09H0100041	Andinzanskij	1954	SUN	1035	3	60
09H0100042	Uzbeckij	1954	SUN	1036	4	80
09H0100043	Dvurutchka	1954	SUN	1037	4	80
09H0100053	Tianshanskij	1954	SUN	1041	4	80
09H0100063	landrace (Krasnodar)	1983	SUN	1047	3	60
09H0100066	Kirgizskij	1983	SUN	1048	4	80
09H0100070*)	Brusel	1975	BEL	1050	3	60
09H0100081*)	Ropal	1985	CSK	1058	3	60
09H0100211	landrace (Gagra 51)	1986	SUN	1053	4	80
09H0100212	landrace (Picunda 41)	1986	SUN	1209	3	60
09H0100222	landrace (Sochi 22)	1986	SUN	1216	3	60
09H0100223	landrace (Sochi 23)	1986	SUN	1217	3	60
09H0100225	landrace (Tulcea 1)	1986	ROM	1218	4	80
09H0100226	landrace (Mahmudia)	1986	ROM	1090	3	60
09H0100233	landrace (Lidkov 2)	1986	ROM	1093	3	60
09H0100239	Jugoslavska	1986	CZE	1222	3	60
09H0100244	landrace (Olomouc 3)	1960	CZE	1054	3	60
09H0100249	landrace (FRA 1)	1985	FRA	1226	6	120
09H0100255	HA-1 new breeding	1986	CZE	1230	3	60
09H0100258	Bzenecky (mutant)	1986	CZE	1056	3	60
09H0100288*)	landrace (Gerstel)	1987	AUT	1241	4	80
09H0100290*)	landrace (Katzerdorf)	1987	AUT	1243	3	60
09H0100292	landrace (Zistersdorf)	1987	AUT	1244	3	60
09H0100315	landrace (Tiraspol)	1983	SUN	1247	3	60
09H0100316	landrace (Sochi 24\1)	1986	SUN	1248	3	60
09H0100322	landrace (Valencia 2)	1987	ESP	1254	3	60
09H0100421		1987	SUN	1291	3	60
09H0100422		1987	SUN	1292	3	60
09H0100424		1987	SUN	1294	6	120
09H0100426		1987	SUN	1296	6	120
09H0100487	landrace (CSK BK/6)	1987	CSK	1302	3	60
09H0100496	landrace (CSK BK/318/1)	1987	CSK	1321	3	60
09H0100498	landrace (CSK BK/249/1)	1987	CSK	1323	6	120
09H0100500	landr. (CSK BK 87/425/1)	1987	CSK	1325	3	60
09H0100502	landrace (Velicna 95)	1988	CZE	1326	3	60
09H0100504*)	landrace (Zazriva 261)	1988	CZE	1327	3	60
09H0100505	landrace (Velicna 1)	1988	CZE	1328	3	60
09H0100511	landr. (Vysny Kubin 145/2)	1988	CZE	1341	3	60
09H0100517	landrace (Mutne 2)	1988	SVK	1426	3	60
09H0100533	landrace (Djambul 2)	1988	SUN	1353	3	60
09H0100780	landrace (Zbrojniky 38)	1988	SVK	1386	6	120
09H0100790	landrace (Panicke Dravce)	1988	SVK	1394	6	120
09H0100791	landrace (Tomasovce)	1989	SVK	1395	6	120
09H0100794	landrace (Oravka 9)	1989	SVK	1397	3	60
09H0100803*)	landrace (Pavlovce 283/1)	1989	SVK	1405	3	60

ANNEX 14, PART 4: SAFETY DUPLICATED ACCESSIONS SENT FROM P1 TO P0

ACCENUMB	ACCENAME	ACQDATE	ORIGCTY	OTHERNUMB	NO OF CRYO-VIALS	NO. OF SENT EXPLANTS
09H0100925	landrace (Samarkand 2/145)	1988	SUN	1442	3	60
09H0101037*)	wild (UdSSR Etoh)	1992	SUN	2015	3	60
09H0101080*)	landrace	1996	POL	2697	3	60
09H0101093	landrace (prostejovsko)	2000	CZE	2804	3	60
09H0101169	Vekan	1999	CZE	2806	6	120

*) Accession not included in the core collection list

ANNEX 14, PART 5: SAFETY DUPLICATED ACCESSIONS SENT FROM P1 TO P2

ACCENUMB	ACCENAME	ACQDATE	ORIGCTY	FIELD No.	NO OF CRYO-VIALS	NO. OF SENT EXPLANTS
09H0100025	Alb de Arad	1965	ROM	1007	3	60
09H0100029*)	Jampolskij	1955	SUN	1011	3	60
09H0100036	Kooneckij	1954	SUN	1029	3	60
09H0100049	landrace (CSK 1)	1982	CZE	1205	3	60
09H0100056	landrace (Valassky)	1966	CZE	1044	3	60
09H0100059	landrace (Smederevska Palanka	1983	YUG	1018	3	60
09H0100062*)	Moldavskij Mestnyj Ozimyj	1983	SUN	1019	2	40
09H0100080	Moravan	1973	CZE	1057	3	60
09H0100214	landrace (Dzanchoteko 32)	1986	SUN	1210	3	60
09H0100215	landrace (Dzanchoteko 31)	1986	SUN	1211	3	60
09H0100228*)	landrace (Nufaru)	1986	ROM	1220	3	60
09H0100245	41/82	1960	CZE	1055	3	60
09H0100250*)	vild Moscow	1987	SUN	1227	3	60
09H0100251	landrace (Rousinov 1)	1986	CSK	1228	3	60
09H0100252	landrace (Rousinov 2)	1986	CSK	1229	3	60
09H0100260	Pobeda	1986	BGR	1233	3	60
09H0100261	Voronezskij	1986	BGR	1234	3	60
09H0100317*)	landrace (Sochi 25)	1986	SUN	1249	3	60
09H0100357	landrace (Nyiregyhaza)	1987	HUN	1265	3	60
09H0100358	landrace (Nagykallo 1)	1987	HUN	1266	3	60
09H0100419*)	-	1987	SUN	1289	3	60
09H0100482*)	landrace (CSK BK/16)	1987	CSK	1297	3	60
09H0100484	landrace (CSK BK/45)	1987	CSK	1299	6	120
09H0100485	landrace (CSK BK/24)	1987	CSK	1300	3	60
09H0100488	landrace (CSK BK/1)	1987	CZE	1303	3	60
09H0100489	landrace (CSK BK/129)	1987	CZE	1304	3	60
09H0100492	landrace (CSK BK/3)	1987	CZE	1307	2	40
09H0100494	landrace (CSK BK/130)	1987	CSK	1309	3	60
09H0100495	landrace (CSK BK/34)	1987	CSK	1310	3	60
09H0100519*)	landrace (Semetes)	1988	CSK	1347	3	60
09H0100536	landrace (Djambul 1)	1988	SUN	1356	3	60
09H0100781	landrace (Sazdice 1)	1988	SVK	1387	3	60
09H0100784*)	landrace (Kosihy nad Ipelom 13	1988	SVK	1388	3	60
09H0100787	landrace (Kalonda 2)	1988	SVK	1391	3	60
09H0100788	landrace (Kalinovo)	1988	SVK	1392	3	60
09H0100792	landrace (Gemersky Jablonec 91	1989	SVK	1396	3	60
09H0100795	landrace (Barca)	1989	SVK	1398	3	60
09H0100796	landrace (Nizna Hutka)	1989	SVK	1399	3	60
09H0100797	landrace (Filakovo)	1989	SVK	1400	3	60
09H0100798	landrace (Ozdoba)	1989	SVK	1401	3	60
09H0100804	landrace (Pavlovce 283/2)	1989	SVK	1406	3	60
09H0100807	landrace (Baska 152)	1989	SVK	1408	3	60
09H0100808	landrace (Rimavska Sec)	1989	SVK	1409	3	60
09H0100919*)	landr. (Djambul 4/71)	1988	SUN	1436	3	60
09H0100940	landr. (Dushanbe 1/29)	1988	SUN	1462	3	60

ANNEX 14, PART 6: SAFETY DUPLICATED ACCESSIONS SENT FROM P1 TO P2

ACCENUMB	ACCENAME	ACQDATE	ORIGCTY	FIELD No.	NO OF CRYO-VIALS	NO. OF SENT EXPLANTS
09H0100983	landrace	1995	CZE	2681	2	40
09H0100984	landrace	1995	CZE	2682	3	60
09H0100985	landrace	1995	CZE	2683	3	60
09H0101052	landrace (Dubovy vrch-Zarosice	1995	CZE	2655	3	60
09H0101168*)	Jovan	1999	CZE	2805	2	40

*) Accession not included in the core collection list

ANNEX 14, PART 7: SAFETY DUPLICATED ACCESSIONS SENT FROM P2 TO P0

ACCENUMB	COLLNUMB	ACQDATE	ORIGCTY	OTHERNUMB	NO OF CRYO-VIALS	NO. OF SENT EXPLANTS
225311	13/80	1980	RUS	101K	5	50
225330	33/80	1986	POL	14K	5	50
225346	50/80	1986	POL	23K	5	50
225351	55/80	1980	UKR	35K	5	50
225386	99/81	1981	POL	69K	5	50
225423	155/82	1982	POL	72K	5	50
225539	PV072	1991	POL	232K	5	50
225540	PV083	1991	POL	233K	5	50
225543	PV086	1991	POL	236K	5	50
225584	J/89	1989	POL	129K	5	50
225586	55P1	1989	CZE	159K	5	50
225588	BYS 1	1990	LTU	168K	5	50
225590	A006	1990	RUS	171K	5	50
225593	A041	1990	RUS	180K	5	50
225594	A044	1990	RUS	183K	5	50
225599	A109	1990	RUS	190K	5	50
225600	GRIBOWSKIJ	1990	RUS	192K	5	50
225604	E4184	1994	POL	256K	10	100
225653	KOTT 32	1988	TJK	nr 124;303K	5	50
225671	UKR 048	1997	UKR	333K	5	50
225685	KRAK 2	1997	POL	347K	5	50
225688	BES 016	1997	POL	350K	5	50
225690	BES 022	1997	POL	352K	5	50
225692	BES 041	1997	POL	354K	5	50
225693	BES 042	1997	POL	355K	5	50
225695	BES 069	1997	POL	357K	5	50
225696	BES 077	1997	POL	358K	5	50
225781	POLTAR00-020	2000	POL	1014K	10	100
CV100004	CV90-4	1995	ITA		5	50
CV100037	CV90-37	1998	ITA		5	50
CV100061	CV90-61	2001	ITA		5	50

ANNEX 14, PART 8: SAFETY DUPLICATED ACCESSIONS SENT FROM P2 TO P1

ACCENUMB	COLLNUMB	ACQDATE	ORIGCTY	OTHERNUMB	NO OF CRYO-VIALS	NO. OF SENT EXPLANTS
225381	94/81	1981	POL	38K	10	100
225438	185/83	1983	POL	50K	5	50
225551	PV143	1991	POL	244K	5	50
225697	KRAK 4	1997	POL	359K	5	50
225698	KRAK 5	1997	POL	360K	5	50
225721	POLPOD98-079	1998	POL	385K	5	50
225722	POLPOD98-090	1998	POL	386K	5	50
225729	POLBIA98-029	1998	POL	393K	5	50
225732	POLBIA98-075	1998	POL	396K	5	50
225749	POLPRZ99-033	1999	POL	416K	5	50
225750	POLPRZ99-057	1999	POL	417K	5	50
225753	POLPRZ99-138	1999	POL	420K	5	50
225768	SVKBES99 - 364	1999	SVK	435K	5	50
225779	POLKIE99-27	1999	POL	1012K	5	50
225785	POLTAR00-78	2000	POL	1018K	10	100
225798	POLAUG01-022	2001	POL	1021K	5	50
225800	POLMRO 40	2002	POL	445K	5	50
225804	ORLIK	2003	POL	438K	5	50
225810	POLMRO 012	2002	POL	444K	5	50
225815	G 142C	1991	JPN	230K	5	50
225817	POLKIE99-49A	1999	POL	413K	5	50
225831	POLOPL05-53	2005	POL	463K	5	50
225849	WUKR06-0218	2006	UKR	481K	5	50
225866	WUKR06-0725	2006	UKR	509K	5	50
225891	WUKR06-1192	2006	UKR	534K	5	50
225894	POLKLO-12	2006	POL	499K	5	50
225896	POLKLO-49	2006	POL	501K	5	50

ANNEX 15, PART 1: CONSIGNMENT AGREEMENT FOR THE SAFETY DUPLICATED ACCESSIONS

Consignment Agreement

between

Leibniz-Institut for Plant Genetics and Crop Plant Research,
Corrensstraße 3, 06466 Gatersleben,
represented by the Acting Director , Prof. Dr. A. Graner
and the Administrative Director, Mrs S.-A. Lorenz

– hereinafter referred to as IPK –

and

Crop Research Institute Prague Ruzyne
Drnovska 507, 161 06 Prague, Czech Republic
represented by Dr. Jan Lipavský
Deputy Head, Dr. Jaroslava Ovesná

– hereinafter referred to as CRI –

and

Institute of Horticulture
Konstytucji 3 Maja 1/3, 96-100 Skierniewice, Poland
represented by Director Prof. Dr. habil. Franciszek Adamicki

- hereinafter referred to as RIVC –

Hereinafter also referred to, individually or jointly, as Party or Parties.

Preamble

With a collection encompassing over 300 different accessions and lengthy experience in cryopreservation, the CRI is the central facility for the conservation of plant genetic resources in the Czech Republic. In the context of the EU-funded project AGRI GEN RES 050 EURALLIVEG together with the IPK Research Group In Vitro Storage and Cryopreservation IVC, the CRI Cryopreservation Laboratory has established a collection of cryopreserved garlic accessions.

The IPK is one of the large, internationally significant centres of plant research, in which questions of modern biology are investigated principally in crop plants. With the Federal Central *Ex situ* Genebank, the IPK has a unique collection of plant genetic resources comprising over 3,000 botanic species of around 800 different genera at its disposal. The total stock consists currently of around 148,000 accessions.

The Institute of Horticulture, Division of Vegetable Crops, is the main research unit in Poland developing the scientific and practical bases for production of vegetable crops in the field and under cover as well as for mushrooms. Most of the research work carried out at RIVC is related to priority areas of agricultural research defined by the Ministry of Agriculture and Rural Developments including the following subjects: genetics, breeding and biotechnology; technology of vegetable production in open field, under cover and mushroom growing; plant protection against diseases, pests and weeds; technology of vegetable storage, processing and evaluation of quality and biological value. The Institute is responsible for the programme of plant genetic resources of vegetable crops in Poland, which is a branch of the national genebank. This programme includes the seed collection of around 10,000 accessions representing genetic resources of 70 vegetable species and maintaining over 1700 accessions of vegetatively propagated species in field collections.

ANNEX 15, PART 2: CONSIGNMENT AGREEMENT FOR THE SAFETY DUPLICATED ACCESSIONS, CONTINUED

In the interests of the international integration of the preservation of plant genetic resources, IPK, CRI, and RIVC aim to jointly store the cryopreserved accessions of the garlic collection established in the EURALLIVEG project, and to reciprocally exchange and store security duplicates in accordance with the recommendations of the AEGIS (A European Genebank Integrated System) program (see AEGIS Memorandum of Understanding of June 2009). With this purpose the Parties conclude the following Agreement.

§ 1 Material to be Consigned

(1) Each Party will each accept consignment within their facilities of security duplicates of living biological material belonging to the other Parties' collections (Material) and will store the Material appropriately. For this purpose the Parties allow each other to accept, in accordance with the provisions of this Agreement, the following consignment:

a) 165 cryotubes of 31 accessions to be consigned by RIVC to IPK;
b) 175 cryotubes of 34 accessions to be consigned by IPK to RIVC;
c) 200 cryotubes of 57 accessions to be consigned by CRI to IPK;
d) 185 cryotubes of 31 accessions to be consigned by IPK to CRI;
e) 150 cryotubes of 51 accessions to be consigned by CRI to RIVC;
f) 145 cryotubes of 27 accessions to be consigned by RIVC to CRI;

and to preserve these appropriately in liquid nitrogen in their cryotanks.

(2) Further plant material of the genus *Allium*, which arises within the context of later work, and which complies with the provisions of the international exchange of plant genetic material valid at that time, may with mutual written consent of the Parties be included in the Agreement.

§ 2 Obligations of the Parties

(1) The consignor Party will only consign to the consignee Party such Material which comprises, to the best of the consignor Party's knowledge, security duplicates which are also contained within the consignor Party's own collection and stored in the consignor Party's own facility.

(2) The consignor Party will ensure that only Material for which the consignment complies with pertinent national and international legal provisions is consigned to the consignee Party. The cryoboxes provided in consignment are to be explicitly labelled as the property of the consignor Party. In addition, the names, telephone numbers, and email addresses of at least two contact persons from the consignor Party must be documented and stored in an easily visible file in the laboratory in which the cryoboxes are stored. The consignor Party is responsible for ensuring that up to date contact information is always made available to the consignee Party.

(3) The consignee Party will ensure that the space in which the storage of the Material occurs complies with the legal safety requirements for the installation of cryotanks. The consignee Party carries the responsibility for ensuring that the consigned Material is stored in cryoboxes which are always contained in liquid nitrogen, such that their viability is never affected or destroyed by any temporary rise in the storage temperature above -150 °C. The consignee Party must keep a record of the inspections and refilling activities regarding the cryotanks in which Material is stored, a copy of which must be made available to the consignor Party if requested.

(4) The consignor Party will compile a comprehensive written inventory of the contents of all consigned cryoboxes. One copy of this inventory is to be attached to the consignment when it is conveyed to the consignee Party. The consignor Party will review this inventory at regular intervals and update it when necessary. The consignee Party will file the most current inventory and diligently retain it.

(5) A copy of each inventory will be sent by the respective consignor Party to a third party to be filed as a record. Each consignor Party will review such inventory at regular intervals and update it when necessary.

§ 3 Consignment Costs

(1) In consideration of the parity of the services provided in kind by each Party for the benefit of the other Parties under this Agreement, the Parties waive any claim to any payment for the services provided under this Agreement as well as any claim to any compensation for other expenses which may arise in connection with their responsibility, according to this Agreement, to take appropriate care of the Material.

(2) Costs which arise in connection with the packaging, conveyance (including return transport), removal or partial removal, or supplementation of Material to be consigned or already consigned, will be carried by the consignor Party.

§ 4 Rights and Access to Consignment Material

(1) Ownership and use rights to the Material will not be affected by the consignment. In particular, through the consignment the consignor Party does not transfer any ownership or use rights with regards to the Material to the consignee Party.

(2) The consignee Party will ensure that third parties do not have access to the Material.

(3) The removal of biological material from the Material or the exchange of cryoboxes will be carried out exclusively by the consignor Party. The consignor Party must be allowed, once a year with prior appointment, or in the case of emergencies, to remove or to supplement biological material (security duplicates) from/to the Material.

(4) Notwithstanding Article 4 (3), in the case of emergencies, the consignor Party may agree in writing by mutual consent that the consignee Party may remove Material from storage, regenerate it in vitro, and send the resulting plant material in vitro to its owner consignor Party.

§ 5 Liability

(1) Each Party disclaims any and all liability for any damage which may arise in connection with the services provided under this Agreement (including, but not limited to, damage derived or later originating from an initial damage, and claims to consequential losses) that is not the result of that Party's wilful misconduct or gross negligence. Liability for personal injury is in accordance with the relevant legal provisions.

(2) Each Party will hold the other Parties, and their officers, agents, and employees harmless against any claims, costs, product or other liabilities, of whatsoever nature, which may arise from or in connection with this Agreement, except for acts or omissions amounting to wilful misconduct or gross negligence.

(3) Notwithstanding the foregoing, in the case of any adverse effect on the condition of the Material which arises due to wilful misconduct or gross negligence on the part of the consignee Party, the regeneration or replacement of the Material (security duplicates) cannot be demanded of the consignee Party. Solely the costs for packaging and conveying new security duplicates will be compensated.

§ 6 Term, Termination, and Withdrawal

(1) This Agreement shall come into effect only with the execution by all Parties, and shall be retrospectively effective from 28th March 2011 for a period of twenty years. The validity of the Agreement shall be automatically extended by further ten years unless the Parties mutually consent to terminate this Agreement in writing with notice of at least six months prior to the expiration of the initial twenty year period.

(2) Furthermore the Parties are free to agree by mutual consent in writing to the abrogation of this Agreement.

(3) In the case of termination of this Agreement, all consignee Parties will promptly return all Material received to the consignor Party who owns it, at the consignor Party's cost.

(4) A Party may withdraw from this Agreement in writing with notice of at least 3 months to the other Parties. The withdrawal of a Party from this Agreement shall not affect the rights and responsibilities of the remaining Parties to each other under this Agreement. A withdrawing Party shall promptly return all Material that it has received to the consignor Party who owns it, at the consignor Party's cost. Any consignee Party holding Material belonging to the withdrawing consignor Party shall promptly return that Material to the withdrawing consignor Party at the withdrawing consignor Party's cost.

(5) If a Party is unable to avoid a situation which may prove detrimental to the storage of the Material, that Party will promptly inform the other Parties in writing of the potential detrimental effect on the Material, thus giving the Parties the opportunity to make alternative arrangements for their Material.

§ 7 Miscellaneous

(1) This Agreement and the rights and obligations contained within may not, in entirety or in parts, be transferred or assigned by a Party in any manner whatsoever to any third party without previous written assent of the other Parties.

(2) Additional parties may join this Agreement solely on the mutual consent in writing of all Parties. This requires a written amendment to this Agreement.

(3) This Agreement is the only authoritative instrument. There are no oral collateral agreements. Any alteration, modification, amendment and completion of this Agreement may be done in a written form only. The same applies to any waiver of the written form requirement.

(4) If any of the provisions of this Agreement or a part thereof should be or become nugatory, then the validity of the remaining Agreement shall not be affected thereby. The same applies in the event that any provision or parts thereof should prove unenforceable. In the case that the unenforceability or invalidity of a clause rests on its material, spatial or temporal extent the clause shall be valid in its largest and widest enforceable extent possible. All Parties agree to replace an unenforceable or nugatory clause or part of this Agreement by a new clause to be negotiated in good faith which covers the content of the invalid clause as far as possible. This may also be applicable in the case of a supplementary interpretation of the Agreement.

(5) This agreement shall be governed by and construed in accordance with the laws of Switzerland and the Parties hereto submit to the jurisdiction of the Swiss Court which is locally competent in Geneva.

Note:

The document will be concluded by the respective signatures. The document is ready for signing. The signing procedure will be finalised by September 2011

ANNEX 16: THE FINAL BACKBONE SUBSET COMPOSITION

Acc. No.	Subtaxa (group)bolting (B) or non (NB)	Country origin	Year of acq.	Sent to CGP
P0 – IPK (Germany)				
ALL 218	*B*	*Botanic Garden Bucharest*	*1993*	*27.05.09*
ALL 506	*B*	*DEU*	*1975*	*14.09.10*
ALL 839	*NB*	*GEO*	*1986*	*06.04.09*
ALL 852	*B*	*GEO*	*1987*	*18.07.08*
ALL 518	*B*	*DEU*	*1975*	*20.01.11*
P1- RICP (Czech Republic)				
09H0100056	*B*	*CSK*	*1966*	*26.03.08- Lost*
09H0100488	*B*	*CSK*	*1987*	*26.03.08- Lost*
09H0100492	*B*	*CSK*	*1987*	*26.03.08- Lost*
09H0101168	*B*	*CZE*	*1999*	*25.05.09*
09H0100781	*-*	*-*	*-*	*24.02.10*
P2 – RIVC (Poland)				
225804 (0438K)	*B*	*POL*	*2003*	*02.04.09*
225386 (0069K)	*NB*	*POL*	*1981*	*03.12.08*
225798 (1021K)	*NB*	*POL*	*2001*	*02.04.09*
225593 (0180K)	*B*	*RUS*	*1990*	*20.10.09*
225778 (1011K)	*NB*	*POL*	*1999*	*01.03.10*
P3 – UNIBAS (Italy)				
CV100003	*NB*	*ITA*	*1995*	*19.11.09*
CV100024	*NB*	*ITA*	*1997*	*03.12.08*
CV100012	*NB*	*ITA*	*1995*	*14.09.10*
CV100018	*NB*	*ITA*		*14.09.10*
CV100053	*NB*	*ITA*	*2000*	*14.09.10*
P5 – INRA (France)				
Farimole (Ail 005)	*NB*	*FRA*	*1998*	*30.09.08*
Violet de cadours VC6 (Ail 008)	*NB*	*FRA*	*1967*	*24.02.10*
Bretagne 1 (Ail 011)	*NB*	*FRA*	*1996*	*09.11.09*
Rouge de vendée (Ail 020)	*NB*	*FRA*	*1997*	*01.03.10*
Rose de Lautrec RLBT (Ail 001)	*B*	*FRA*	*1960*	*20.01.11*

ANNEX 17: THE FINAL ROUTINE VIRUS ELIMINATION LIST (BATCHES 1-3)

P0-IPK

Year	Accession number	Other number	Bolting / non-bolting	*In vitro* culture started	*In vitro* plantlets transferred in the tubes	No. of plantlets transferred in the tubes	Virus free plantlets sent on (date)
First	ALL 100-1	-	B	02.03.09	06.04.09	8	19.11.09
	ALL 275	K 4735	B	02.03.09	06.04.09	16 (eliminated)	
	ALL 292	K 4736	B	04.02.10	15.03.10	24	14.09.10
	ALL 493	-	B	02.04.09	12.05.09	7	24.02.10
	ALL 500	-	B	04.02.10	07.04.10	24	March 2011
	ALL 651	K 5655	NB	to request			
	ALL 754	K 5862	NB	02.03.09	06.04.09	11	24.02.10
	ALL 760	K 5874	NB	to request			
	ALL 781	K 6040	NB	to request			
	ALL 782	K 6042	NB	to request			

P1-CRI

Year	Accession number	Other number	Bolting / non-bolting	*In vitro* culture started	*In vitro* plantlets transferred in the tubes	No. of plantlets transferred in the tubes	Virus free plantlets sent on (date)
First	09H0100983	2681	B	18.09.07	22.10.07	19	24.02.10
	09H0100784	1388	-	27.02.09	06.04.09	48	24.02.10
	09H0100787	1391		14.05.09	11.06.09	22	04.03.10
	09H0100788	1392		14.06.09	15.07.09	24	04.03.10
	09H0100789	1393		14.06.09	15.07.09	47	-

P2-RIVC

Year	Acc. number	Other num.	Bolting / non-bolting	*In vitro* culture started	*In vitro* plantlets transferred in the tubes	No. of plantlets transferred in the tubes	Virus free plantlets sent on (date)
First	225420	42K	NB	03.04.08	04.06.08	24	03.08.09
	225383	67K	NB	Lost - to request			
	225734	399K	B	Lost - to request			
	225390	70K	NB	03.04.08	04.06.08	24	03.12.08
	225601	193K	B	Lost - to request			
	225752 225686	419K 348K	B B	07.01.10 Lost - to request	15.02.10	24	13.10.10
	225694	356K	B	08.09.09	02.11.09	28	13.10.10
	225589	170K	B	Lost - to request			
	225831	463K	B	Lost - to request			

P3-UNIBAS

Year	Accession number	Other number	Bolting / non-bolting	In vitro culture started	In vitro plantlets transferred in the tubes	No. of plantlets transferred in the tubes	Virus free plantlets sent on (date)
First	*CVI00038*	*VC90-38*	*NB*	*12.01.10*	*13.05.10*	*15*	*05.08.09*
	CV100004	*VC90-4*	*NB*	*13.01.10*	*01.03.10*	*24*	*20.01.10*
	CV100014	*VC90-14*	*NB*	*12.01.10*	*11.02.10*	*23*	*20.01.10*
	CV100015	*VC90-15*	*NB*	*13.01.10*	*11.02.10*	*9*	*20.01.10*
	CV100022	*VC90-22*	*NB*	*13.01.10*	*12.02.10*	*15*	*20.01.10*

ANNEX 18: THE FINAL ROUTINE VIRUS ELIMINATION LIST (BATCHES 4-7)

P0-IPK

Year	Accession number	Other number	Bolting / non-bolting	*In vitro* culture started	*In vitro* plantlets transferred in the tubes	No. of plantlets transferred in the tubes	Virus free plantlets sent on (date)
Second	ALL 502	-	B	22.02.10	Lost-no growth		
	ALL 503	-	B	22.02.10	Lost-no growth		
	ALL 504	-	B	23.02.10	27.04.10	8	March 2011
	ALL 505	-	B	23.02.10	27.04.10	6	20.01.11
	ALL 507	-	B	24.02.10	Lost-no growth		
	ALL 786	K 6802	B	04.01.10	15.02.10	24 (eliminated-infected)	
	ALL 523	-	B	25.02.10	Lost-no growth		
	ALL 524	-	B	25.02.10	01.04.10	9	20.01.11
	ALL 789	K 6807	NB	to request			
	ALL 804	K 6990	NB	to request			
	ALL 805	K 6992	NB	to request			
	ALL 1259	K 8590	NB	to request			
	ALL 1269	K 9082	NB	to request			

P1-CRI

Second	09H0100792	1396	-	27.01.10	17.03.10	17	
	09H0100795	1398	-	28.01.10	17.03.10	24	
	09H0100796	1399	-	28.01.10	16.03.10	24	
	09H0100797	1400	-	29.01.10	16.03.10	11	
	09H0100291	1116	-	29.01.10	16.03.10	10	
	09H0100364	1127	-	02.02.10	18.03.10	15	
	09H0100400	1153	-	02.02.10	18.03.10	24	

P2-RIVC

Year	Accession number	Other number	Bolting / non-bolting	*In vitro* culture started	*In vitro* plantlets transferred in the tubes	No. of plantlets transferred in the tubes	Virus free plantlets sent on (date)
Second	225514	162K	B	22.01.10	01.03.10	17	30.11.10
	225600	192K	B	22.01.10	01.03.10	19	30.11.10
	225545	238K	B	15.01.10	01.03.10	12	30.11.10
	225548	241K	B	15.01.10	01.03.10	24	30.11.10
	225551	244K	B	16.01.10	01.03.10	18	13.10.10
	225651	296K	B	25.01.10	01.03.10	20	30.11.10
	225688	350K	B	19.01.10	01.03.10	24	30.11.10
	225604	256K	B	20.01.10	16.02.10	13	30.11.10
	225806	440K	B	25.01.10	16.02.10	13	30.11.10
	225590	171K	B	26.01.11			
	225591	173K	B	27.01.10	01.03.10	20	30.11.10
	225809	443K	B	27.01.10	01.03.10	10	30.11.10
	225423	72K	B	02.12.10	02.02.11	14	

P3-UNIBAS

Second	CV100026	VC90-26	NB	08.11.10	03.01.11	23	
	CV100027	VC90-27	NB	08.11.10	27.12.10	21	
	CV100028	VC90-28	NB	09.11.10	27.12.10	13	
	CV100035	VC90-35	NB	09.11.10	03.01.11	18	
	CV100037	VC90-37	NB	10.11.10	03.01.11	20	
	CV100039	VC90-39	NB	10.11.10	03.01.11	24	
	CV100043	VC90-43	NB	11.11.10	10.01.11	10	

ANNEX 19: THE NEW SITUATION ROUTINE VIRUS ELIMINATION LIST (BATCH 8)

P0-IPK

Year	Acc. number	Other num.	Bolting / non-bolting	In vitro culture started	In vitro plantlets transferred in the tubes	No. of plantlets transferred in the tubes	Virus free plantlets sent on (date)
Third	ALL 649	K 5615	-	to request			
	ALL 652	-	-	to request			
	ALL 774	K 6028	-	to request			

P1-CRI

Third	09H0100451	-	-	02.02.11			
	09H0100514	-	-	04.02.11			

P2-RIVC

Third	225550	243K	-	28.01.11			
	225560	249K	-	31.01.11			
	225577	0094K	-	02.12.10	02.02.11	4	

P3-UNIBAS

Third	CV100044	VC90-44	NB	16.11.10	10.01.11	22	
	CV100048	VC90-48	NB	17.11.10	10.01.11	18	

9. SUMMARY OF MANPOWER BY WORK PACKAGE FOR THE ENTIRE PERIOD OF THE ACTION

ACTION 050		Category of manpower	Work Package	Days worked	cntrl totals	
Partner 0	**IPK**	Coordinator (adm. & fin. only)	1	14,60		
		Scientists, Researchers, Engineers	2	30,50		
		Scientists, Researchers, Engineers	3	59,40		
		Scientists, Researchers, Engineers	4	12,60		
		Coordinator (adm. & fin. only)	5	16,90		
		Scientists, Researchers, Engineers	1	94,35		
		Scientists, Researchers, Engineers	2	163,07		
		Scientists, Researchers, Engineers	3	431,50		
		Scientists, Researchers, Engineers	4	46,10		
		Scientists, Researchers, Engineers	5	159,47		
		Technicians	2	165,89		
		Technicians	3	625,51		
		Technicians	4	52,60	1.872,5	cntrl
Partner 1	**CRI**	Scientists, Researchers, Engineers	1	22,30		
		Scientists, Researchers, Engineers	2	121,73		
		Scientists, Researchers, Engineers	3	188,26		
		Technicians	2	57,25		
		Technicians	3	1.432,56		
		Labourer, Students	3	283,63		
		Scientists, Researchers, Engineers	4	123,89		
		Technicians	4	180,22		
		Labourer, Students	4	19,55		
		Scientists, Researchers, Engineers	5	16,82	2.446,2	cntrl
Partner 2	**RIVC**	Scientists, Researchers, Engineers	1	678,80		
		Technicians	1	241,00		
		Technicians	2	82,00		
		Technicians	3	593,10		
		Scientists, Researchers, Engineers	2	140,00		
		Scientists, Researchers, Engineers	3	752,00		
		Scientists, Researchers, Engineers	4	15,00		
		Scientists, Researchers, Engineers	5	5,00	2506,9	cntrl
Partner 3	**UNIBAS**	Scientists, Researchers, Engineers	1	20,00		
		Scientists, Researchers, Engineers	5	31,00		
		Scientists, Researchers, Engineers	4	954,00		
		Technicians	4	240,00		
		Labourer, Students	4	70,00	1315	cntrl
Partner 4	**Stg DLO/CGN**	Scientists, Researchers, Engineers	2	106,45		
		Technicians	2	3,80	110,25	cntrl
Partner 5	**INRA**	Scientists, Researchers, Engineers	2	11,92		
		Scientists, Researchers, Engineers	3	5,50		
		Scientists, Researchers, Engineers	4	5,50		

		Technicians	2	34,20		
		Technicians	3	11,88		
		Technicians	4	11,86	80,86	cntrl
Partner 6	**NordGen**	Scientists, Researchers, Engineers	2	55,00		
		Technicians	2	3,00		
		Technicians	2	10,00		
		Technicians	2	8,00	76	cntrl

8407,71 sum cntrl total
0 should be zero

ACTION 050

WP	total days	Scientists, Researchers, Engineers	Technicians	Labourer, Students	Coordinator (adm. & fin. only)
1	**1.071,05**	815,45	241	0	14,6
2	**992,81**	628,67	364,14	0	0
3	**4.383,34**	1436,66	2663,05	283,63	0
4	**1.731,32**	1157,09	484,68	89,55	0
5	**229,19**	212,29	0	0	16,9
sum	**8.407,71**	**4.250,16**	**3.752,87**	**373,18**	**31,50**