



AEGIS

*A EUROPEAN GENE BANK
INTEGRATED SYSTEM*

Lorenzo Maggioni, ECPGR Secretary

New AEGIS Final meeting
22 May 2025



www.ecpgr.cgiar.org/aegis

Welcome and Introduction

- ‘**New AEGIS**’ project (German-funded) September 2024 – February 2025 – extended until May 2025 (ca. 150,000 EUR)
- **Online meeting** with AEGIS Associate members in October 2024
- **Activities launched**: Genebank manuals; peer reviews; translation of SOPs; genebank metrics tests; crop specific standards; phenotypic data
- **Final meeting** together with Genebank Managers Network
 - Take stock of results
 - Clarify processes
 - Identify needs



Ex situ conservation in Europe - Background

- 423 germplasm collections/genebanks in Europe across 43 countries
- > 2 million accessions
- 35-50% unique accessions
- A genebank system created without planning or coordination – inefficient use of resources



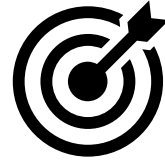
Ex situ conservation in Europe - weaknesses

- Lack of long-term conservation facilities
- Insufficient safety-duplication
- Regeneration backlogs
- Duplications and gaps across the region
- Inhomogeneous quality of material and information
- Variable germplasm exchange conditions
 - Uncertain access



A Strategic Framework for the Implementation of a European Genebank Integrated System (AEGIS)

A Policy Guide



AEGIS objective

Conserving in a collaborative way and at agreed quality standards, the genetically unique and important accessions for Europe of all crops and making them available for breeding and research through SMTAs

Perceived public benefits of AEGIS

- Improved collaboration among European countries
- Cost-efficient conservation activities
- Improved quality system
- Facilitated access to all germplasm in AEGIS
-



Memorandum of Understanding (MoU)

1. Signed by Country and deposited at Bioversity International, on behalf of ECPGR
2. Long-term conservation commitment for registered European Accessions
3. Provision of access to material and information under SMTA
4. Adherence to the AEGIS technical standards
5. Separate agreement between National Coordinator and participating national institutions (Associate Membership Agreement).



AEGIS membership

35 Member countries

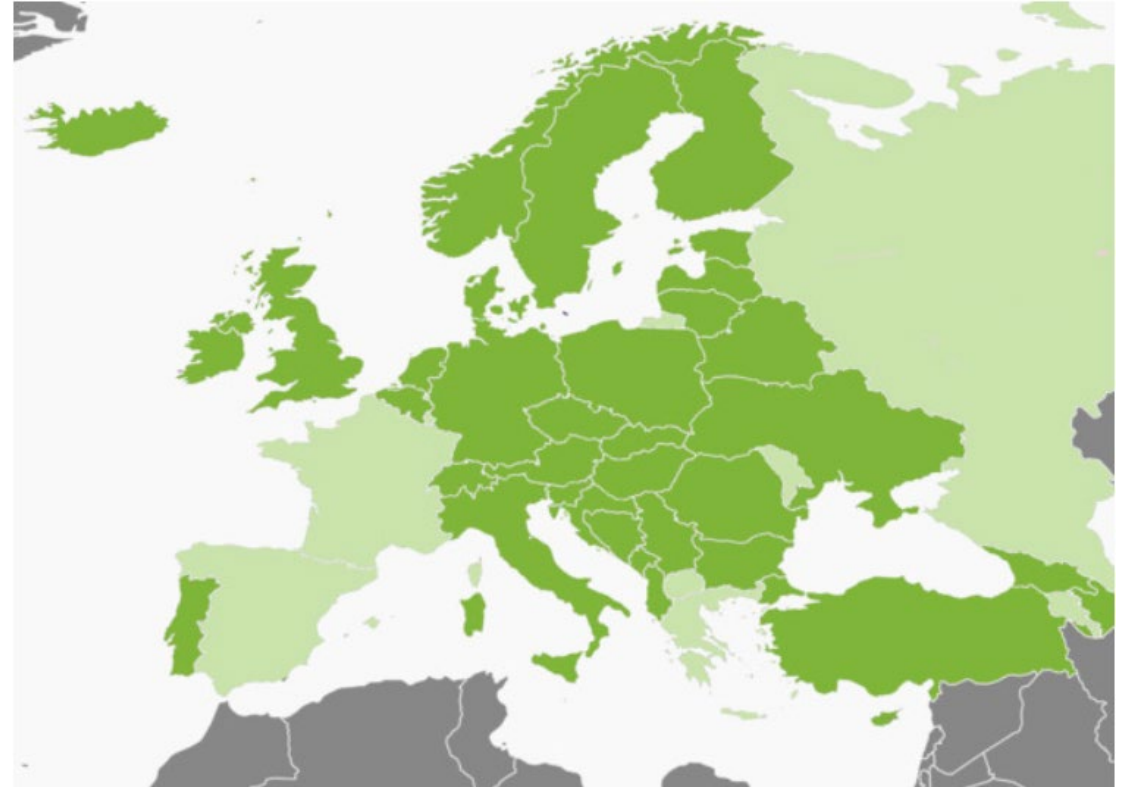
26 providers of accessions (25)

69 Associate Member Institutions (63)

28 providing AEGIS accessions (27)

41 not providing (36)

1 provider without agreement (BEL094)



<https://www.ecpgr.org/aegis/aegis-membership/associate-member-agreements>

Total Associate Member Agreements: 73

Albania (1)

Belarus (9)

Bulgaria (1)

Czech Republic (9)

Finland (1)

Hungary (1)

Latvia (3)

Netherlands (1)

Portugal (2)

Slovakia (1)

Switzerland (1)

Austria (2)

Belgium (1)

Croatia (2)

Denmark (1)

Georgia (1)

Iceland (1)

Lithuania (2)

Norway (1)

Romania (1)

Slovenia (4)

Türkiye (1)

Azerbaijan (2)

Bosnia and Herzegovina (2)

Cyprus (1)

Estonia (2)

Germany (3)

Italy (3)

Montenegro (1)

Poland (2)

Serbia (5)

Sweden (2)

United Kingdom (3)

Czech Agrifood Research Center

Czech Agrifood Research Center, Wine Research Station Karlstejn

Institute Code: CZE041

Contact: Radomíra Střalková ✉ stralkova@carc.cz

Website: <https://www.carc.cz/en/>

Date of signature of Associate Membership: 11 October 2011

MORE DETAILS

Czech Agrifood Research Center, Dept of Vegetables and Special Crops, Olomouc

Institute Code: CZE061

Contact: Miroslav Hýbl ✉ hybl@carc.cz

Website: <https://www.carc.cz/en/>

Date of signature of Associate Membership: 11 October 2011

MORE DETAILS

Czech Agrifood Research Center, Dept of Gene Bank, Prague

Institute Code: CZE122

Contact: Vojtěch Holubec ✉ holubec@carc.cz

Website: <https://www.carc.cz/en/>

Date of signature of Associate Membership: 10 October 2011

MORE DETAILS

Associate Members

Czech Republic

Czech Agrifood Research Center, Dept of Gene Bank, Prague

GENERAL INFORMATION

-  Institute Code(s): CZE122
-  Local name: Czech Agrifood Research Center
-  Dmowska 507 - 16106, Prague 6, Czech Republic
-  Vojtěch Holubec [holubec@carc.cz]
-  <https://www.carc.cz/en/>
-  Date of signature of Associate Membership: 10 October 2011

☒ GENE BANK MANUAL

 DOWNLOAD

☐ Standard Operation Procedures (SOP)

☒ PEER REVIEW REPORT

 DOWNLOAD

☒ PARTICIPATION IN EVA NETWORK

EVA Pepper, EVA Wheat and Barley

TOTAL EUROPEAN ACCESSIONS: 1671



The European Collection

Country	No of accessions Sept 2024	No of accessions May 2025
Albania	8	
Belgium	2	
Bosnia and Herzegovina	29	
Bulgaria	391	
Croatia	90	
Czechia	2,097	+15
Estonia	257	+118
Germany	84,236	-295
Hungary	0	+559
Italy	10,946	
Latvia	27	
Lithuania	45	
Montenegro	31	
Netherlands	5,840	-2
Nordic Countries	4,785	
Poland	443	
Portugal	86	
Romania	754	+46
Slovakia	1381	
Slovenia	21	
Switzerland	8,860	-3249
United Kingdom	1,659	
Total	121,988	119,180



AQUAS – Quality system

- Transparency: operational **genebank manuals**
- Agreed common conservation **standards** (FAO + crop-specific)
- **Safety-duplication** policy
- **Distribution** guidelines
- **Monitoring** system: voluntary capacity building peer visits

<https://www.ecpgr.org/aegis/aquas/overview>



A European Genebank Integrated System



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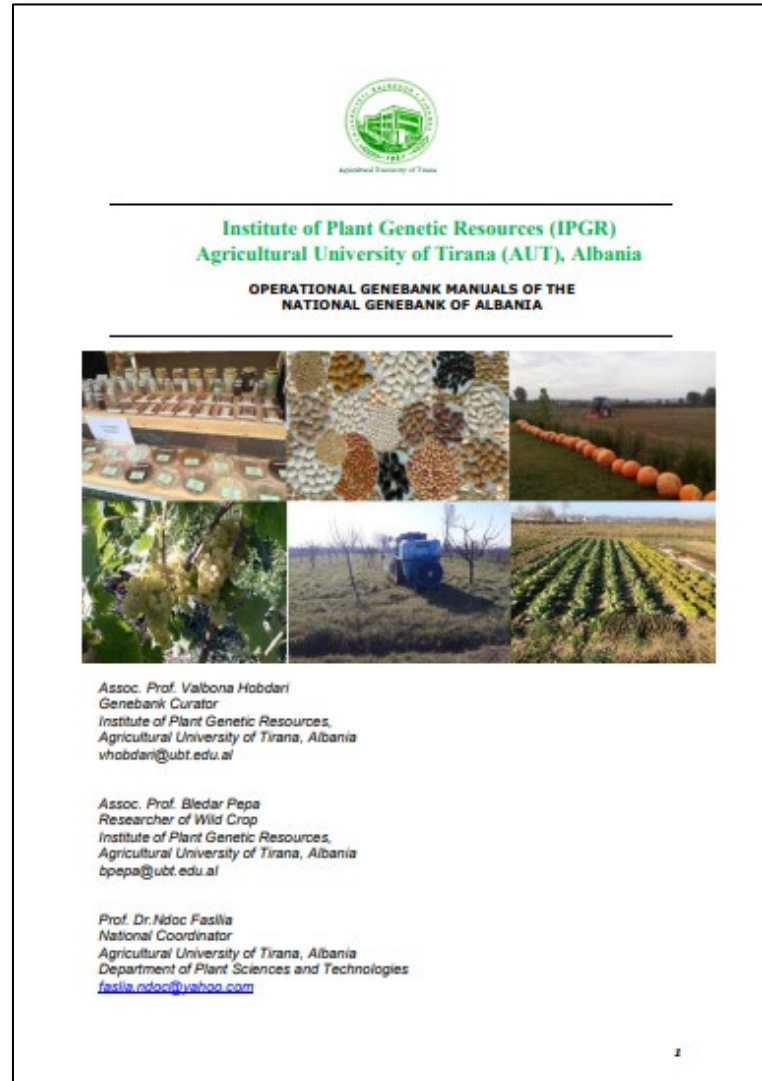
[Policies](#)

[Genebank manuals](#)

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Genebank Manuals



Genebank Manuals

Template

- Template for the preparation of operational genebank manuals (Final version formally approved by the AEGIS Advisory Committee - 24.09.2010) [Word] (425,5 KB)

Associate Members' Genebank Manuals

Albania	Operational genebank manual of the National Genebank of Albania (April 2025) (565,0 KB)
Austria	Operational genebank manual of AGES (December 2024) (359,9 KB) Operational genebank manual of AREC (March 2025) (357,4 KB)
Bulgaria	Operational genebank manual of the National Genebank of Bulgaria, Institute of Plant Genetic Resource 'K. Malkov' (February 2023) (429,2 KB)
Czech Republic	Operational genebank manual of the Czech Agrifood Research Center (CARC), Czech Republic (May 2025) (840,7 KB) Operational genebank manual of the Potato Research Institute (PRI), Czech Republic (March 2016) (373,1 KB)
Estonia	Operational genebank manual of the Estonian Crop Research Institute (ECRI), Estonia (April 2024) (952,2 KB) Operational genebank manual of the Polli Horticultural Research Centre, Institute of Agricultural and Environmental Sciences, Estonian University of Life Sciences (May 2024) (671,3 KB)
Georgia	Operational genebank manual of the LEPL Scientific Research Center of Agriculture, Georgia (February 2025) (431,6 KB)
Germany	Operational genebank manual of Leibniz Institute of Plant Genetics and Crop Plant Research (IPK), Germany (February 2011) (230,0 KB) Operational genebank manual of Julius Kühn-Institute, Dresden-Pillnitz, Germany (July 2012) (1,0 MB)

Agreed crop-specific conservation standards

Allium

Avena

Beta

Cucurbits

Forages

Leafy vegetables

Prunus

Solanaceae

Vitis

Wheat



Prunus-specific standards (PGS) for genebank management

Daniela Giovannini¹, Emilie Balsemin² and Johannes Engels³

¹ Consiglio per la Ricerca in agricoltura e l'analisi dell'Economia Agraria (CREA), Unità di ricerca di Frutticoltura, Forlì, Italy

² Centre National pour la Recherche Scientifique (CNRS), Unité Mixte de Recherche Géographie de l'Environnement (GEODE), Toulouse, France

³ ECPGR Secretariat, c/o Bioversity International, Maccaresse, Rome, Italy



Photos © Daniela Giovannini, except for apricot © Pavlina Drogoudi and for almond © Pasquale Losciale.

Genebank peer visits (GenRes Bridge and AGENT)

- Institute of Plant Genetic Resources (IPGR), Sadovo, **Bulgaria**
- Crop Research Institute (CRI), Prague, **Czech Republic**
- Leibniz Institute of Plant Genetics and Crop Plant Research (IPK), Gatersleben, **Germany**
- Research Center for cereal and industrial crops, CREA-CI, Vercelli, **Italy**,
- Centre for Genetic Resources (CGN), Wageningen, **the Netherlands**
- Plant Breeding and Acclimatization Institute (IHAR), Radzikow, **Poland**
- National Agricultural and Food Centre (NPPC), Piestany, **Slovakia**
- Institute for Conservation and Improvement of Valentian Agrobiodiversity (COMAV), Valencia, **Spain**
- National Institute for Agricultural and Food Research and Technology (INIA), Madrid, **Spain**
- Nordic Genetic Resource Center (NordGen), Alnarp, **Sweden**
- Millennium Seed Bank, Ardingly, **UK**



Critical assessment

Opinion

AEGIS, the Virtual European Genebank: Why It Is Such a Good Idea, Why It Is Not Working and How It Could Be Improved

Theo van Hintum ^{1,*}, Johannes M. M. Engels ² and Lorenzo Maggioni ^{2,3}

Plants **2021**, *10*, 2165. <https://doi.org/10.3390/plants10102165>

<https://www.mdpi.com/journal/plants>

- Too little material has been included in the European Collection
- The quality of genebank operations has not been assured
- The continuity of the availability of accessions has not been assured

Actions for improvement

- Steering Committee decision June 2023
 - AEGIS still a priority: Certification system to be implemented; capacity-building services to be organized; support to identify and include material into AEGIS; implementation of genebank review system
- Survey by ECPGR Secretariat (2024)
 - General support towards AEGIS' commitment
- German-funded project “New AEGIS” (Sept. 2024- May 2025)
 - Support towards improvement of AQUAS



Objectives of the project “New AEGIS”

<https://www.ecpgr.org/aegis/projects/new-aegis>

- Supporting Associate members
 - Kick-off meeting (online)
 - Prepare operational genebank manuals
 - Analyze genebank manuals and provide recommendation
 - Develop agreed genebank metrics
 - Translate/publish Standard Operational Procedures (SOPs)
 - Carry-out peer visits
 - Final project meeting (in-person)
- Completing definition of crop-specific standards
- Improving C&E data coverage in EURISCO

Outcomes

- AMs increase their awareness of the AEGIS principles and increase quality of operations and accessibility of the European Collection
- At least 20 new operational genebank manuals developed → 19
- All manuals analyzed and compared. Overview of current practices/recommendations
- Three crop-specific genebank standards developed → 2
- 5-10 AMs publish their SOPs → 2
- Genebank metrics list agreed by pilot genebanks
- Six reciprocal visits of genebanks are completed → 9
- Final in-person meeting to discuss results

New Genebank manuals

1. National Genebank, Tirana, Albania
2. AGES, Linz, Austria
3. HBLFA, Raumberg-Gumpenstein, Austria
4. CRA-W, Belgium
5. CARC, Czech Republic
6. Polli HRC, Estonia
7. LEPL, Tbilisi, Georgia
8. NCBGC, Tapioszele, Hungary
9. CNR, Bari, Italy
10. Uni. Pavia, Italy
11. Latvian Genebank, Silava, Latvia
12. IHAR, Radzikow, Poland
13. Genebank, Suceava, Romania
14. MRI Zemun-Polje, Serbia
15. Plant Gene Bank, Belgrade, Serbia
16. SLU, Lomma, Sweden
17. JIC, Norwich, UK
18. Uni. Reading, UK
19. Warwick Uni., UK



Crop specific standards & SOPs

- BERRIES
- MAIZE
- Suceava genebank, Romania
- Uni. Pavia, Italy

Genebank peer visits

- Nordgen, Sweden
- AGES Linz, Austria
- NCBGC Taposzele, Hungary
- CGN, Wageningen, The Netherlands
- LVMI, Silava, Latvia
- INIAV, Braga, Portugal
- CARC, Prague, Czech Republic
- LEPL, Tbilisi, Georgia
- Suceava genebank, Romania



Phenotypic data to EURISCO

- 125 maize accessions from Romania (19 traits)
- 110 Brassica accessions from France (BrasExplor) (18 traits)
- 400 tomato accessions from Italy and Spain (BRESOV) (36 traits)
- 200 hop accessions from Slovenia
- 200 maize accessions from Albania (14 traits)

TOTAL: > 1000 new accessions with phenotypic traits

How to add Accessions to the European Collection:

National Coordinator promotes and coordinates with the Associate Members the designation of European Accessions

Use of "Revised simplified procedure" for selection of Accessions

Associate Members propose to the National Coordinator selected Accessions for registration as European Accessions

National Coordinator ensures registration in EURISCO through the National Inventory System (This simply consists in flagging the descriptor "Part of AEGIS" with YES)

New AEGIS accessions are reflected on the map of the European Collection

(<http://www.ecpgr.cgiar.org/aegis/european-collection/european-collection/>)

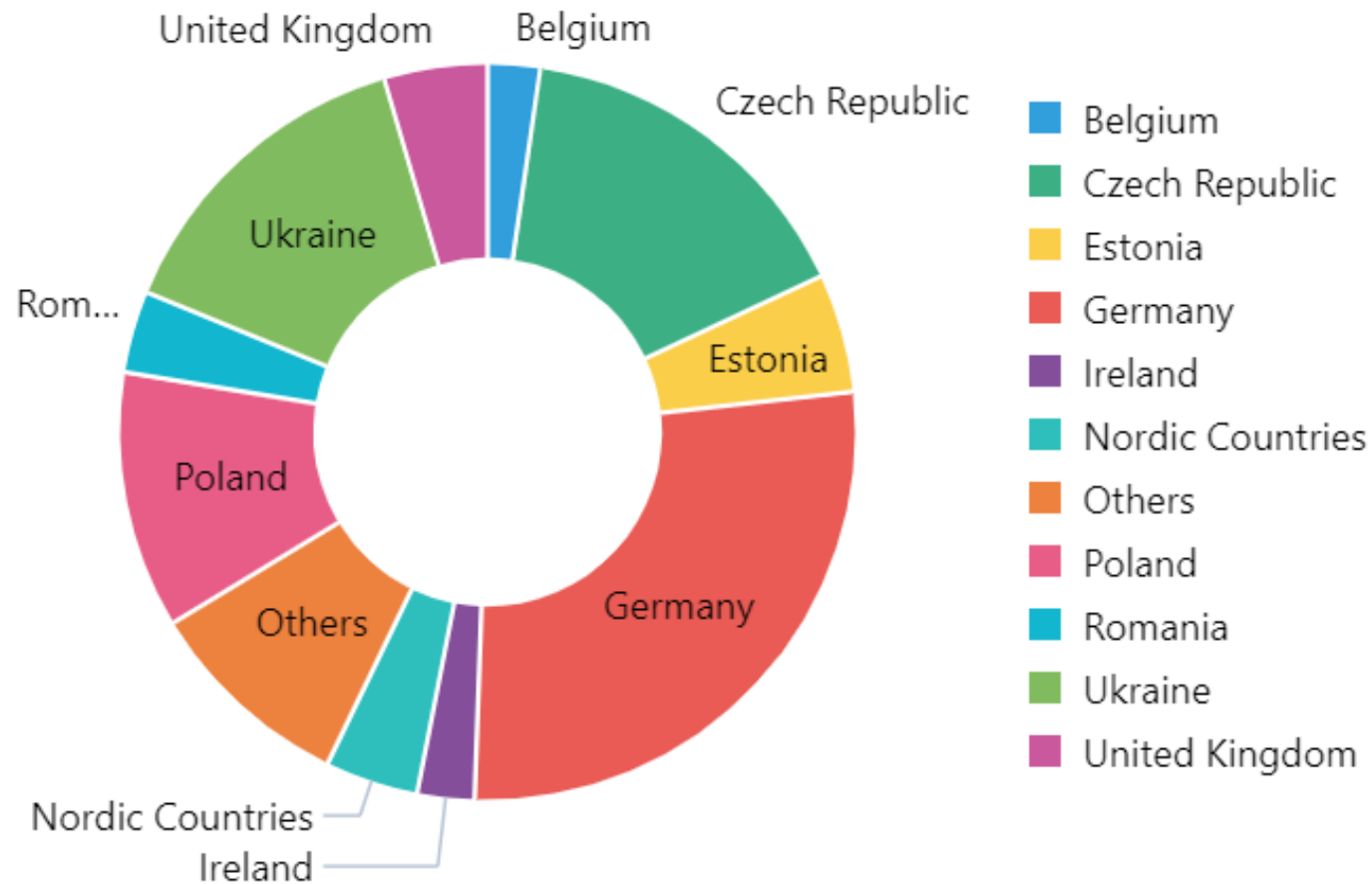
- 
1. Accessions originating within the country (Check the old name of the country!)
 2. Accessions collected or received from collecting missions outside the country and considered unique (after verification that legal status allows distribution with SMTA)
 3. At the discretion of each country is the option of considering additional criteria



- a) Identified Accessions are free from any third-party obligations or registrations
- b) Identified Accessions meet [the selection requirements](#) adopted by the ECPGR Steering Committee

Decentralized collections

POTATO (15,421 accessions)

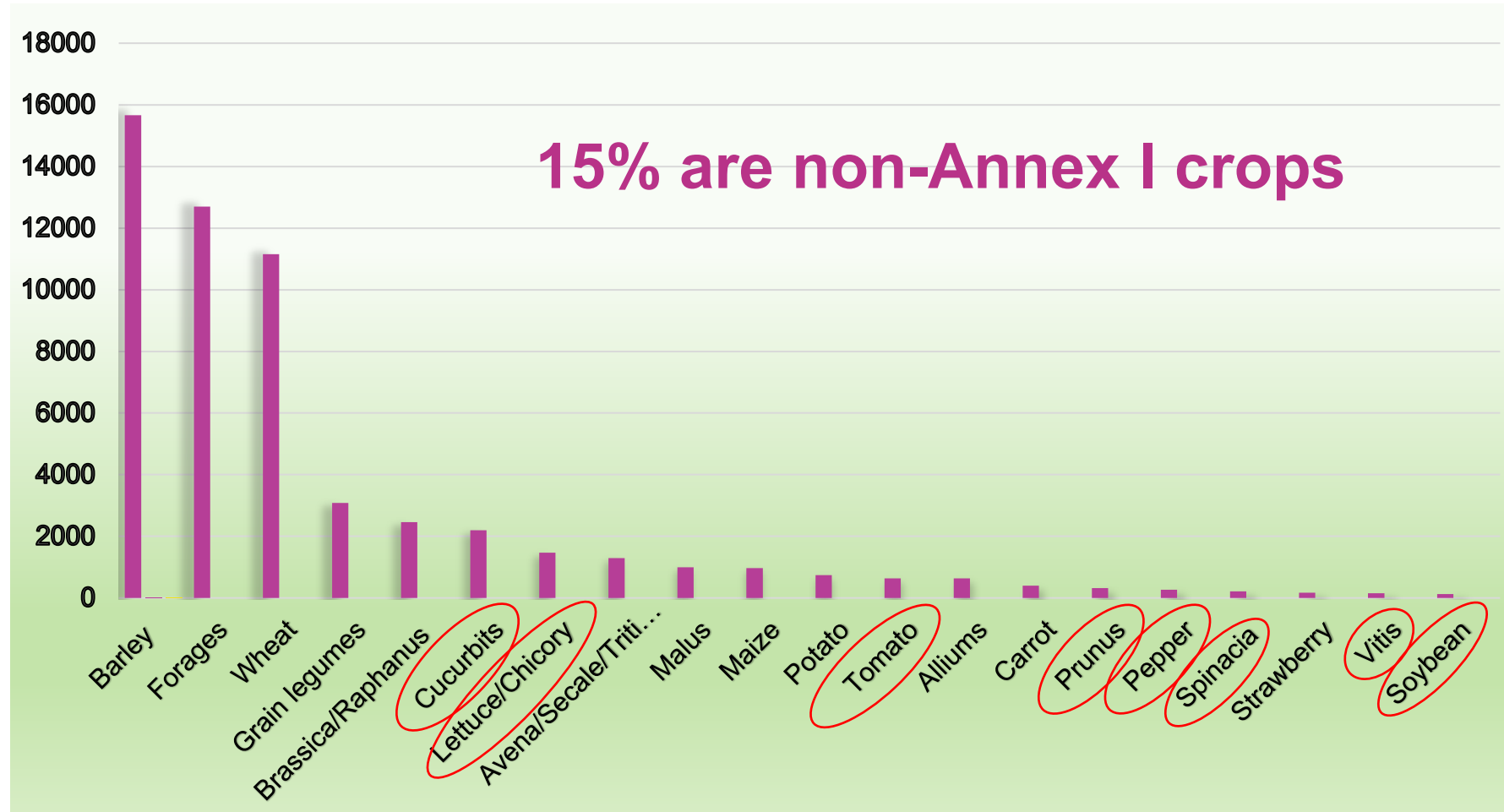


(source: EURISCO 2024)



ECP/GR

European Collection by crops



Unique vs. AEGIS accessions

Unique in EURISCO (all countries)	AEGIS accessions	%
468,168	121,988	26%

Unique in EURISCO (AEGIS members)	AEGIS accessions	
308,064	121,988	40%



Country	Accessions of national origin	AEGIS accessions	%
ALB	5,181	8	0%
AUT	4,368	0	0%
ARM	5,847	0	0%
AZE	9,744	0	0%
BEL	1,222	2	0%
BIH	?	29	
BGR	18,846	391	2%
BLR	52	0	0%
HRV	3,700	90	2%
CYP	977	0	0%
CZE	10,185	2,097	21%
EST	1,725	257	15%
FRA	9,705	0	0%
GEO	436	0	0%
GRE	5,511	0	0%
DEU	30,072	84,236	280%
HUN	14,215	0	0%
IRL	1,284	0	0%
ISR	26,674	0	0%
ITA	24,171	10,946	45%

Country	Accessions of national origin	AEGIS accessions	%
LVA	2,437	27	1%
LTU	2,115	45	2%
MKD	1,086	0	0%
MDA	2,197	0	0%
MNE	346	31	9%
NLD	5,688	5,840	103%
NORDGEN	27,722	4,785	17%
POL	31,575	443	1%
PRT	19,383	86	0%
ROM	21,984	754	3%
RUS	44,625	0	0%
SRB	1,382	0	0%
SVK	3,092	1,381	45%
SVN	2,507	21	1%
ESP	58,771	0	0%
CHE	38,526	8,860	23%
TUR	12,996	0	0%
GBR	17,821	1,659	9%
TOTAL	468,168	121,988	26%

AEGIS in the ECPGR Strategy targets

- AEGIS Certification system developed **P1**
- Genebanks with > 1,000 accessions AEGIS certified **P1**
- European collection:
 - Comprehensive **P1**
 - Conserved at AQUAS standards (review system involving GBM network) **P1**
 - Fully available via EURISCO request system **P2**
 - All safety-duplicated **P1**
 - Diversity gaps filled **P2**

AEGIS coordination revived (March-May 24)

29 National Coordinators + NordGen contacted:

- Confirm agreements (AMs) and contact details
- Clarify role of AMs with no AEGIS accessions
- Request compilation of operational genebank manuals
- Intention to add accessions or reasons not to do so



RESULTS so far (30 Sep 24)

- 30 interactions:

Positive and working on it	Need more time to reply	No priority	No answer
21	2	2	5

- 2 AMAs cancelled, 2 new AMAs signed
- 1 manual updated / 2 new manuals drafted / 7 acknowledged the need to prepare
- New accessions in 2024: 51560 from seven countries
- Reasons for no progress: no funds and thus low priority (CYP)/ slow bureaucratic process (FRA)/ lack of staff resources /administrative shakiness (BiH)
- Need more time to reply: HRV, LTU
- No answer: AZE; PRT; SRB; TUR; GBR
- No priority: CYP; FRA
- Overall: general intention to engage into AEGIS implementation