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AEGIS Approaches for Leafy vegetables: Introduction to the Discussion

Jelka Šuštar Vozlič

Third Meeting of the ECPGR Leafy Vegetables Working Group and the EVA lettuce Network
6-8 October 2026, Skierniewice, Poland

Outline

- Introduction to AEGIS / AQUAS
- AEGIS and Leafy Vegetables: Current Status
- Discussion Points

AEGIS - A European Genebank Integrated System

- AEGIS is a platform connecting European genebanks **under a common system for the long-term conservation** of **unique accessions** of Plant Genetic Resources for Food and Agriculture **(PGRFA)**.
- These selected accessions are maintained by the participating institutions (i.e. **Associate Member institutions**) at an **agreed quality standard** and are **made available** in accordance with the terms and conditions set out in the International Treaty on PGRFA, i.e. through a Standard Material Transfer Agreement **(SMTA)**.

AEGIS Leaflet: A European Genebank Integrated System

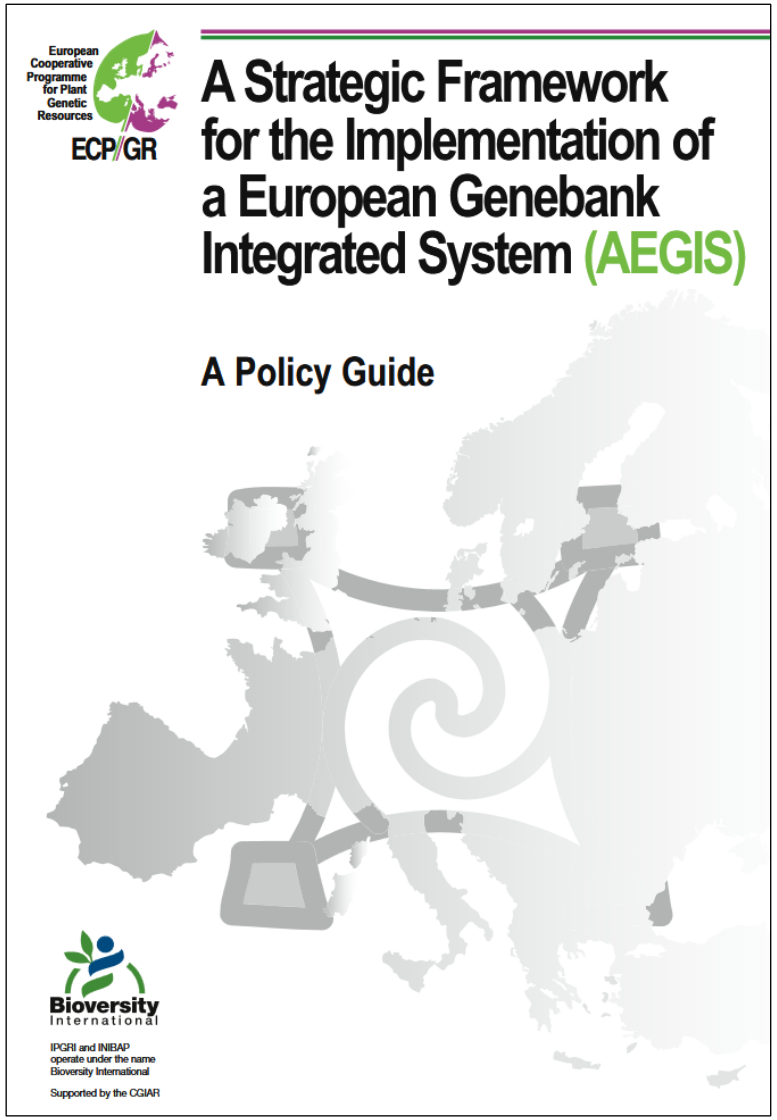
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AEGIS: Governance and structure

- AEGIS operates within the framework of ECPGR.
- The ECPGR Steering Committee has overall responsibility and oversight over the operation of AEGIS and delegated the oversight function to its Executive Committee.
- Coordination of AEGIS is provided by the ECPGR Secretariat.
- ➢ **The ECPGR Crop Working Groups provide technical support.**
- Associate Member (AM) institutions conserve the genetic material and/or offer related services, such as regeneration capacity, safety-duplication space, etc.



AEGIS Membership

Membership is open to all European countries that are members of ECPGR and willing to make PGRFA available under the conditions of the FAO International Treaty.

- Member country signs a MoU with the legal host of ECPGR Member country's National Coordinator signs Associate Memberships Agreements with national institutions conserving genetic resources or providing related services
- National Coordinators, in agreement with Associate Member institutions, **designate accessions under their jurisdiction that they wish to include in the European Collection**.



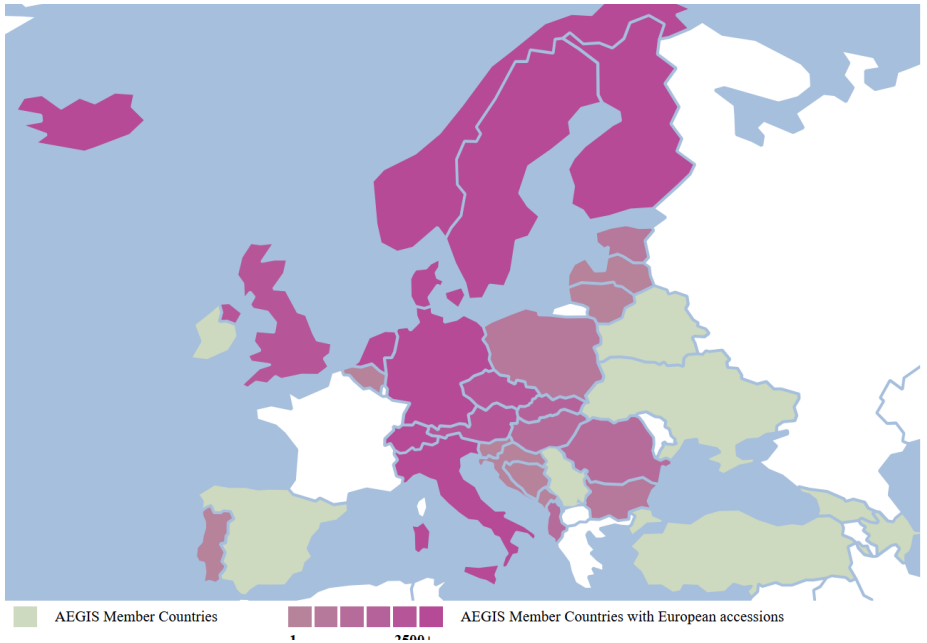
2026:

- 36 member countries
- 76 AM agreements

AEGIS Leaflet: A European Genebank Integrated System

European Collection, European Accessions

- The European Collection is operated as a **virtual European genebank,** and is composed of **European Accessions** **conserved for the long-term** by the AEGIS Associate Members on behalf of the ECPGR Member countries and being available for use or conservation only for the purposes of research, breeding and training for food and agriculture.
- European Accessions are conserved in accordance with **technical standards** agreed upon at the ECPGR level, based on the principles of the AEGIS Quality System (**AQUAS**).
- European Accessions are **available upon signature of the SMTA**.



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European Collection, European Accessions

- National Coordinators, in agreement with Associate Member institutions, designate accessions under their jurisdiction that they wish to include in the European Collection
- Designated accessions become **European Accessions** as soon as they are flagged in EURISCO by the National Inventory Focal Point as “part of AEGIS”
- **European Accessions** are expected to be conserved by their holding Associate Member institutions for the **long term** and according to agreed quality standards. They should also be safety-duplicated in a different institution and provided to users upon request under the terms of the SMTA.
- ECPGR Crop Working Groups define the standards, identify gaps and avoid inclusion of redundancies in the European Collection.

European Collection, European Accessions

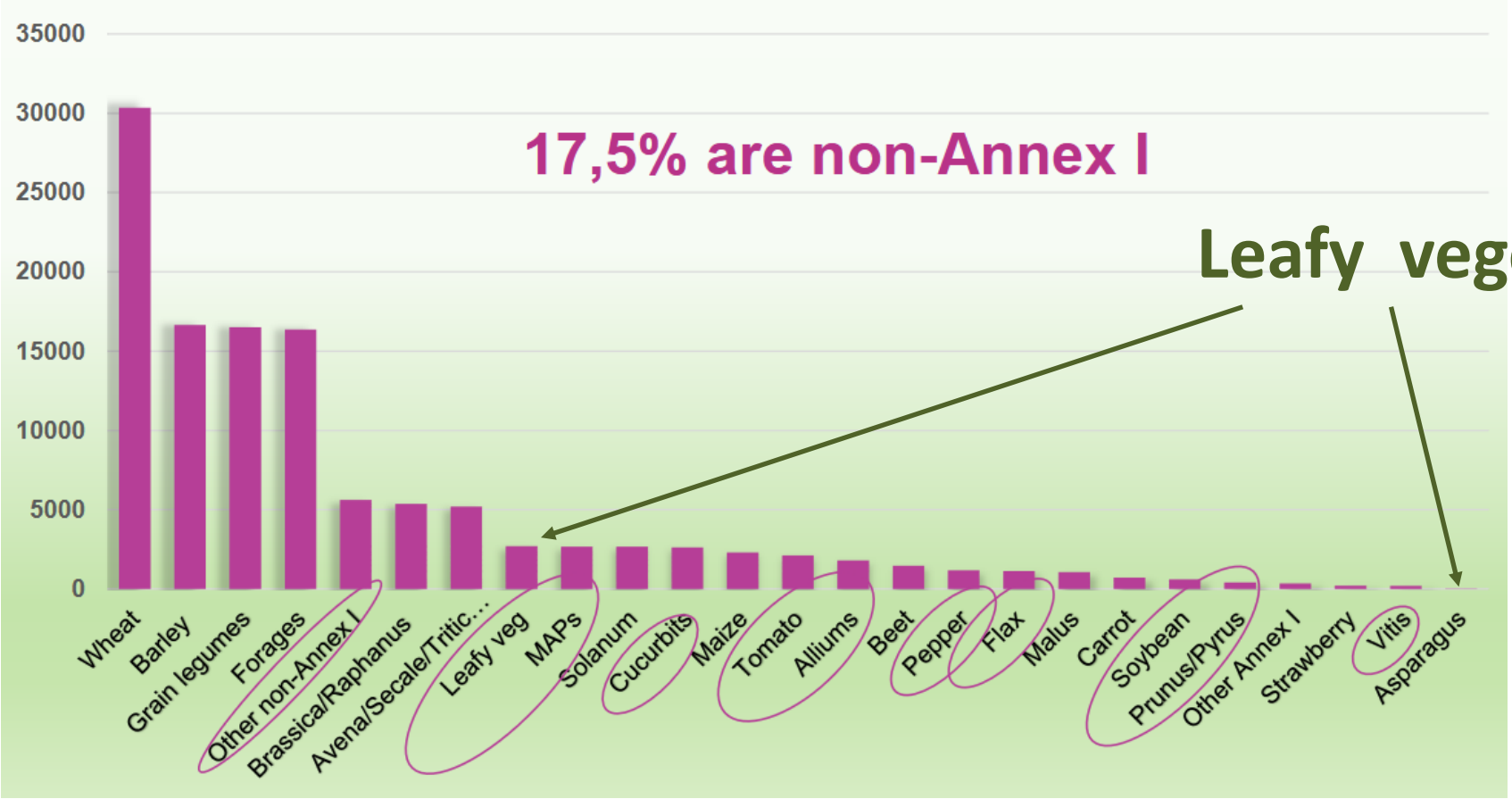
Selection requirements:

- Material under the management and control of the member countries and their AM, in the public domain and offered by the AM for inclusion into AEGIS.
- Genetically unique within AEGIS, to the best available knowledge (i.e. genetically distinct accessions; assessment based on available data and/or on the recorded history of the accession).
- PGRFA as defined in the ITPGRFA as well as medicinal and ornamental species.
- European origin or introduced germplasm that is of actual or potential importance to Europe (for breeding, research, education or for historical and cultural reasons).

Selection criteria:

- Accessions originating within the country
- Accessions collected or received from collecting missions outside the country and considered unique
- At the discretion of each country is the option of considering additional criteria such as completeness of passport data, presence of characterization data, safety duplication, quality of material, etc.

European Collection by crops



L. Maggioni, 18th SC Meetting, Tbilisi, 2026

AQUAS: Quality Management System for AEGIS

The AEGIS Quality Management System is the set of policies, processes and procedures that are to be followed by all members of AEGIS to assure an appropriate quality of the activities.

Elements of AQUAS:

- General and crop-specific standards
- Operational genebank manuals
- Safety duplication policy
- Distribution guidelines
- Record keeping, reporting and monitoring.

Genebank operational and crop-specific standards

Generic operational standards:

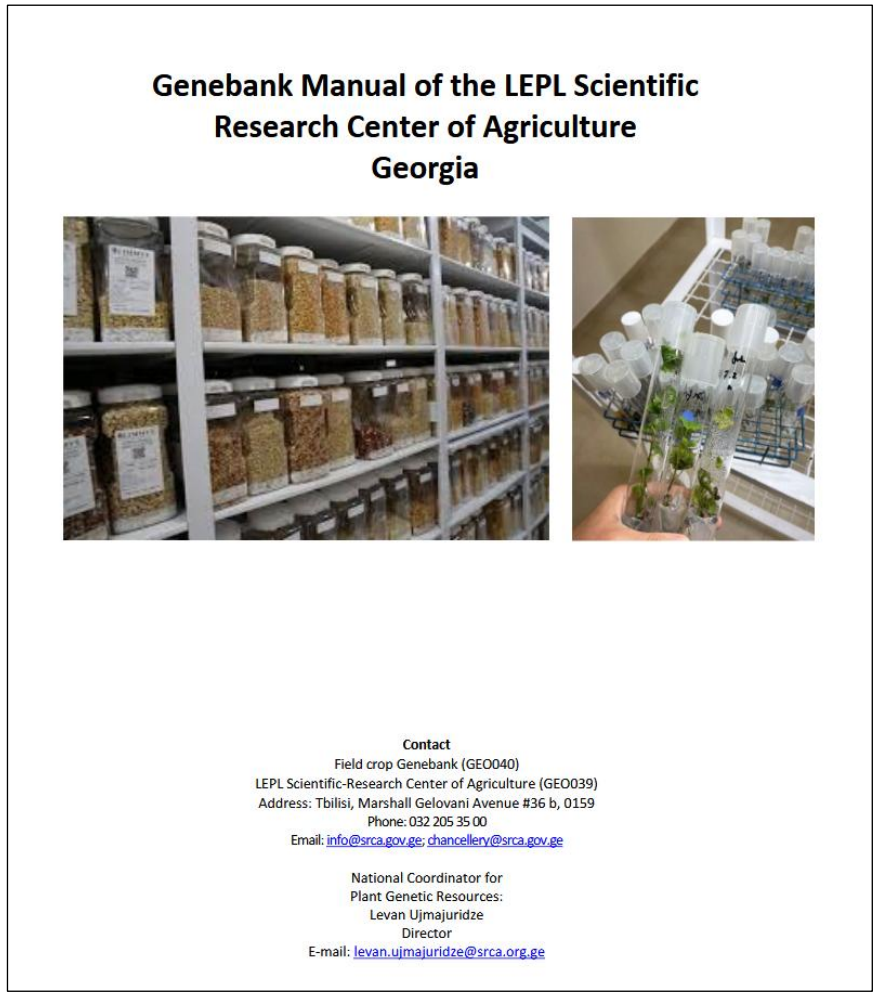
- Genebank Standards for PGRFA (FAO, 2014) (orthodox seeds, field genebanks, *in vitro* culture and cryopreservation)
- Practical guides for the application of Genebank Standards (FAO, 2022, 2025)

Crop specific standards:

- Agreed crop-specific standards (*Allium*, *Avena*,… Leafy Vegetables)
- Other crop-specific documents



Genebank Manuals



Genebank Manual of the LEPL Scientific Research Center of Agriculture Georgia

Contact
Field crop Genebank (GEO040)
LEPL Scientific-Research Center of Agriculture (GEO039)
Address: Tbilisi, Marshall Gelovani Avenue #36 b, 0159
Phone: 032 205 35 00
Email: info@srca.gov.ge; chancellery@srca.gov.ge

National Coordinator for
Plant Genetic Resources:
Levan Ujmajuridze
Director
E-mail: levan.ujmajuridze@srca.org.ge

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Template

- Template for the preparation of operational genebank manuals (Version 2, revised as part of the AEGIS Plus project, published 6 July 2026) [Word]

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)
Belgium	Operational genebank manual of CRA-W – Potato Genetic Resources Collection (October 2025) (672,9 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 Centre of Estonian Rural Research and Knowledge (METK), 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)

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AEGIS Policies

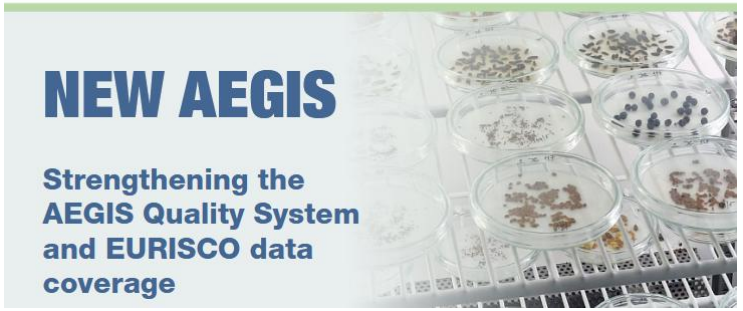
Safety duplication

- The AEGIS Safety-Duplication Policy (endorsed by the ECPGR Steering Committee - 15.02.2013) (162,3 KB)
- Proposed models (non-mandatory) for a safety-duplication agreement:
- AEGIS Safety-Duplication Agreement (64,5 KB)
- AEGIS Safety-Duplication Agreement (simplified version) (49,0 KB)

Distribution

- AEGIS Guidelines for Distribution of Material from the European Collection (89,7 KB)

German-funded project: New AEGIS



Reinforcement of the AEGIS Quality System and EURISCO data coverage: New AEGIS (1 Sept 2024-31 May 2025)

- AMs increase their awareness of the AEGIS principles and increase quality of operations and accessibility of the European Collection.
- 19 new operational genebank manuals developed.
- All manuals analyzed and compared. Overview of current practices/recommendations.
- Two crop-specific genebank standards are developed.
- Two Associate Members published their Standard Operating Procedures.
- A list of genebank metrics agreed by pilot genebanks.
- Characterization and evaluation data for various crops are integrated into EURISCO (> 1000 new accessions with phenotypic traits).
- Nine reciprocal genebank review visits are completed, with reports published online.

German-funded project: AEGIS PLUS

Reinforcing European *ex situ* conservation through AEGIS implementation and capacity building: AEGIS PLUS (15 Nov 2025-31 Dec 2026)

- Developing and testing the genebank metrics tool
- Revised, user-friendly operational genebank manual template
- Twelve reciprocal genebank review visits
- Regeneration and safety-duplication of AEGIS accessions
- Hands-on practical workshops
- Final meeting with Genebank Managers Network (Nov 26, Warsaw)



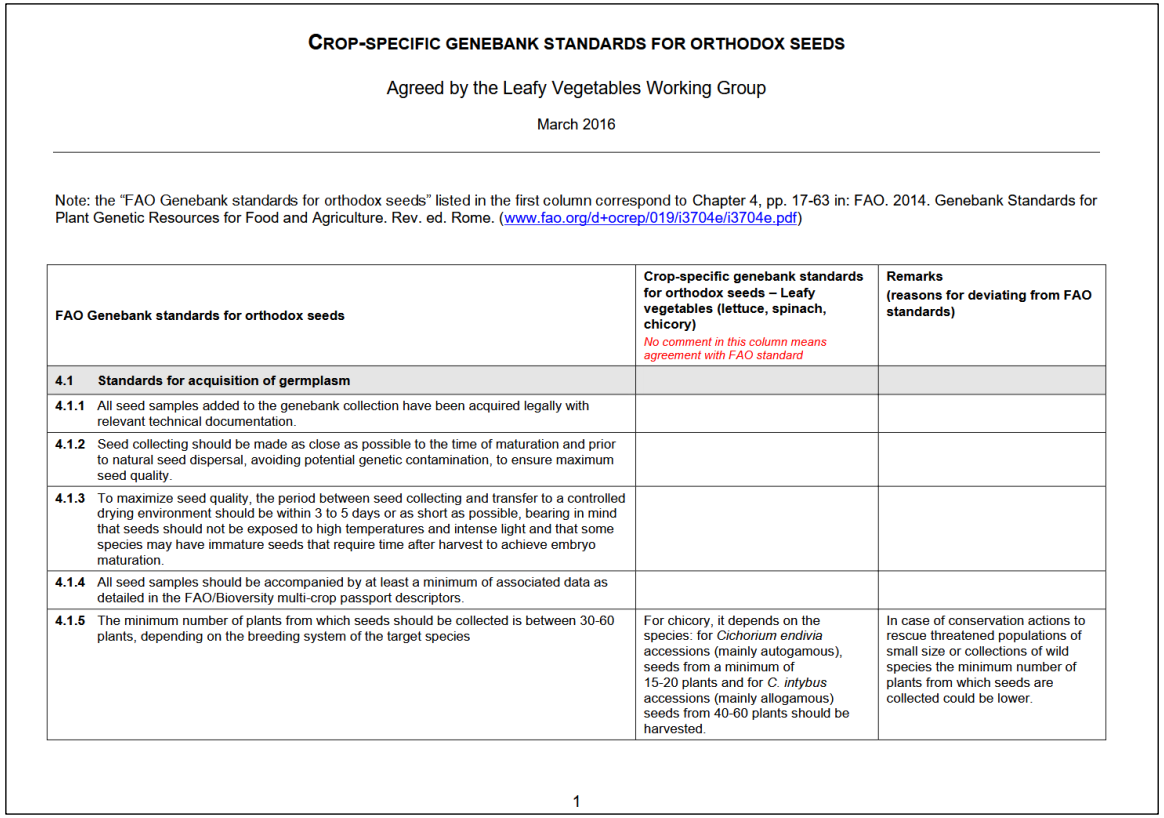
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Outline

- Introduction to AEGIS / AQUAS
- **AEGIS and Leafy Vegetables: Current Status**
- Discussion Points

Crop-specific Genebank Standards, Minimum descriptors



CROP-SPECIFIC GENEBANK STANDARDS FOR ORTHODOX SEEDS

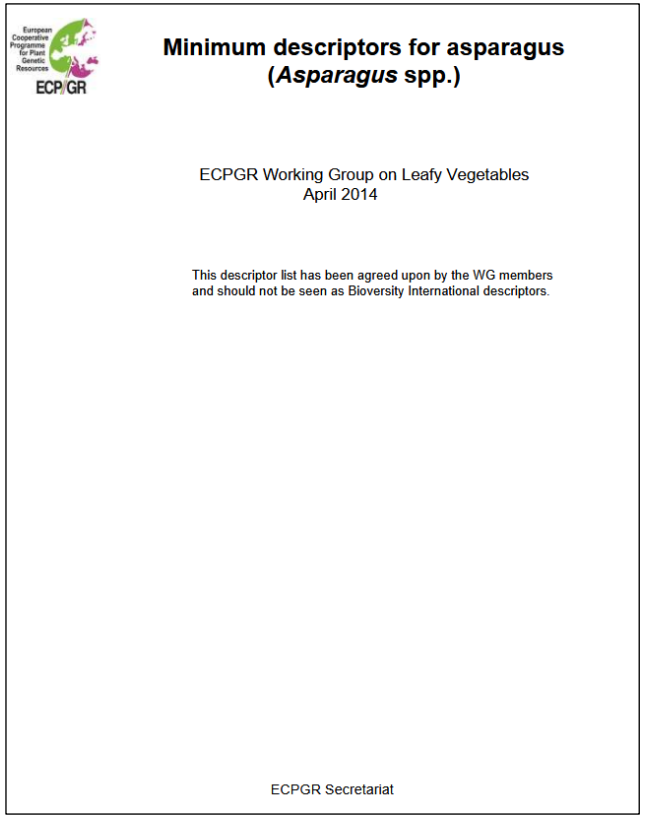
Agreed by the Leafy Vegetables Working Group

March 2016

Note: the "FAO Genebank standards for orthodox seeds" listed in the first column correspond to Chapter 4, pp. 17-63 in: FAO. 2014. Genebank Standards for Plant Genetic Resources for Food and Agriculture. Rev. ed. Rome. (www.fao.org/d+ocrep/019/i3704e/i3704e.pdf)

FAO Genebank standards for orthodox seeds	Crop-specific genebank standards for orthodox seeds – Leafy vegetables (lettuce, spinach, chicory) *No comment in this column means agreement with FAO standard*	Remarks (reasons for deviating from FAO standards)
4.1 Standards for acquisition of germplasm		
4.1.1 All seed samples added to the genebank collection have been acquired legally with relevant technical documentation.		
4.1.2 Seed collecting should be made as close as possible to the time of maturation and prior to natural seed dispersal, avoiding potential genetic contamination, to ensure maximum seed quality.		
4.1.3 To maximize seed quality, the period between seed collecting and transfer to a controlled drying environment should be within 3 to 5 days or as short as possible, bearing in mind that seeds should not be exposed to high temperatures and intense light and that some species may have immature seeds that require time after harvest to achieve embryo maturation.		
4.1.4 All seed samples should be accompanied by at least a minimum of associated data as detailed in the FAO/Bioversity multi-crop passport descriptors.		
4.1.5 The minimum number of plants from which seeds should be collected is between 30-60 plants, depending on the breeding system of the target species	For chicory, it depends on the species: for *Cichorium endivia* accessions (mainly autogamous), seeds from a minimum of 15-20 plants and for *C. intybus* accessions (mainly allogamous) seeds from 40-60 plants should be harvested.	In case of conservation actions to rescue threatened populations of small size or collections of wild species the minimum number of plants from which seeds are collected could be lower.

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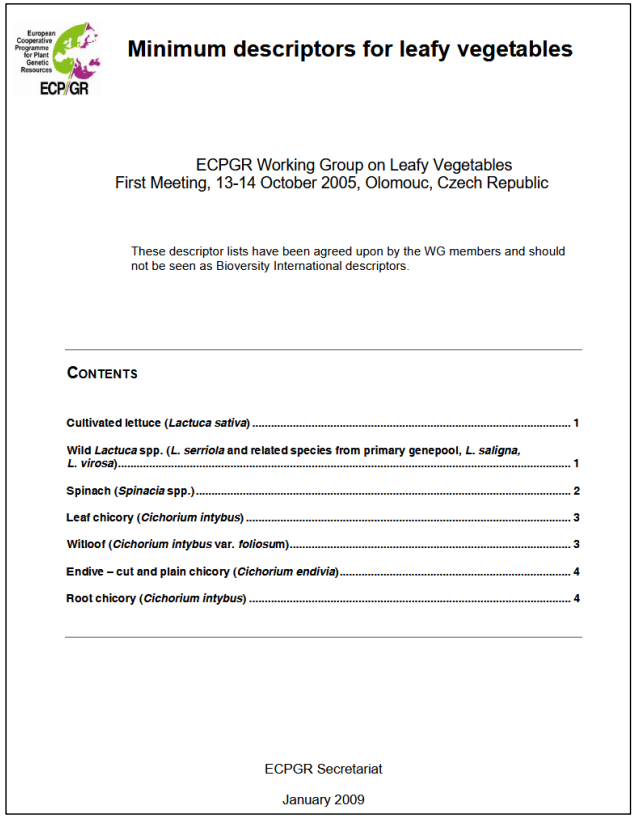


Minimum descriptors for asparagus (*Asparagus* spp.)

ECPGR Working Group on Leafy Vegetables
April 2014

This descriptor list has been agreed upon by the WG members and should not be seen as Bioversity International descriptors.

ECPGR Secretariat



Minimum descriptors for leafy vegetables

ECPGR Working Group on Leafy Vegetables
First Meeting, 13-14 October 2005, Olomouc, Czech Republic

These descriptor lists have been agreed upon by the WG members and should not be seen as Bioversity International descriptors.

CONTENTS

Cultivated lettuce (*Lactuca sativa*) 1
Wild *Lactuca* spp. (*L. serriola* and related species from primary genepool, *L. saligna*, *L. virosa*) 1
Spinach (*Spinacia* spp.) 2
Leaf chicory (*Cichorium intybus*) 3
Witloof (*Cichorium intybus* var. *foliosum*) 3
Endive – cut and plain chicory (*Cichorium endivia*) 4
Root chicory (*Cichorium intybus*) 4

ECPGR Secretariat

January 2009

Documents developed with the EU GENRES project on Leafy Vegetables:

- Minimum Descriptor List for *Eruca*
- Minimum Descriptor List for *Valerianella*

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European Collection – Leafy vegetables

Since 2023, the number of leafy vegetables represented in the European Collection has increased by around 30%.

Currently, **more than 2,600 European accessions are part of AEGIS**, including major leafy vegetables (lettuce, chicory, spinach) as well as minor leafy vegetables (rocket salad, lamb's lettuce, asparagus, artichoke) and their crop wild relatives (CWR).

- The genus ***Lactuca*** is the most represented, with 1,674 European accessions, followed by ***Chicorium*** with 325 and ***Spinacia*** with 284 accessions.
- Some new species of **minor leafy vegetables and/or CWR** have also been included in the European Collection, including *Blitum bonus-henricus*, *Brassica nigra*, *Cynara cardunculus*, *C. humilis*, eight species of *Lepidium*, *Portulaca oleracea* and *P. grandiflora*.
- The major contributing countries to the European Collection are, as in previous surveys, Germany, the Netherlands, the Nordic Countries and the UK.
- Some other countries have also assigned accessions as European Accessions (e.g. Italy – *Asparagus acutifolius*, Romania – *Brassica nigra*, Slovenia – *Lactuca sativa*).

European Accessions: Leafy Vegetables

AEGIS Accessions that make up the European Collection: European accessions of leafy Vegetables (Status as of October 2026)

Genus	No. of accessions		Increase 2023-2026		Contributing countries
	2023	2026	No. of accessions	%	
Lactuca	1378	1674	296	21,48	D (569), CZ (46), A (1)Slo (3), UK (119), NL (830), Nordic c. (106)
Spinacia	281	284	3	1,07	D (126), NL (110), Nordic c. (32), UK (16)
Cichorium	247	325	78	31,58	D (320), Nordic c. (3), A (2)
Asparagus	16	17	1	6,25	I (2), D (14), Nordic c. (1)
Diplotaxis	7	16	9	128,57	D (16)
Eruca	67	92	25	37,31	D (87), NL (4), A (1)
Valerianella	7	43	36	514,29	D (43), NL (13)
Summary	**2003**	**2451**	**448**	**22,37**	

https://www.ecpgr.org/aegis/european-collection/european-accessions

European Accessions: Leafy Vegetables

AEGIS Accessions that make up the European Collection: European accessions of leafy Vegetables (Status as of October 2026)

Genus	No. of accessions	Contributing countries	Remark
Blitum bonus-henricus	1	Nordic countries	CWR of spinach (tertiary genepool)
Brassica nigra	46	Germany (40), Italy (4), Romania (2)	CWR of perennial wall rocket (secondary genepool)
Cynara	27	Germany (17), Italy (10)	
Lepidium	97	Germany (97)	
Portulaca	10	Germany (6), Netherlands (3), Italy (1)	
Summary	**181**		

Objectives and targets of the Plant Genetic Resources Strategy for Europe and associated priorities for ECPGR Phase XI

Table 3: *Consolidating and sustaining* ex situ *conservation*

PGR Strategy for Europe Objectives	PGR Strategy for Europe Targets	Responsibility (main level/ responsible bodies)	Type of action that ECPGR could undertake	Potential sources of funding to cover the ECPGR action	ExCo proposal for activities to be included in Phase XI workplan
By 2030, the **GR diversity in European genebanks is conserved reliably and made accessible for sustainable use**, by improving the efficiency and efficacy of the European genebank infrastructure. Thus, the European *ex situ* conservation system will be raised to a level of excellence in terms of i) long-term quality (conservation management, viability, genetic integrity and phytosanitary protection), and ii) accessibility of conserved material to users, thereby positioning Europe as a primary contributor to the global PGR conservation and use effort. By 2030 European genebanks **ensure the long-term conservation of PGR** and **provide access to appropriate samples of the genetic diversity** that has occurred and/or is still occurring in European agriculture and in-nature. This covers the diversity needed for direct use, research and plant breeding that contributes to the continuous adaptation of	1.The AEGIS Certification System, guaranteeing the quality of genebank operations, has been developed and is widely recognized and implemented in Europe through a decentralized network of AEGIS-certified genebanks.	Task Force / Steering Committee	Develop the Certification System	EU- funded project (currently through PRO-GRACE project) External donor	• ~~PRO-GRACE~~ (**COMPLETED**) •
	2. Up to one third of European genebanks have been AEGIS-certified (100–150, including all those with more than 1,000 accessions), relying when needed on a capacity-building and support system to facilitate their upgrading to reach the AEGIS certification level.	National/Task Force/ Crop and Cryo WGs/ Secretariat	Implement Certification System and capacity-building services, including cryo, phytosanitary and duplication	National Funds EU-funded project External donor **ECPGR Grant** /AEGIS budget line	• **P1** - Certification system to be implemented, based on mechanism proposed by PRO-GRACE. (Possible role of ECPGR Secretariat - Budget may not be necessary) • **P1** - Capacity building services to be organized within the framework of the genebank managers' network, also based on blueprint provided by PRO-GRACE • **P1** Increase quality of genebank operations by creating a mechanism for organizing peer reviews, introducing genebank metrics and supporting the implementation of quality management systems.
	3. The coordinated European collection (i.e. the combined collections of AEGIS-certified genebanks) contains a substantial part of the accessions conserved in European genebanks. All these accessions are conserved to AQUAS standards (see section 2.3.1) and fully available from the AEGIS-certified genebanks via a request system through EURISCO. All AEGIS material is safety-duplicated possibly in another European country and/or in the Svalbard Seed Vault and/or at one of the CGIAR Centres	National/Genebanks EURISCO	Implement genebank review system	National Funds **ECPGR Grant/** EURISCO budget lines	• **P1** - Support to countries to identify and include material into AEGIS, including regeneration and safety-duplication. • **P1** - Implementation of genebank review system by the network of genebank managers, taking into account Crop Trust certification experience and global strategies. • **P1** - Extension of EURISCO to include a centralized genebank ordering system.

Objectives and targets of the Plant Genetic Resources Strategy for Europe and associated priorities for ECPGR Phase XI

PGR Strategy for Europe Objectives	PGR Strategy for Europe Targets	Responsibility (main level/ responsible bodies)	Type of action that ECPGR could undertake	Potential sources of funding to cover the ECPGR action	ExCo proposal for activities to be included in Phase XI workplan
European agriculture to current and future needs.	4. A comprehensive assessment of European plant genetic resources and diversity required by users for present and future needs in food and agriculture and the corresponding gaps in the conservation system has been completed and is regularly updated.	National and regional (Crop WGs)	Crop by crop assessment	National funds/External donor / **ECPGR Grant**	• **P2 -** Crop Working Groups to develop methodology to assess crop diversity required and gaps in the conservation system in cooperation with users, as a dynamic process, for current and future needs.
	5. The genetic diversity maintained in European AEGIS-certified genebanks includes: i) the vast majority of the European landraces; ii) a wide range of CWR diversity of crops grown in Europe; iii) a representative selection of developed varieties, and iv) other relevant material related to crops grown in Europe, including WFP	National and regional (Crop WGs)	Crop by crop assessment	National funds / External donor / **ECPGR Grant**	• **P2** - Crop WGs, in collaboration with CWR and On-farm WGs, assess and remedy to gaps in *ex situ* genebanks, including through collecting missions. • **P3** - An exhaustive inventory of the genetic diversity conserved in all national or local genebanks maintaining and characterizing GR – outside the network of AEGIS certified genebanks – is made to enlarge the potential of European genetic diversity to be conserved in a long-term perspective. • ***P3*** *- Countries encourage the development of cooperative work between their national AEGIS – certified genebanks and other local or national genebanks to ensure that all original genetic diversity held in genebanks outside AEGIS-certified ones be conserved in a long-term perspective.*

Discussion

Discussion Points:

- Application of standards
- Regeneration protocols
- Current status and gaps
- Challenges and opportunities
- Future action plan