



Agricultural Institute of Slovenia

EXAMPLES FROM GENE BANKS ON QUALITY MANAGEMENT SYSTEMS

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Meeting of the ECPGR Network of Genebank Managers
INI AV-BPGV, Braga, Portugal, 13 – 15 May 2024

Content

- Introduction
- Slovene Plant Genebank - PGB.SI: structure and functioning
- QMS in PGB.SI: where we are?
- Future steps
- Experience from other genebanks?
- Discussion

My experience with QMS



- Introduction of quality system in Genetic laboratory of Agricultural Institute of Slovenia
- ISTA (International Seed Testing Association) accreditation: Verification of species and variety (including Performance Approved Methods)
- ENGL – European Network of GMO Laboratories
- ISO 9001:2015: internal auditor



Kmetijski inštitut Slovenije SOP-OPVGŽ-001 LABORATORIJSKI RED V G-LAB

SEBINA

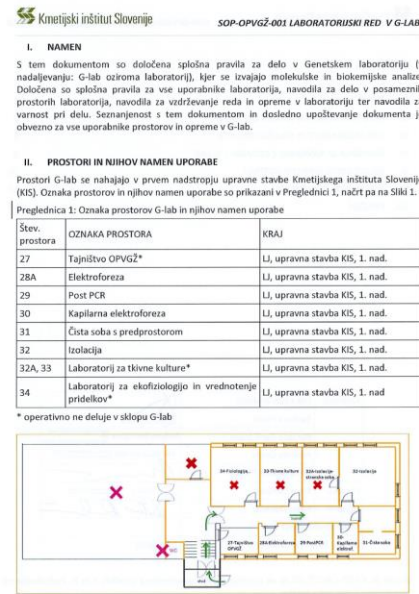
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Priloga 1: Oznaka prostorov G-lab in njihov namen uporabe

Štev. prostora	OZNAKA PROSTORA	KRAJ
27	Tajništvo OPVGŽ*	Lj, upravna stavba KIS, 1. nad.
28A	Elektroforeza	Lj, upravna stavba KIS, 1. nad.
29	Post PCR	Lj, upravna stavba KIS, 1. nad.
30	Kapilarna elektroforeza	Lj, upravna stavba KIS, 1. nad.
31	Čista soba s predprostorom	Lj, upravna stavba KIS, 1. nad.
32	Izolacija	Lj, upravna stavba KIS, 1. nad.
32A, 33	Laboratorij za tkivne kulture*	Lj, upravna stavba KIS, 1. nad.
34	Laboratorij za ekofiziologijo in vrednotenje pridelkov*	Lj, upravna stavba KIS, 1. nad.

* operativno ne deluje v sklopu G-lab

Prejeli: Jelka Šuštar Vozlič, Barbara Pipan, Barbara Gerič Stare, Andreja Opara, Irena Mavrič Pleško
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Kmetijski inštitut Slovenije SOP-OPVGŽ-001 LABORATORIJSKI RED V G-LAB

vešbine ne sme presegati 1/3 volumna stekleničke. Petrijevke s trdim pojštem zberem v avtoklavirni vrečki in avtoklaviramo. Centrifugirke, nastavke za pipete, rokavice, papirnate brisače, kapalne zanke, zlobočnice in morebiten drug material zberemo v za to namenjene vrečke na stojalih (krošče), ki so postavljeni na delovnem pulnu in laminarju, nato pa prenesemo celotne vrečke v avtoklavirno vrečko in avtoklaviramo.

12. ODVOZ ODPADKOV iz garažnega prostora št. 220

Ključ za garažni prostor št. 220 se nahaja v glavni sobi genetskega laboratorija, v zgorjem predalu pod petlom, kjer stoji mikrolavna pečica.

Ko je prostor za odpadke poln, se dogovorimo za odvoz odpadkov s pooblaščenim podjetjem. Če je možno, se na ravni inštituta dogovorimo za skupen odvoz odpadkov (skupaj s Centralnim in Semenskim laboratorijem).

V. DELO Z GSO V ZAPRTEM SISTEMU

Genetski laboratorij Kmetijskega inštituta Slovenije je za delo z gensko spremenjenimi organizmi vpisan v register Zaprtih sistemov pri Ministrstvu za okolje in prostor (Zaprti sistem KIS, G-lab).

Delo z GSO v zaprtim sistemu na KIS se izvaja v dveh skupinah, obe sta vršičeni v prvi varnostni razred:

- Skupina 1: seme gensko spremenjenih kmetijskih rastlin in kmetijske rastline (dogodki), ki so dovoljeni v EU; dobočanje vršičnosti GSO v vzorcih semenkega materiala rastlin (kruza, soja, oljna ogršča) s pomočjo genetskih analiz (PCR, PCR v realnem času).
- Skupina 2: transformacija celic E. coli za določanje nukleotidnih zaporedij.

Za delo z GSO v zaprtim sistemu veljajo enaka pravila, kot za vsa druga dela v G-lab. Dodatno je predpisan načrt ukrepov za primer neresne ali nezrednega dogodka pri delu z GSO (SOP-OPVGŽ-002: Delo z GSO v zaprtim sistemu).

VI. REFERENČNI DOKUMENTI

SIST EN ISO/IEC 17025:2017
SIST EN ISO 9001:2015
Področje kakovosti KIS
SOP-01 Obvladovanje dokumentiranih informacij sistema kakovosti
SOP-OPVGŽ-002 Delo z GSO v zaprtim sistemu

VII. PRILoge

Slovene Plant Genebank – PGB.SI

- **Early projects** to collect Slovenian local varieties and populations, ecotypes and old cultivars of agricultural species were initiated about 80 years ago.
- **In 1996** the Ministry of Agriculture, Forestry and Food (MAFF) started financing the **Slovene Plant Genetic Resources Programme** with the goal to maintain, evaluate, regenerate and preserve Slovenian autochthonous species, ecotypes, populations and landraces of agricultural, medicinal and aromatic plants. Slovene Plant Gene Bank (SPGB) – Gene Bank of Agricultural Crop Species was established. The programme was active until the end of 2017.
- **Since 2018** the programme on Plant Genetic Resources in Slovenia operates through **Public Service on Plant Genetic Resources**, financed by the Ministry of Agriculture, Forestry and Food (MAFF).





REPUBLIC OF SLOVENIA
 MINISTRY OF AGRICULTURE,
 FORESTRY AND FOOD

**MINISTRY OF AGRICULTURE, FORESTRY AND FOOD
 &
 AGRICULTURAL INSTITUTE OF SLOVENIA**



BF

UNIVERSITY OF LJUBLJANA
 Biotechnical Faculty

**Biotechnical Faculty,
 University of Ljubljana (BF)**



University of Maribor

Faculty of Agriculture
 and Life Sciences

**Faculty of Agriculture and Life Sciences,
 University of Maribor (FKBV)**

- COORDINATION
- CENTRAL DATABASE



NGO,
 botanical gardens, schools, ...



Agricultural Institute of Slovenia

**Agricultural Institute of Slovenia,
 Ljubljana (KIS)**



Slovenian Institute
 of Hop Research
 and Brewing

**Slovenian Institute for Hop Research
 and Brewing, Žalec (IHPS)**



Agricultural Institute of Slovenia

Slovene Plant Genebank – PGB.SI

KIS: 3220 accessions

- Vegetables: 1468
- Forage crops: 1033
- Potato: 32
- Cereals: 108
- Berries: 166
- Grapevine: 158
- Fruit trees: 310

BF: 1631 accessions

- Cereals: 471
- Maize: 615
- Forage crops: 260
- Fruit trees: 184
- Medicinal and aromatic plants: 163

IHPS: 262 accessions

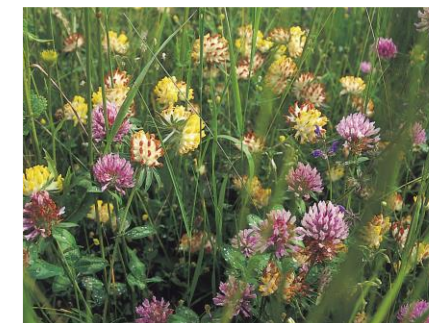
- Hops: 263
- Medicinal and aromatic plants: 134

FKBV : 327 accessions

- Fruit trees: 197
- Berries: 39
- Grapevine: 295

Total number of accessions in the PGB.SI: 5896
represented by total of 248 species:

- KIS: 204
- BF: 31
- IHPS: 36
- FKBV: 8



Public service on PGR: Multiannual program

In connection with the International Treaty, the multiannual public service program has the following objectives:

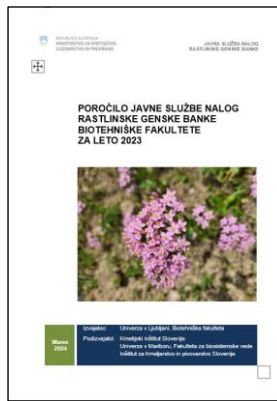
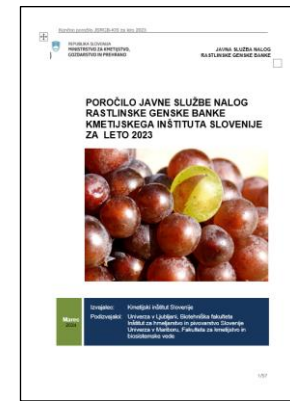
- **ensure the long-term and safe storage** of PGR in the most appropriate way;
- **document and evaluate** the collected PGR;
- **enable the sustainable use of PGR** with an appropriate system of controlled sharing of accessions (by implementing MLS system);
- **ensure the continuous collection of PGR** and information on the origin of PGR, the method of obtaining PGR, the method of production, use, storage and reproduction of PGR;
- **contribute to increasing agricultural biodiversity**, taking into account the current state of PGR in the natural environment;
- **increase the cooperation** and responsibility of all stakeholders involved in the conservation and sustainable use of PGR, taking into account professional guidance;
- **promote institutional building and public awareness** of the importance of PGR.

Public service on PGR: Annual program

- Collection PGRFA
- Documentation and regeneration
- Characterization and evaluation
- Conservation
- Use: exchange, research, breeding, direct use on farm..

Funding:

- MAFF
- Rural Development Programme - RDP
- National and International Research programmes and projects (H2020, Horizon Europe, ECPGR Grant Scheme, etc.)



Slovenian priorities related to AEGIS and AQUAS

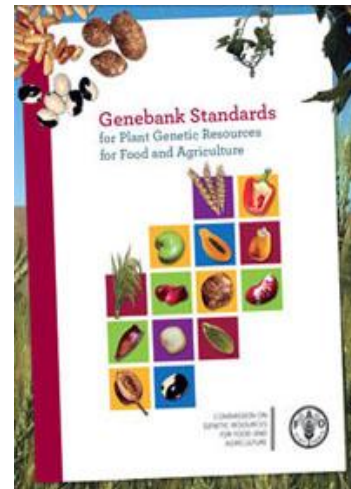
- Identification of suitable accessions in Associate Member (AM) institutions (four out of five AM are included in PGB.SI) to be proposed for registration as European Accessions;
- Managing these accessions in accordance with agreed quality standards;
- Facilitate supporting activities (regeneration, viability testing, etc);
- Facilitate access to the European Accessions in AM institutions and related information in accordance with internationally agreed conditions in line with the ITPGRFA.

Slovenian priorities related to AEGIS and AQUAS



Implementation of AQUAS in individual Associate Member Institutions as well as in the Slovene Plant Genebank as a whole:

- Development of Operational Genebank Manuals (AEGIS guidelines/templates);
- Development of Standard Operational Procedures for individual collection / group of species/ species (generic and crop specific standards);
- Ensure safety duplication: a large number of accessions in Slovene plant genebank are not yet safety duplicated;
- Upgrade IT system for PGR:
 - revision of data on accesses and connections between IT systems (national and international level);
 - GRIN Global?



Preparation of manuals or general and specific standard operating procedures for *ex situ* conservation

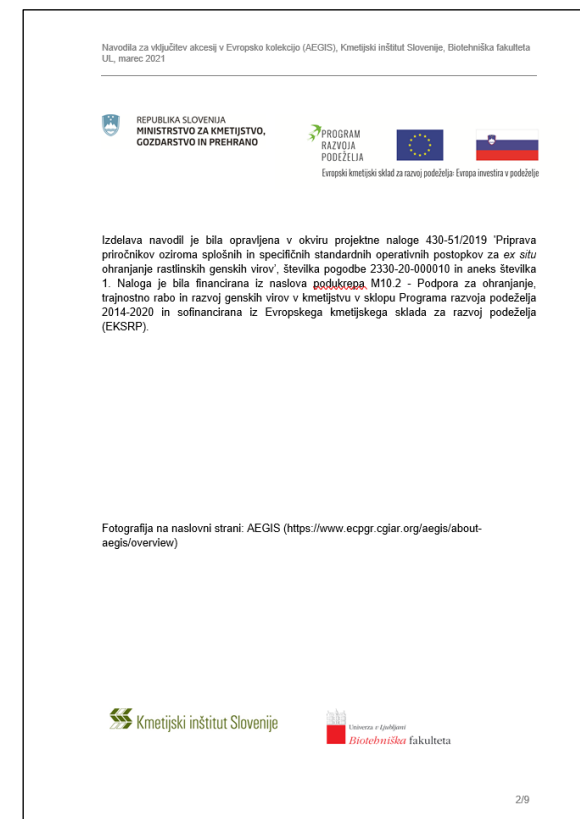
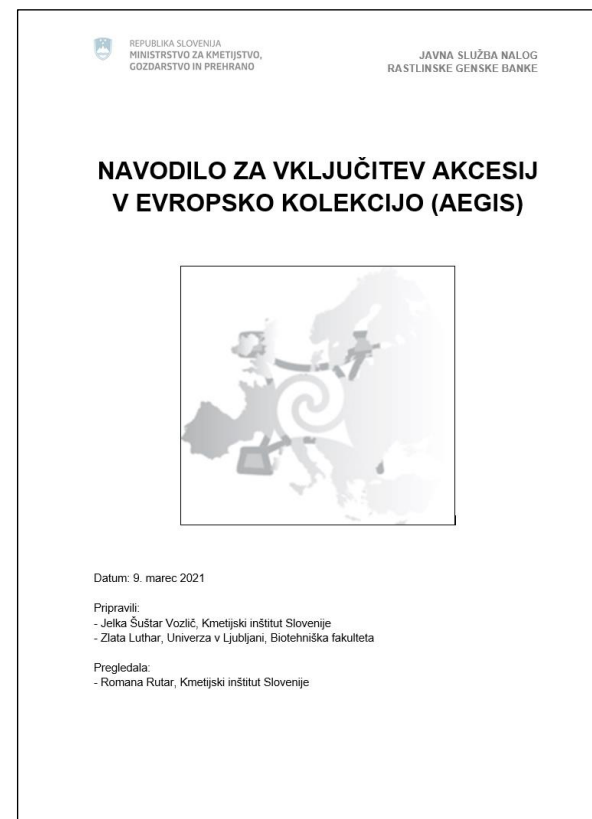
Project financed through Rural Development Programme (RDP) 2014 – 2020 (PN 430-51-2019):

- Translation of nine FAO and AEGIS documents for managing plant genebanks into Slovenian language;
- Preparation of the Operational genebank manual of the Slovene Plant Genebank (in Slovene and English language) (the template provided by AEGIS)
- Preparation of five general instructions for management of PGR collections:
 - Instructions for the inclusion of new accessions in the plant genebank
 - Guidelines for the exchange and distribution of PGR for research, breeding and direct use on farms
 - Instructions regarding premises, equipment and access to PGR
 - Instructions for reporting (national and international, including FAO, ECPGR: EURISCO, AEGIS)
 - Instructions for the inclusion of accessions in the European Collection (AEGIS)
- Preparation of 16 manuals for management of individual PGR collections

Instructions for the inclusion of accessions in the European Collection (AEGIS)

Content:

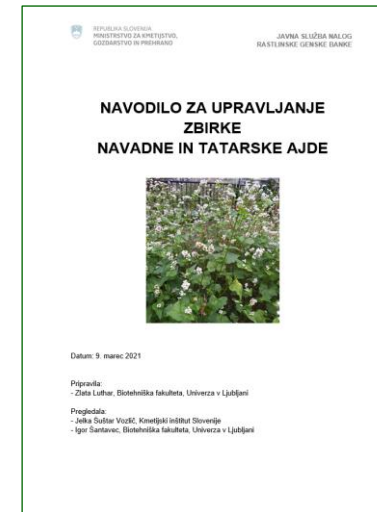
- Introduction
- Criteria for inclusion in the European Collection
- Instructions for the inclusion of Slovene accessions in the European Collection
 - Procedures
 - Instructions for fulfilment of AEGIS status in the application
- Reference documents
- Appendices



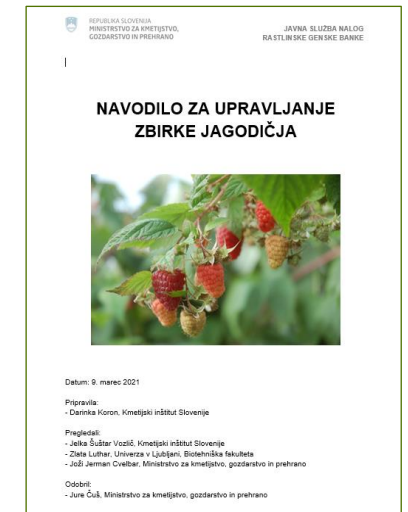
Manuals for management of individual PGR collections

- Manuals for management collections of:
 - Bean, Lettuce, *Allium*, Cabbage, Other vegetables
 - Maize, Other cereals, Buckwheat
 - Potatoes
 - Fodder crops
 - Hops
 - Berries
 - Grapevine
 - Medicinal and aromatic plants
 - Fruit crops: *Malus*, *Prunus*, *Pyrus*

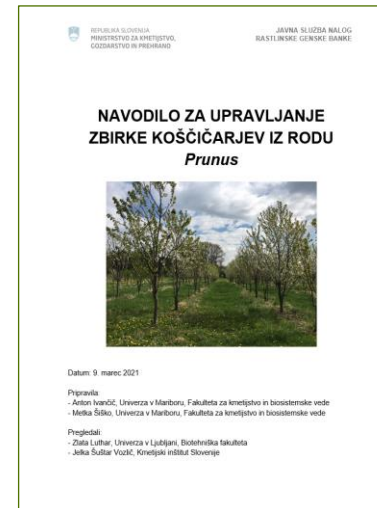
Buckwheat



Berries



Prunus



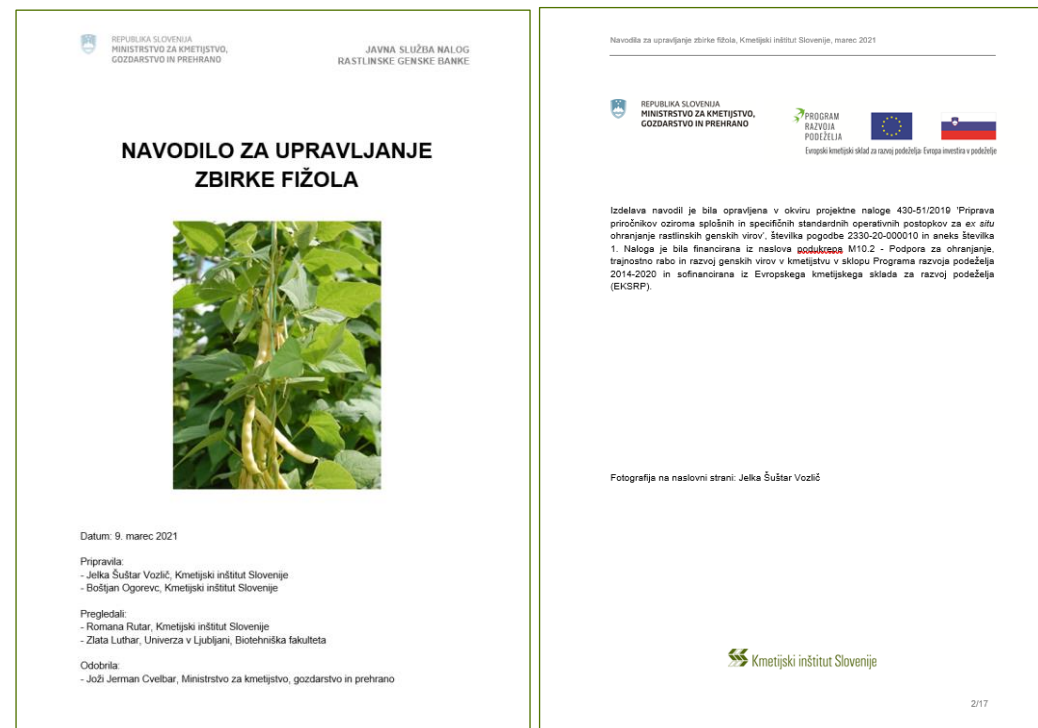
Medicinal and aromatic plants



Manual for management of bean collection

Content:

- Introduction
- Management of collection
 - Acquisition
 - Drying and storage
 - Maintenance of viability
 - Regeneration
 - Characterization and evaluation
- Documentation
- Exchange and distribution
- Safety duplication
- Reference documents
- Appendices



Problems encountered

- Lack of long term-conservation
- Insufficient safety duplication
- Lack of human resources
- Insufficient funding
- Capacity building
-



Photo: J. Verbič

Future steps

- Preparation of operational genebank manual for Slovene Plant Genebank operating through Public Service for PGR
- Finalization of AEGIS Operational genebank manual of the Slovene Plant Genebank
- Increase safety duplication
- Increase inclusion of accessions in the European Collection
-

PRO-GRACE: Promoting A Plant Genetic Resource Community for Europe

WP2: Quality-certified *ex situ* and *in situ* management (Lead: Wageningen University and Research)

WP2 focuses on improving the current infrastructure for PGR conservation and **access by developing a quality certification system for genebanks** and **establishing methods and standards for multiple crucial aspects**, including:

- next-generation *ex situ* and *in situ* management,
- conservation and sampling of heterogeneous/allogamous/clonal accessions with minimum loss of genetic diversity,
- safety duplication of accessions,
- minimization of viability loss,
- monitoring and eradication of plant pathogens.

PRO-GRACE: Promoting A Plant Genetic Resource Community for Europe

WP2: Quality-certified *ex situ* and *in situ* management (Lead: Wageningen University and Research)

- **D2.1: Minimum quality standards for genebank operations**
- D2.2: Blueprint for a genebank quality certification system
- D2.3: Methods and minimum quality standards for *in situ* management of PGR, including CWR and WFP
- D2.4: A blueprint for a capacity building programme for genebanks and *in situ*/on farm conservation networks
- D2.5: A blueprint for constructing national inventories of *in situ* resources
- D2.6: A system for the unique identification of PGR based both on DOIs and DNA barcoding

Call identifier: PRO-GRACE
Grant agreement no: 101094738

Promoting a plant genetic resource community for Europe

Deliverable No. D2.1
Minimum quality standards for genebank operations

Contractual delivery date:
M11

Actual delivery date:
M13

Responsible partner:
WR

Contributing partners:
INIAV, KIS, NASC, UOB, UPV, VURV, WORLDVEG



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- European Rural Development Programme for financing the RDP projects
- Horizon Europe Programme, Project PRO-GRACE (Project No. 101094738)



Photo: J. Verbič

Thank you for your attention!

DISCUSSION