A European Genebank Integrated System (AEGIS): Concept and Reality

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Historical background

• Collecting of genetic diversity for breeding purposes made since 1920-30ies (Vavilov)
• Many collections in European genebanks stem from breeders collections
• More systematic conservation efforts of threatened landraces and CWRs initiated in 1960s and 1970s, incl. establishment national genebanks
• Collecting (51K past 10 years - nat. and intern.) and germplasm exchange increased holdings > 2.4 mill.
Historical background

• Approx. **1,100,000** accessions included in EURISCO (of which 70% have “biological status”)

• Of **875,000** accessions with country of origin status, **38%** are maintained in country of origin (varying from 22% in north and 54% in south)

• **48%** accessions with biological status, obtained through collecting (and thus, are expected to be unique + having good data)

• —> Above data support estimate that only approx. **35-50%** of accessions are unique!

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Historical background

Besides unwanted duplication other reasons to increase efficiency and to establish AEGIS are:

- significant variation in quality of conservation efforts across Europe
- inadequate information on identity and breeding value of germplasm
- lack of uniformity in terms and conditions for access to conserved germplasm
Historical background

In addition, further arguments for establishing AEGIS came from ECPGR (early 2000s):

• Reported difficulties in proper PGR maintenance because of:
  ➢ Lack of long-term conservation facilities
  ➢ Insufficient safety duplication
  ➢ Regeneration backlogs

• Providing concrete options for sharing conservation responsibilities in Europe (being discussed since 1998)
Background to AEGIS

Worldwide

• About 1,750 genebanks/collections
• Approx. 7.4 million accessions
• Estimated 25-30% unique
• Approx. 62% Annex I spp. (SOW II, 2010)
• Approx. 30,300 Allium accessions held in 81 countries (WIEWS, 2011)

Europe

• App. 625 genebanks/germplasm coll.
• > 2.47 million acc. (SOW II, 2010)
• Est. 35-50% unique (EURISCO, 2011)
• Approx. 16,400 Allium accessions held in 77 genebanks; 32 countries (WIEWS 2011)
Background: legal aspects

  - Commitment by countries to conserve biodiversity and associated TK to provide access (PIC and mutual agreed terms)
  - Establish conservation monitoring mechanisms (checkpoints)
  - Protocol will not interrupt ITPGRFA’s MLS or other agreements

- **GPA (1996 – now being updated)**
  - Increase the efficiency of conservation activities
  - Establishment of a rational global conservation system
  - Reduce unnecessary duplication of efforts and accessions
Background: legal aspects

- **ITPGRFA (2004 – implementation underway)**
  - Enhance *national commitments* and international cooperation
  - Establishment of *Multilateral System (MLS)* with clear *ABS arrangements* for Annex I species
  - Use of *SMTA for exchange* of Annex I germplasm
  - (ECPGR decided to use same text also for *Non-Annex I species*)
AEGIS concept: Establishment and milestones

1. ECPGR SC decision to initiate establishment of AEGIS in 2006 (facilitated by establishment IT)
2. AEGIS Advisory Committee appointed (in 2009)
3. ECPGR Secretariat (incl. AEGIS Coordinator) to coordinate
5. Strategic framework policy guide agreed (2008)
6. Memorandum of Understanding (MOU) developed and currently signed by 26 countries
AEGIS concept:
Establishment and milestones

7. Agreement on development of quality management system; AQUAS discussion paper

8. Agreement on selection requirements for European Accessions and selection criteria for MAAs

9. Competitive Small Grant Scheme:
   - First Call: 18 proposals received and 3 awarded;
   - Second Call: published October last year; 12 proposals received; evaluation process ongoing

10. EUROGENEBANK proposal to FP7 Research Infrastructure Call; met threshold but not selected for funding; other opportunity likely for 2012 Call
Model Crops

- Seed propagated material – annual
- Annex I crops of ITPGRFA

- Avena
  - selfing

- Brassica
  - outcrossing

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- Vegetatively propagated material – biennial and perennial
- Non Annex I of ITPGRFA

- Allium
  - (Veg. propag.)

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AEGIS concept: principles

General
1. AEGIS is seen as assisting countries/region to implement IT
2. Intention to involve ALL countries, irrespective of their current conservation performance
3. Building on existing ECPGR structures and processes (SC provides oversight; Advisory Comm. supervision; Networks and WGs play key technical role)
4. Pre-dominantly self-financed and “in-kind” contributions
5. Building on commitments (in MoU) of countries/institutions

The European Collection
1. Free and timely availability of accessions to bona fide users
AEGIS concept: principles

2. Similar terms for access and benefit-sharing to non-Annex 1 species as in SMTA of the ITPGRFA
3. European Accessions maintained as a dispersed collection
4. AEGIS genebanks and other participating institutions will perform all selected activities according to common agreed standards
5. Accession-level passport and non-confidential characterization and evaluation data made available on EURISCO web site
6. Safety-duplicates of all European Accession in European genebank(s) and/or at the Svalbard Seed Vault
7. TORs for each body are/will be established through a to be agreed process by Steering Committee
AEGIS concept: objective

To create a European Genebank Integrated System for plant genetic resources for food and agriculture, aimed at conserving the genetically unique and important accessions for Europe and making them available for breeding and research. Such material will be safely conserved under conditions that ensure genetic integrity and viability in the long-term.
AEGIS concept: components


2. Formal agreement (MOU), currently with 26 countries and with 19 institutions within countries (i.e. Associate Members)

3. European Collection
   - only contains agreed accessions countries for each crop;
   - simplified selection procedure established;
   - in public domain;
   - readily available
   - selection processes on the way

4. Generic (FAO) and crop specific (WG) standards

5. Template for development of genebank manuals

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AEGIS concept: components

6. Quality management system (reporting; monitoring; capacity building – under development)

7. EURISCO as information portal for European Collection (operational; modifications needed)


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AEGIS reality

- Despite dedicated budget, limited funds available keep establishment speed low
- Routine applications (such as molecular tools) in accession management are expensive
- EUROGENEBANK proposal (FP7 RI3) unsuccessful
- Possible new proposal for 2012 Call
- Development of components and processes rather slow and sometimes cumbersome
- Learning by doing

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AEGIS reality

• Dependence on “in kind” contributions of members
• Not all countries and genebanks are actively engaged
• Data coverage in EURISCO and CCDBs and quality of available information hinders steady progress with selection of European Accessions
• Coordination of AEGIS too hands off?

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Conclusions and perspectives

• Good progress being made despite constraints
• Pragmatic decisions and solutions are aimed at (especially to establish European Collection and agreed crop specific standards)
• Additional funding will be sought (FP7; others?)
• European Collection expected to provide attractive vehicle for additional funding for specific projects
• Rationalization process can only start if European Collection (for individual crops) will be in place
Conclusions and perspectives

• Better quality germplasm with relevant data are expected, incl. C&E data (phenotypic and genotypic!)

• Recent ECPGR External Review fully supported and assessed concept/progress positively
Thank you!