AEGIS

An ECPGR initiative to establish a rational European genebank system

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Content of presentation

• Background
• Objectives
• Description and implementation
• Findings
• Suggestions
Background

- **Worldwide**
  - app. 1500 genebanks/germplasm coll.
  - app. 6 million accessions
  - Estimated 2 million unique
  - Approx. 220,000 oats accessions
  - Number of genebanks 85?

- **Europe**
  - app. 500 genebanks/germplasm coll.
  - app. 2 million accessions
  - 30-40% unique(?)
  - Approx. 34,146 oat accessions
  - Held in 35 genebanks

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Background: legal

• **CBD (1993)**
  - Commitment by countries to conserve biodiversity and to provide access (PIC and mutual agreed terms)

• **GPA (1996)**
  - Increase the efficiency of conservation activities
  - Establishment of a rational global conservation system
  - Reduce unnecessary duplication of efforts and accessions

• **ITPGRFA (2004)**
  - Enhance national commitments and international cooperation
  - Establishment of Multilateral System (MLS)
Background: Europe

- European Cooperative Programme for Plant Genetic Resources (ECPGR)
  - Since 1980; Europe wide; most major crops/groups
- ECPGR Crop Working Groups (incl. Cereals):
  - Reported on difficulties in proper PGR maintenance:
    - lack of long-term conservation facilities
    - insufficient safety-duplication
    - regeneration backlogs
  - Discussed options for sharing conservation responsibilities in Europe already in 1998
Towards AEGIS

- ECPGR Steering Committee (9th Meeting, Turkey 2003):
  - **Concept note** on ‘Sharing of long-term conservation responsibilities as a possible model for “A European Genebank Integration System (AEGIS)”
  - **Decision** to initiate and fund a feasibility study (mid 2004 – mid 2006)
    - Using 4 “model” crops (i.e. *Avena, Allium, Brassica and Prunus*)
    - Coordination Unit based at Bioversity International

- **Initiation of AEGIS feasibility study:** mid 2004
- **Objectives:** assess organizational, technical, legal/political and economic feasibility as basis for the establishment of AEGIS
AEGIS Feasibility Study Activities:

- Tasks / Outputs for the Project Partners:
  - Assess different approaches and propose models for the system and discuss pros and cons
  - Propose an organizational structure
  - Address legal/political issues in developing the system
  - Analyze the concept of Most Appropriate Accession
  - Draft guidelines on quality standards for long-term conservation
  - Applicability to other crops
AEGIS Steering Committee

• Members selected on the basis of:
  ➢ Personal expertise (broadest possible coverage)
  ➢ Representatives of relevant stakeholder institutions and different countries

• 3 face-to-face meetings and email correspondence

• Composition:
  ➢ Ayfer Tan, Turkey
  ➢ Béla Bartha, European PGR (NGOs)
  ➢ Brad Fraleigh, Food and Agriculture Organization (FAO)
  ➢ Eliseu Bettencourt, Portugal
  ➢ Eva Thörn, Sweden: Chair
  ➢ Frank Begemann, Germany
  ➢ Garlich von Essen, European Seed Association (ESA)
  ➢ Gert Kleijer, Switzerland
  ➢ Lorenzo Maggioni and Jan Engels, ECP/GR Secretariat

• Local AEGIS Task Force at Bioversity International
  ➢ Jozef Turok
  ➢ Ehsan Dulloo

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Model Crops

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

AEGIS Avena group:
Germeier
Loskutov
Bulinska
Garcia
Koenig
Ryabchoun
Stehno

Avena

selfing

Brassica

outcrossing

Prunus

Allium

Vegetatively propagated material – biennial and perennial

Non Annex I of ITPGRFA

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Meetings as part of Feasibility Study

- Project Partner Meetings:
  - Start up, Nov. 2004, NGB, Sweden
  - Mid term, June 2005, IPGRI, Italy
    Joint meeting with the AEGIS SC
  - Final meeting was cancelled; four groups prepared final reports
  - Subgroup meetings Prunus, Allium & Brassica
- Final report of four groups prepared by Secretariat
- Presented to mid-term ECPGR SC meeting in Riga
Findings/results of model crop groups, analysis of past experiences, network and SC discussions, interactions with Bioversity and FAO staff provided inputs for the evolving Strategic Framework Discussion Paper (i.e. concept paper)
Perceived Benefits of AEGIS

- Improved \textit{collaboration} between countries
- \textbf{Cost efficient} conservation activities
- \textbf{Reduced duplication} of germplasm material
- Improved \textit{quality standards}
- Increased \textit{effectiveness in regeneration}
- Facilitated \textit{access and availability} of germplasm
- Improved \textit{security of germplasm} through safety-duplication
- Improved \textit{sharing of knowledge and information}
Findings for *Avena*

*based on Avena subgroup report*

*adapted to be consistent with Strategic Framework paper*

*Avena* Working Group preferred as **primary model**:

- Decentralized system
- Share responsibilities at accession basis
- For duplicate accessions, country of origin of accession or cultivar or of collector of wild species or landrace sample matters
- Therefore, sub-regional considerations are the starting point for deciding on primary conservation responsibility

- NB: For vegetatively propagated crops and for cryopreserved collections a **semi-centralized approach** was identified
Findings for *Avena*

Main considerations for **decentralized approach**:  
1. CBD and IT recognize national responsibilities/patrimony  
2. Conservation of local knowledge of crop and its uses  
3. Visibility in national conservation context; securing local expertise for crop; maintaining awareness and recognition  
4. Access to local/nearby conserved germplasm is easier  
5. Quality of management depends on combination of local (growing) conditions, interest and capacity  
6. Specific peculiarities of individual accessions, especially for regeneration and maintenance, better addressed by local curation  
7. Can build on existing elements of conservation system  
8. Buffers better against continuous political, scientific and environmental changes
Findings for *Avena*

Some advantages of a **centralized approach**:

1. More effective management in economic terms (i.e. economies of scale)
2. “One stop shop” system, i.e. only one focal point; easier acquisition – for (foreign) scientists, but possibly not for farmers/non-academics
3. Same **quality standards** for all accessions, which does not necessarily mean they are “the best”
Lessons learned from the old IBPGR/FAO base collection concept

• The concept (i.e. 49 genebanks holding base collections of identified crop gene pools for long-term; operational from 1976 – mid 1990’s; still existing) was felt valid, in principle

• A number of shortcomings were identified that partly have been overcome due to policy/technology developments:
  ➢ Insufficient formalization and involvement of governments
  ➢ Informal, legally non-binding agreements with single institutions or even individuals
  ➢ No active follow-up and management of system (now AEGIS!)
  ➢ System was based on notion of “common heritage” (that changed to national sovereignty by CBD)
  ➢ Too strong centralization? (now IT technologies allow decentralized approaches!)
  ➢ Lack of any budgets to support system (now Trust!?)
  ➢ Lack of effective links between conservation and use (AEGIS?)
  ➢ Unclear policy situation (now CBD and Treaty!)

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Findings
Organizational structures and institutional relationships (1)

• Build on nat. genebanks that hold collection of crop
• Additional coordination elements are considered, i.e.:
  ➢ European Coordinating Lead Institution for *Avena* GR
    ✓ coordinate implementation annual work plans:
      ❖ manage central crop database
      ❖ coordinate collecting activities
      ❖ coordinate characterization/ evaluation
      ❖ EU programme spoke’s person
    ✓ However, when inviting institutes to apply, consider:
      ❖ experience in GR + research management
      ❖ legal and financial status
Findings

Organizational structures and institutional relationships (2)

- Location of *Avena* WG chair and CCDB manager
- Minimum expertise and facilities available

The **European Collection “system”** with the following responsibilities:

1. **Long-term conservation** of public domain AEGIS Accessions (including routine operations such as viability testing, regeneration, characterization/evaluation; services of entire Network!)
2. Germplasm distribution
3. Safety duplication

**Note:** Norwegian proposal to use Svalbard Facility to be supported
Findings

Legal aspects to be considered

• Legally binding agreement between all partners, i.e. the Collective MOU
• Where needed for a given crop also collaborating institutes might conclude a contract
• Need to involve national policy makers in process
• Question whether AEGIS countries have ratified IT. If not, they should accept AEGIS principles!
• Type of MTA to be used by AEGIS? SMTA
• Importance of phytosanitary/quarantine considerations when exchanging germplasm
Findings

Concept of Most Appropriate Accession

• A MAA accession should be:
  ➢ True to name
  ➢ Maintained in country of origin, or
  ➢ Introduced material of importance to breeding and research and used in Europe
  ➢ Virus-free or of highest health status
  ➢ Possess complete passport data (PPD)
  ➢ Morphologically and/or molecularly characterized

• Avena WG elaborated MAA concept and suggests:
  ➢ Start with accessions that have clear/complete PPD, i.e. accessions originally collected by holding institute and accessions considered as national cultivars
  ➢ Clarified legal status, and
  ➢ Agreed primary conservation responsibility by nat. genebank
Findings
Genebank quality system (1)

- Focus on genebank operational (e.g. seed storage, regeneration protocols, etc) and not on product related aspects (e.g. quality of composition of collection, info supply, etc)
- Important to distinguish between quality assurance and quality standards!
- Quality assurance is based on principle that you a) say what you do; b) you do what you say; and c) you let an independent body check that you do what you say (i.e. an audit) (ISO9001)
- Each genebank should write down what their procedures are.
- This will be a good basis for discussing standards and a good feedback mechanism aimed at improving quality!
Findings

Genebank quality system (2)

Develop genebank quality assurance system in ECPGR
Details to be developed over coming two years.
Possible process to follow to establish standards:

- Inventory of technical standards on routine operations in genebanks (assemble these as lessons learnt)
  - FAO-IPGRI Genebank Standards
  - Regeneration guidelines (IPGRI, 1997)
  - Others?

- Assess standards on their scientific merits with respect to longevity and genetic integrity (especially regarding storage, viability testing and regeneration)

- Agree on minimum set of standards
Findings
Genebank quality system (3)

• Target areas for quality standards:
  ➢ Collecting methodology
  ➢ Regeneration methodology
  ➢ Preparation for storage (e.g. drying regime)
  ➢ Storage conditions (for various collection types)
  ➢ Seed quality and viability monitoring
  ➢ Distribution practices

• Specific *Avena* concerns (especially wild spp):
  ➢ Environmental requirements for regeneration of wild species might be (very) different
  ➢ Quarantine aspects (e.g. weediness!)
  ➢ Safety duplication (proposed to centralize in Europe; cooperation at global level!?)

• Need to secure financial resources in order to constantly improve the standards
Findings

Financial opportunities to support system

• AEGIS will only come to fruition if the necessary funds are identified and provided
• Additional funds needed as ‘activation energy’ during initial part of implementation process
• Foreseen that cost-savings will only occur at later stages when countries are willing/able to “eliminate” accessions that are conserved (as European Accessions) elsewhere
• Essential pre-requisite to establish the system: Formalized commitments from the national governments
• Project proposals submitted (i.e. GENRES and COST) to speed up the process; attempts so far failed; solution?
Steps ahead in making AEGIS operational (1)

- Develop Collective Memorandum of Understanding (MOU)
- MOU should contain details on:
  - Conservation, services and management responsibilities that each country agrees to assume for accessions and its related information it will maintain and make available as part of European Collection
  - Details on the process developing lists of accessions that country agrees to include in European Collection
  - Other responsibilities and rights (reporting; access; etc)
  - Minimum standards and agreed procedures that need to be achieved/followed
- Agreements to be signed by each country with AEGIS; collectively these will form the MOU
Steps ahead in making AEGIS operational (2)

• Develop model institutional contract with details on:
  ➢ Details of responsibilities that collaborating institutes for the conservation/distribution of accessions of a given crop of the European Collection agree to assume
  ➢ Agreement on standards and procedures that will be achieved/followed
  ➢ Detailed timeframe (i.e. annual workplans?)

• Development of Quality Management System for long-term conservation of the AEGIS Collection
• Survey institutional capacities and service conditions
• Assessing economic implications of AEGIS implementation (i.e. prior and after)
Steps ahead in making AEGIS operational (3)

• Work closely with four model crops in implementing above steps
• Lobby for and seek funding in order to carrying out the implementation process through national commitments, regional commitments (i.e. EU), global opportunities (Trust?) and project proposals.
• Others?
Steps ahead in making AEGIS operational (4)

Foreseen responsibilities of *Avena* Working Group:

- Establish **criteria** for Most Appropriate Accessions
- Establish draft list of European *Avena* Accessions
- Oversee process to identify AEGIS Accessions that will form the *Avena* European Collection, incl. sharing information on identified accessions with respective National Coordinators as suggestions for “designation”
- Draft and agree on **crop specific technical standards** and assess applicability of **generic management standards**
- Prepare and coordinate implementation of *Avena* conservation action plan
- Improve data quality and coverage of AEGIS accessions
- Survey institutes (i.e. capacities and availability)
Current implementation status of AEGIS

- **Strategic Framework paper** being finalized by Bioversity Local Task Force, based on findings of 4 model crop groups, in close consultation with AEGIS SC and being endorsed by ECPGR SC
- General description of **AEGIS goal, scope, procedures, benefits and its governance** (= ECPGR SC)
- Agreed **implementation process** (as described above), which is seen as important contribution to IT implementation
- AEGIS coordination unit established
- TORs and composition of new Advisory Committee, Local Task Force and Coordinator established
- AEGIS adopted as **integral part** of ECPGR programme
- Funding comes from **regular ECPGR budget**
Thank you