



AEGIS

An ECPGR initiative to establish a
rational European genebank system

Jan Engels and Lorenzo Maggioni

AEGIS Coordination

**Oats Global Conservation Strategy
Meeting**

01-03 March, 2007

St. Petersburg, Russia

Content of presentation

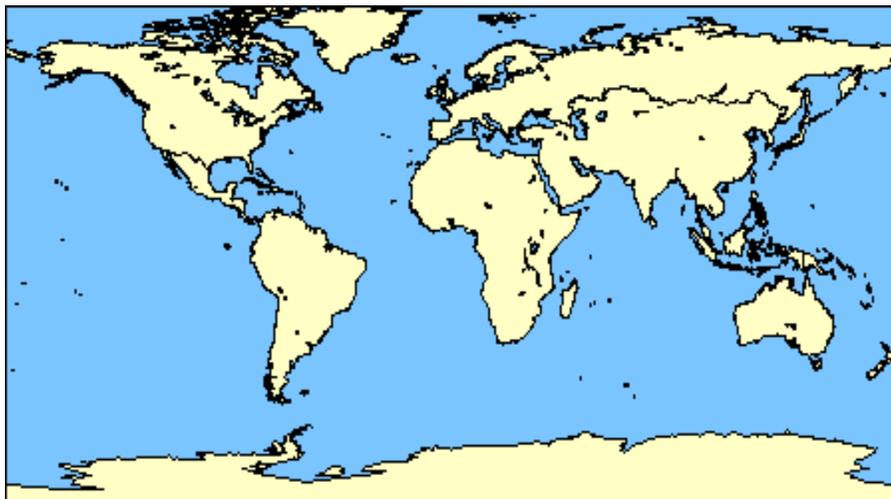


- Background
- Objectives
- Description and implementation
- Findings
- Suggestions

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

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**

Model Crops



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

- ***Avena***

selfing

AEGIS *Avena* group:

Germeier
Loskutov
Bulinska
Garcia
Koenig
Ryabchoun
Stehno

- ***Brassica***

outcrossing

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

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 **collaboration** between countries
- **Cost efficient** conservation activities
- **Reduced duplication** of germplasm material
- Improved **quality standards**
- Increased **effectiveness in regeneration**
- Facilitated **access and availability** of germplasm
- Improved **security of germplasm** through safety-duplication
- Improved **sharing of knowledge and information**

Oats Global Conservation Strategy Meeting - 01-03 March, 2007 - St. Petersburg, Russia

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!**)

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