European Cooperative Programme for Plant Genetic Resources

ECP//GR

Report of a Working Group on *Brassica*

Fourth Meeting, 2-4 March 2010, Linguaglossa, Catania, Italy

L. Maggioni and E. Lipman

Bioversity International

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The European Cooperative Programme for Plant Genetic Resources (ECPGR) is a collaborative programme among most European countries aimed at facilitating the long-term conservation and the increased utilization of plant genetic resources in Europe. The Programme, which is entirely financed by the member countries, is overseen by a Steering Committee composed of National Coordinators nominated by the participating countries and a number of relevant international bodies. Bioversity International provides the Coordinating Secretariat. The Programme operates through nine networks in which activities are carried out through a number of permanent working groups or through ad hoc actions. The ECPGR networks deal with either groups of crops (cereals; forages; fruit; oil and protein crops; sugar, starch and fibre crops; vegetables) or general themes related to plant genetic resources (documentation and information; *in situ* and on-farm conservation; inter-regional cooperation). Members of the working groups and other scientists from participating countries carry out an agreed workplan with their own resources as inputs in kind to the Programme.

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Yellow-flowered *Brassica insularis* Moris; *B. fruticulosa* Cyr. (top) and *B. hilarionis* Post (bottom). All plants grown at the demonstration field of the University of Catania, Italy. Courtesy of © L. Maggioni, Bioversity International.

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SUMMARY REPORT OF THE MEETING

Introduction

Welcome address

F. Branca, Chair of the Working Group on *Brassica* of the European Cooperative Programme for Plant Genetic Resources (ECPGR) and local host, welcomed the Group on behalf of the University of Catania. Members participating for the first time in the Working Group were invited to interact informally with the rest of the Group.

L. Maggioni, ECPGR Coordinator, explained that O. De Ponti, President of the International Seed Federation and Senior Advisor for Nunhems B.V. was attending the meeting as an observer in his quality of panel member of the ECPGR Independent External Review, currently ongoing and to be concluded in July 2010. The Group was happy to offer collaboration and to answer any questions to facilitate the task of O. De Ponti.

Update on ECPGR, including AEGIS

Presentation by Lorenzo Maggioni available online

The objectives and priorities of ECPGR during Phase VIII (2009-2013) were summarized, as well as the workplan and budget of the *Brassica* Working Group (WG).

Among other relevant upcoming activities for the WG, L. Maggioni mentioned the final meeting of the project "An integrated European *In Situ* management Work plan: Implementing Genetic Reserves and On Farm concepts" (AEGRO) in September 2010, Madeira, Portugal; the meeting of all Network Coordinating Groups (NCGs) in early 2011; and the Mid-term Steering Committee meeting in June or October 2011.

A short update was given on the status of the European Plant Genetic Resources Catalogue (or European Internet Search Catalogue, EURISCO) and the ongoing initiative by the ECPGR Documentation and Information Network which is preparing a strategy for the inclusion of characterization and evaluation data into EURISCO.

The status of membership in "A European Genebank Integrated System" (AEGIS) (17 countries), its objectives, perceived benefits and principles were also summarized. The "EUROGENEBANK" proposal, recently submitted for funding under the European Commission's Seventh Framework Programme (EC FP7) and intended to boost the implementation process of AEGIS, was also briefly outlined (partners, work packages, budget). Following from the discussion held at the Vegetables Network (VEGNET) meeting in Catania, Italy (November 2009), the dilemma remains whether to start implementing AEGIS or to wait for the result of the EUROGENEBANK project submission. The idea expressed in November 2009 was reiterated, that the essential objective regarding Most Appropriate Accessions (MAAs) would not be to identify duplicates, but rather to identify important accessions for inclusion in the European Collection. The agreement with the principles of the AEGIS Quality System (AQUAS) that was expressed in Catania by the Network was quoted as a starting basis for a proposal to involve the *Brassica* WG in the development of various AQUAS elements (see below).

Discussion

A discussion prompted by F. Branca focused on the difference between a "core collection" and the concept of "Most Appropriate Accessions" used by AEGIS.

It was pointed out that a core collection has mainly to do with the perspective of a specific user, usually a breeder (the core collection being a relatively small set of accessions containing the highest possible genetic diversity), while MAA is a concept related to the conservation of accessions for the long term (those accessions that it is important to conserve for various reasons, i.e. usually many more than those forming a core collection).

Brassica Working Group projects

Working Group project on wild Brassica *species*

Presentation by Ferdinando Branca available online

The project planned as a *Brassica* WG activity for Phase VIII involves the comparison of various populations of wild brassicas in the same environmental conditions, with the aim of establishing a core collection of well characterized and diverse wild accessions. The samples were selected mainly on the basis of their availability and were obtained by the Centre for Genetic Resources, the Netherlands, Wageningen (CGN) from various genebanks. The accessions were planted in a field in the farm of the University of Catania.

Not all the accessions are part of the section *Brassica* (n=9). The chromosome check could be part of the project if there are any volunteers to do the work.

The Group needs to take decisions on the type of analysis to carry out (morphological, chemical and molecular), the sharing of the tasks and the budget.

Considering that the ECPGR budget for this activity is limited, the Group was asked if anyone wished to participate in the project on wild brassicas by offering a specific contribution with their own resources. Freeze-dried samples could be provided to anyone interested in carrying out chemical or molecular analysis.

Discussion

O. De Ponti asked why only 20 wild *Brassica* accessions were being analysed. He stressed the fact that the wild accessions would be of special interest for breeders, since they may contain important resistance genes that are not available in the cultivated types. He recommended shifting part of the budget from the analysis of the cultivated brassicas to the wild ones.

M. E. Gonzalez said that she would check with Antonio de Haro about any possibility for collaboration.

C. Allender reported that a diversity set of wild brassicas maintained at Wellesbourne has already been subject to various analyses. She will check if there are any overlaps between the Wellesbourne and the *Brassica* WG project accessions, in which case some data on these accessions may already be available.

V. Lopes expressed interest in carrying out DNA analysis with simple sequence repeat (SSR) markers, but no national funds would be available for this.

A. Artemyeva said that botanists at the N.I. Vavilov Research Institute of Plant Industry, (VIR), St. Petersburg could offer their expertise for taxonomic characterization.

J. Cervenski could offer to do chemical and perhaps molecular analysis, but would need project funds for this.

J. Grahić said that he needed to check at his institute, but would need a clear programme with project funds in order to carry out any activity.

S. Neykov offered for chemical analysis, provided funds were made available.

A. Simon will forward the question to suitable persons.

P. Kopecky said that his institute in Olomouc does not carry out chemical or molecular analysis, therefore only morphological analysis could be carried out.

M. Hansen expressed interest in carrying out analysis of content of glucosinolates, anthocyanins, carotenoids and total phenols.

G. Poulsen said that NordGen would not be able to contribute to this activity.

N. Bas said that CGN could not do any characterization or molecular work. However, Dutch breeders could be invited to carry out the evaluation for themselves (insect resistance). She would also need to ask if anyone would be interested to use the freeze-dried samples.

H. Reiner described a disappointing experience with a previous similar initiative that he had tried to promote in Austria by setting up a consortium of breeders to characterize *B. rapa*, with no success.

A. Traka-Mavrona was very interested to participate, but financial support would be critical. She stressed the importance of understanding the breeding value of the accessions, by finding out their suitability for breeding purposes. She would be interested in doing characterization and creating dendrograms. Another area of interest where her institute has developed a methodology is about answering the question on how the environment affects characterization and regeneration.

F. Branca said that his institute would do molecular marker analysis and work on anti-oxidants.

O. De Ponti suggested that breeders could be invited for a field day, in order to raise their interest.

N. Bas recommended that any result should be made available though the European *Brassica* Database (Bras-EDB).

H. Reiner thought that private breeders would not be interested in pre-competitive research, but O. De Ponti replied that it would be worth trying.

N. Bas said that Dutch plant breeders would be available to regenerate material, but F. Branca replied that in the case of wild *Brassica* it would be much quicker and also convenient to regenerate the accessions in Sicily.

Decisions

- Each WG member should reconfirm whether there is any action that they could do related to characterization of the small project collection of wild brassicas (**by 15 March 2010**). F. Branca will then make a proposal on how to split the funds of the *Brassica* WG budget. A Letter of Agreement will need to be signed between Bioversity and the recipient(s) of the funds.
- F. Branca will organize a "field demonstration day" in Catania, with the purpose of showing the wild *Brassica* project collection to breeders from Europe. The material will be made available (either seed or freeze-dried samples) to anyone interested in doing characterization or evaluation work and making the resulting data publicly available. Expressions of interest for the field day could be collected through the mailing list of the *Brassica* Group of the European Association for Research on Plant Breeding (EUCARPIA) as well as through contacts to be indicated by the *Brassica* WG members (action to be completed **by December 2010**).

Working Group project on B. rapa

Presentation by Noor Bas available online

In the VEGNET meeting in 2009 the Group agreed to characterize 100 accessions of *B. rapa* selected from the Bras-EDB. A. Artemyeva offered to carry out the characterization at VIR.

Ninety-seven accessions were selected among the unknown accessions, on the basis of absence of a name or a cultivar group and on the basis of easy availability.

Discussion

Possible problems related to provision of the seed samples to Russia were discussed. It was concluded that small samples would not require any certification. The need to use the Standard Material Transfer Agreement (SMTA) for any transfer of this material was confirmed.

The selection of the accessions made by N. Bas was approved by the Group.

Should not all the identified samples be effectively available, no replacement with other samples would be made.

Regarding the list of descriptors to be characterized, it was proposed to use the same five minimum descriptors that were used in the EC project "*Brassica* collections for Broadening Agricultural Use" (BRASCO), keeping in mind that A. Artemyeva would be able to describe the accessions for morphological and phenological descriptors.

Decisions

- N. Bas will go through the process of requesting the material from the holding genebanks, with the help of F. Branca. Seeds should be sent to A. Artemyeva (action to be completed **by June 2010**).
- F. Branca will make a proposal on how to split the funds of the *Brassica* WG budget and about the amount that should be assigned to VIR for characterization as part of the *B. rapa* project. A Letter of Agreement will need to be signed between Bioversity and VIR.

Update on the European *Brassica* Database (Bras-EDB)

Presentation by Noor Bas available online

The Bras-EDB contains 23 753 accessions from 55 institutes in 28 countries. Major updates were carried out in 2005 and 2007. Recent updates were mostly made by taking data from EURISCO. The data are transformed into a standard taxonomy. Accessions belonging to the core collections defined during the EU projects AIR3 - CT920463 "The location and exploitation of genes for pest and disease resistance in European gene bank collections of horticultural Brassicas" (*oleracea)* and RESGEN CT99 109-112 "*Brassica* Collections for Broadening Agricultural Use" including "Characterising and utilising genetic variation in *Brassica carinata* for its exploitation as an oilseed crop" (*oleracea*, *rapa*, *napus*, *carinata*) are flagged.

Duplicates within *B. rapa* accessions have been searched for, based on name, country of origin and sometimes collection number. Among the 3622 *B. rapa* accessions, 545 duplicate groups covering 1698 accessions were found.

Among the possible future activities, updates can be done when necessary. It would be useful if collection holders could inform the DB managers about the need for updates and also inform about changes in contact details. The Group will discuss whether it will be appropriate to extend the DB to other genera (such as *Raphanus*), whether to extend the search for duplicate groups to other species and whether to start the identification of probable MAAs within the *B. rapa* collections.

Discussion

The possibility to extend the search for probable duplicates (currently available only for *B. rapa*) to other species, was discussed.

F. Branca alerted the Group to findings which show that material with the same name, even from the same village, can be very different, according to recent studies at his institute.

N. Bas clarified that the search for probable duplicates is only applied to cultivars with the same name, and not to landraces.

C. Allender thought that the exercise could give an indication of possible duplicates, which means that some very clear-cut situations of duplication can be highlighted by the search, while the status of other probable duplicates will remain less clear.

Regarding the possibility to extend the Bras-EDB to *Raphanus*, the Group felt that other interesting genera are not covered either (e.g. *Eruca*, *Diplotaxis* and *Sinapidendron*); however the prevailing opinion was that information about *Brassica* should be improved as a priority before extending the database to other species. Basic information on other species is already available through EURISCO.

Decisions/ Recommendations

- N. Bas will undertake the extension of the duplicate search function of the Bras-EDB to *B. oleracea*, with the help of C. Allender and P. Kopecky (to be completed **by December 2010**).
- It would be useful if the DB manager could notify the EURISCO coordinator when Bras-EDB has more data in certain fields than EURISCO for the same accessions.

Activities and projects on *Brassica* conservation

Status of wild Brassica *conservation at the Universidad Politécnica de Madrid, Spain*

Presentation by Maria Elena Gonzalez-Benito available online

In 1966, at the Departamento de Biología Vegetal, Escuela Técnica Superior de Ingenieros Agrónomos, Universidad Politécnica de Madrid (UPM), Spain, Prof. César Gómez Campo started a collection of wild plant species, specifically endemic species of the Iberian Peninsula and of the Macaronesian region, and of Brassicaceae. Currently, 23.7% of the Spanish vascular threatened flora is conserved at the Plant Germplasm Bank (Banco de Germoplasma Vegetal, BGV-UPM), with 5100 accessions covering 2400 endemic species. Brassicaceae include 4863 accessions covering 1027 species, with major emphasis on the tribe Brassiceae. Samples have been distributed for basic or applied research. As of the early 1980s, the collection became part of the register of base collections of the International Board for Plant Genetic Resources (IBPGR, now Bioversity International), Rome, Italy with the mandate to conserve "wild relatives of cruciferous crops".

Since the retirement of C. Gómez Campo, a commission of eight people manages the decisions related to the Bank. Among the members, M. Elena González Benito is the Coordinator, Jesús Ortíz Marcide is Head of the Department and David Draper Munt is the curator of the collection.

The collection of seeds is maintained for long-term conservation at low temperature (between -5°C and -10°C) and with low moisture content (approximately between 1.5% and 3% f.w.b.), achieved by desiccation with silica gel and placing some dehydrated silica gel together with the seeds within flame-sealed glass vials. High viability of the seeds after 40 years of storage was demonstrated. The collection database contains almost 10 000 entries. These data are currently available on the Spanish site of the Global Biodiversity Information Facility (GBIF) (www.gbif.es), on the Spanish National Inventory (www.inia.es) and on the site of the European Native Seed Conservation Network (ENSCONET) (accessions of

European origin) (www.ensconet.eu). Duplicate samples have been sent to other seed banks in Spain and in other countries. In the short and medium term, it is planned to improve the facilities and the data management. A bar coding system will also be implemented. Regarding the exchange of accessions, transfer agreement documents need to be adapted to recent Spanish laws. Multiplication of the seed is also a priority. The genebank is currently staffed with one full-time person (curator) provided by UPM. Funds derive from projects (national funding and the EC's Sixth Framework Programme ENSCONET (2005-2009)).

During 1982-1988, IBPGR collecting missions allowed wild brassicas to be collected. All material was characterized in Sweden (M. Gustafsson). Duplicates from all origins were sent to Dr Tsunoda (University of Tohoku, Sendai, Japan). Material from Italy was sent to the genebank in Bari, material from France was sent to Porquerolles, from Greece to Thessaloniki, from Turkey to Izmir and from the UK to Kew. Currently, approximately 300-350 wild relatives of *Brassica* accessions are conserved. The inventory showed that for 23 of those accessions there are no seeds left. While we are working to improve the facilities and the management of the collection, seed requests could be sent to the sites where duplicates are stored.

Wild brassicas in the Madrid collection – History of the agreement with IBPGR

Presentation by Lorenzo Maggioni available online

An agreement was signed on 23 April 1981 between IBPGR and Universidad Politécnica, Madrid (UPM), to hold a "global" collection of "Wild relatives of cruciferous crops", as part of the "Register of base collections". Agreed responsibilities were to ensure long-term conservation under defined storage and access conditions. All material should be safety-duplicated and appropriate monitoring and safety-duplication regimes should be used. At the same time, IBPGR sought to ensure that the germplasm samples collected under its auspices were in fact deposited in the designated centre.

Conditions for availability were that if the material stored was not available from an active collection, it would be made freely available from the base collection to any professionally qualified institution or individual seriously interested in it. The material was expected to be safety-duplicated in another IBPGR designated genebank. However, no clear commitment was given about making the base collection as comprehensive as possible.

Regarding storage conditions, seeds were expected to be dried to between 3 and 7% [5%] moisture content, packaged and stored at temperatures lower than 0°C [-5°C] (and preferably –18°C [between –10°C and –18°C]) with a viability monitoring regime as recommended by IBPGR.[1] A suitable method of regeneration would be used to reconstitute the sample when seed viability began to decline or quantity of seeds was reduced to a critical level.

The collection was planned to continue to receive adequate operating funds and personnel. If this, at some future time, were no longer to be possible, FAO/IBPGR should have been notified promptly.

As reported by Gómez Campo in the report of the second meeting of the *Brassica* WG (1994, Lisbon), six IBPGR missions were organized between 1982 and 1988, collecting a total of 201 wild (n=9) *Brassica* accessions (Table 1).

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[1] Ellis RH, Roberts EH, Whitehead J. 1980. A new, more economic and accurate approach to monitoring the viability of accessions during storage in seed banks. Plant Genetic Resources Newsletter 41:3-18.

Table 1. IBPGR collecting missions (1982-1988)[2]

Year	Country	No. of wild *Brassica* accessions collected
1982	Greece	25
1983	Crete (Greece), Turkey	27
1984	Sicily (southern Italy)	45
1985	Italy, France, Spain	41
1986	Cyprus, Tunisia, Corsica (France), Sardinia (Italy)	19
1988	Spain, France, Great Britain	44
	Total	**201**

In 1995, the International Plant Genetic Resources Institute (IPGRI, successor of IBPGR, now Bioversity International) sent out letters requesting information to make an inventory of the European Institutions holding Base Collections for IBPGR. UPM responded that it was holding 179 designated accessions (out of 224 expected by IPGRI).

During Phase VII of ECPGR (2004–2008), as part of the ECPGR membership agreement, Spain agreed to maintain the "Wild relatives of crucifer collection", Madrid, for long-term conservation on behalf of ECPGR.

In conclusion, it may be noted that a large part of the UPM collection of wild (n=9) *Brassica* was collected with public funds as part of multinational missions and a commitment to conserve and make available the collection was expressed by UPM/Spain at various occasions between 1981 and 2008.

Considering the current temporary unavailability of *Brassica* accessions from UPM, the WG could offer its help for multiplication or for conservation. Also, the possibilities for access to material from safety-duplicated sites could be checked. An analysis of gaps in the European collections, aiming to form a publicly available collection with complete coverage of n=9 *Brassica*, could be recommended.

Discussion

On behalf of the Group, F. Branca wished to thank UPM for having maintained the collection of wild crucifers and for serving the needs of users for many years. Regarding the current problems faced by UPM and the temporary unavailability of material, he suggested that the *Brassica* WG should try to make a list of what is available (regarding wild *Brassica*) in various genebanks in Europe and elsewhere.

G. Poulsen stressed the fact that in many cases an accession was collected from only one plant and that perhaps not so much diversity is actually stored in the various genebanks. A gap analysis of the world collections of wild (n=9) *Brassica* would therefore be opportune.

N. Bas asked what the Group could do to help UPM to multiply/regenerate the *Brassica* accessions.

M. E. Gonzalez replied that UPM is currently starting to regenerate the *Brassica* accessions and that they would appreciate receiving advice on the regeneration methodology. Considering that material will not be available for distribution in the near future, she would also appreciate the help of the Group in tracking down where duplicate samples are stored and available for distribution.

Decisions

- M. Elena Gonzalez will inform the *Brassica* WG, providing a detailed list of the accessions of wild (n=9) *Brassica* currently stored at UPM and the amount of seed left. She will also

[2] Adapted from table on p. 23 *in* Gass T, Gustafsson M, Astley D, Frison EA, compilers. 1995. Report of a Working Group on *Brassica*. Second meeting, 13-15 November 1994, Lisbon, Portugal. European Cooperative Programme for Crop Genetic Resources Networks (ECP/GR). International Plant Genetic Resources Institute, Rome.

provide information about the sites where these accessions have been safety-duplicated, according to the existing records at UPM.

- A Group's Task Force including **N. Bas (coordinator),** F. Branca, G. Poulsen, M.E. Gonzalez, A. Traka-Mavrona and L. Maggioni was formed, with the objective of sharing the following tasks:
  - Identify locations where wild (n=9) *Brassica* accessions are stored in the world
  - Verify the availability of the above accessions for seed exchange
  - Verify whether the genepool of wild *Brassica* can be considered safely conserved in *ex situ* genebanks or whether further collecting is needed
  - Identify the accessions requiring multiplication and prepare a time-framed plan for such multiplication (by whom and by when)
  - Promote any other action required for the safe and effective conservation of the wild (n=9) *Brassica* genepool.

AEGRO project

Presentation by Ferdinando Branca available online

The Department of Horticulture and Food Technology, Catania University (Dipartimento di OrtoFloroArboricoltura e Tecnologie Agroalimentari (DOFATA), Università di Catania), is lead partner in the work package on *Brassica* case studies of the FP7 project AEGRO ("An integrated European *In Situ* management Work plan: Implementing Genetic Reserves and On Farm concepts").

The objectives include:

- **Objective 1**: Collection of data on species and population distribution existing in various information systems
- **Objective 2**: Prioritization of species and populations
- **Objective 3**: Recommendation of sites suited to establish genetic reserves for *Brassica* in the European Union
- **Objective 4**: Development of species-specific guidelines for the design, management and monitoring of genetic reserves
- **Objective 5**: Establishment of a demographic and genetic baseline for a single *Brassica* genetic reserve
- **Objective 6**: Compilation of the national legal framework related to *in situ* management, annotation of the legal and organizational national framework and derivation of a recommendation for a national strategy for *in situ* management
- **Objective 7**: Contribution to the establishment of a European integrated workplan for *in situ* management of crop wild relatives.

To achieve objectives 3, 4 and 5 it was decided to plant and characterize the wild *Brassica* species identified during the first year of the project. Sowing took place in September 2008 and transplanting in December 2008. Characterization was carried out plant by plant utilizing the main biomorphological descriptors (IBPGR 1990).[3] DNA was also extracted from eight plants per accession and allele frequency of different alleles was measured for the *BoAP1* SSR marker.

[3] IBPGR. 1990. Descriptors for *Brassica* and *Raphanus*. International Board for Plant Genetic Resources, Rome.

Discussion

The question was raised about what will be the recommendations for sites suited to establish genetic reserves for *Brassica*.

F. Branca replied that an important point will be to raise public awareness of the importance of wild *Brassica*, particularly among the local administrators and the protected area managers for the sites where populations of *B. incana, B. macrocarpa, B. rupestris* and *B. villosa* are widespread.

He also stated that *B. macrocarpa* in Favignana (a small island to the west of Sicily) is under threat due to a reforestation programme that has changed the habitat and reduced the number of individuals of the populations in the island.

Recommendation

The Group stressed that systematic collecting of *B. macrocarpa* for *ex situ* conservation might be required in the near future owing to the current threat to the survival of the Favignana populations.

Visit to the wild *Brassica* fields

The Group visited the *Brassica* fields located at the Experimental Farm of Catania University. These included the wild *Brassica* samples of the *Brassica* WG Phase VIII project and the AEGRO accessions. An experimental field of leafy kales planted for morphological characterization was also visited.

Discussion on descriptors to use for the characterization work

Decision

A list of possible minimum descriptors to be used for the characterization of wild brassicas and of *B. rapa* was presented by F. Branca. It was decided that F. Branca will make a suggestion by circulating to the Group a list of descriptors to be used for the wild brassica characterization project and A. Artemyeva will do the same regarding the *B. rapa* project. The Group will need to send their comments to complement the initial suggestions, so that a final decision will be taken by the Chair.

Inventory of most important traits for evaluation

Presentation by Noor Bas available online

N. Bas presented the results of a questionnaire she had sent to the *Brassica* WG members, requesting which traits would be the most important for evaluation in each country.

O. De Ponti drew the attention of the Group to the fact that the needs of other regions of the world should also be kept in mind: in particular, in the case of *Brassica*, insect resistance would be very relevant. A genetically modified organism (GMO) project to insert Bt resistance in *Brassica* crops is currently under way, but this route could be avoided if resistance could be found in the wild species. He also suggested that the questionnaire could be sent to the Chair of the EUCARPIA *Brassica* Group, offering the chance to the breeders to express their views.

AEGIS programme

AEGIS Quality System (AQUAS) and proposed workplan

Presentation by Lorenzo Maggioni available online

The principles of the AEGIS Quality System were summarized, as detailed in the AQUAS document (http://aegis.cgiar.org/implementation/aegis_quality_system_document_aquas.html).

A workplan to prepare the various elements of AQUAS was also proposed, aiming to finalize: 1) An operational genebank manual; 2) Generic operational standards; and 3) Agreed minimum technical standards (crop-specific).

The proposed workplan for the preparation of an operational genebank manual is the following:

1. Present template to *Brassica* WG (March 2010).
2. Incorporate any suggested changes and additions (10 March 2010).
3. Circulate draft template to all Crop NCGs for comments. Comments from NCGs back to Secretariat (15 April 2010?).
4. Secretariat revises the draft (before 20 April 2010).
5. Present final draft template at the Grain Legumes WG in Antalya, Turkey (22-23 April 2010) and Forages WG in Poel, Germany (27-29 April 2010).
6. Test the manual template with the help of *Brassica*, Grain Legumes and Forages WGs [or other volunteers?], who will ensure the template is filled in by relevant genebanks (between May and end of June 2010??).
7. Secretariat finalizes the template, prepares a brief guide on its use and seeks approval of AEGIS Advisory Committee (15 July 2010?).
8. Approved template is uploaded on the AEGIS Web site and available for Associate members to fill in (30 July 2010).
9. All AEGIS Associate Members complete the agreed template and produce their respective operational genebank manual (end 2010??).

The proposed workplan for the preparation of generic operational standards is the following:

1. After the testing phase of the template of the operational genebank manual (between beginning of May and end of June) and based on the completed manuals, the ECPGR Secretariat initiates the drafting of the generic operational standards.
2. All Working Groups and subsequently the AEGIS Advisory Committee comment on the draft generic standards.
3. Secretariat revises the first draft (possible need for a second iteration of comments).
4. Revised standards are sent to the ECPGR Steering Committee for approval (by October 2010).
5. Associate members initiate the process of upgrading their genebank operations to the standards (from beginning of 2011 onwards).

The proposed workplan for the preparation of agreed minimum standards (per crop or crop groups) is the following:

1. The Crop WGs start with identification of the list of genebank operations that require crop-specific minimum standards, using the agreed template of the operational genebank manual as a basis (i.e. by the end of July 2010).
2. WGs agree on the list(s) that correspond with the crops they are responsible for.
3. Current genebank and crop germplasm management practices are collected in relation to crop-specific genebank operations by the respective WGs.

4. Draft minimum standards for crop-specific operations are prepared by WG Chairs/Vice-Chairs and proposed to the WG members (suggested after January 2011, i.e. by the time that the generic standards should have been agreed).
5. WGs discuss the proposals and reach consensus agreement on the minimum standards.
6. AEGIS Advisory Group comments on the standards, especially from a "between crops" perspective.
7. WGs (Chair and Vice-Chair) finalize the minimum agreed standards and (via the ECPGR Secretariat) send them to the ECPGR Steering Committee for formal approval (end of 2011).
8. Associate members initiate the process of upgrading their operations to the agreed minimum standards.

Draft template for an operational genebank manual

Presentation by Lorenzo Maggioni available online

A draft template for an operational genebank manual had been prepared by the ECPGR Secretariat and circulated to all the participants. On the basis of this document, when finalized, each associate member of AEGIS will need to prepare a manual that contains descriptions of the routine genebank management procedures and practices and will make it available online. The draft template includes five areas (or conservation objectives), namely: 1) Germplasm acquisition; 2) Ensuring security; 3) Maintaining genetic integrity; 4) Ensuring availability and 5) Providing information. The genebank curators will be expected to describe the way the genebank is carrying out the routine operations at present.

Examples of some of the requested descriptions of specific operations were shown.

Brassica *Working Group's activities related to AEGIS*

Presentation by Noor Bas available online

The *Brassica* WG during 2004-2006 focused on the compilation of draft guidelines on the necessary scientific and technical standards to be met by the European Collections to ensure long-term conservation and easy access. A questionnaire was prepared on different (generic and crop-specific) procedures and standards in genebank management. The generic procedures focused on seed storage facilities, type of documentation system, minimum required passport data, documentation availability/viability, distribution (use of MTA, phytosanitary certification, maximum time for shipping) and use of a quality system. Crop-specific procedures included minimum number of seeds stored for conservation and their availability, minimum germination percentage and its monitoring, different aspects of regeneration (number of plants, pollinators, harvesting, postharvest conditions, seed cleaning), safety-duplication and the use of protocols/logbooks. Responses were received from 18 institutes from 14 countries and draft minimum standards were compiled, discussed and adapted at the VEGNET meeting in Olomouc, Czech Republic (2007) and at the AEGIS meeting in Radzików, Poland (2008). The summary of present practices and the draft minimum standards are included in the *Brassica* progress report for the AEGIS feasibility study (http://aegis.cgiar.org/documents/crop_specific_documents.html).

Discussion

O. De Ponti suggested that standards should also be considered by genebanks with regard to the possibility that GMO contamination might affect the genetic integrity of the accessions.

A discussion followed about the possible role of genebanks regarding GMOs. It was concluded that the suggestion by O. De Ponti should be given further thought and be addressed by the ECPGR Secretariat.

C. Allender thought that it might be counterproductive to publicize the security measures of a genebank, in view of possible attacks by burglars or other potential violators.

A few other specific comments were made to the draft template. The Secretariat took note of these in order to prepare a revised version

F. Branca challenged the concept of AEGIS. He feared that a too strict quality system would make it possible only for the larger genebanks to comply with the standards and would therefore exclude from the system all the small collection holders. He also wondered what would be the benefit for a small genebank to be part of the system. He also noted that AEGIS is not paying much attention to the characterization and evaluation of the accessions. He finally wondered about the funding mechanisms for AEGIS.

L. Maggioni and other Group members replied that the main benefit for a small genebank would be to be recognized at the national level as an important collection, with the role of maintaining European Accessions. The signing of an Associate Agreement would therefore place the small genebank in a better position to ensure permanent funding by the national authorities, in order to be able to contribute to honouring the national commitment towards AEGIS. Moreover, the current philosophy of AQUAS does not intend to be exclusive, i.e. rejecting genebanks from the system, but rather to be inclusive, i.e. promoting the improvement of the capacity of the weak partners. Finally, the funding mechanism for AEGIS will largely depend on projects such as EUROGENEBANK, currently submitted to the EC for funding.

Decisions

- The Group agreed on the general terms of the workplan proposed by the ECPGR Secretariat, in particular with the decision to abandon the plan made at the VEGNET meeting in Catania (November 2009) regarding the circulation of a questionnaire on stakeholder practices.
- G. Poulsen made the offer that NordGen will test the template of an operational genebank manual, starting at the beginning of May 2010. The experience obtained will then be communicated to the rest of the *Brassica* WG in order to reach an agreement on a standard way to fill in the template (such as about the length of the answers). Subsequently, other genebanks will be invited to fill in the template.
- It was decided to postpone the start of the work on a crop-specific template, by waiting until some experience is obtained with the generic standard exercise.

Election of Chair and conclusion

The Group re-elected F. Branca as its Chair and N. Bas was reconfirmed as Vice-Chair. F. Branca stressed the importance of maintaining a strong and friendly relationship among the *Brassica* WG members and to be proactive in preparing collaborative projects to be submitted for funding.

APPENDICES

Appendix I. Acronyms and abbreviations

AEGIS	A European Genebank Integrated System
AEGRO	An integrated European *In Situ* management Work plan: Implementing Genetic Reserves and On Farm concepts
Bras-EDB	European *Brassica* Database
CGN	Centre for Genetic Resources, the Netherlands, Wageningen
DOFATA	Dipartimento di OrtoFloroArboricoltura e Tecnologie Agroalimentari, Università di Catania (Department of Horticulture and Food Technology, Catania University), Italy
EC	European Commission
ECPGR	European Cooperative Programme for Plant Genetic Resources
EU	European Union
EUCARPIA	European Association for Research on Plant Breeding
EURISCO	European Internet Search Catalogue
FAO	Food and Agriculture Organization of the United Nations
GMO	Genetically modified organism
IBPGR	International Board for Plant Genetic Resources, Rome, Italy *(now Bioversity International)*
IPGRI	International Plant Genetic Resources Institute *(now Bioversity International)*
MAA	Most Appropriate Accession
NCG	Network Coordinating Group (ECPGR)
NordGen	Nordic Genetic Resource Center, Alnarp, Sweden
SMTA	Standard Material Transfer Agreement
UPM	Universidad Politécnica de Madrid (Technical University of Madrid), Spain
VEGNET	Vegetables Network (ECPGR)
VIR	N.I. Vavilov Research Institute of Plant Industry, St. Petersburg, Russian Federation
WG	Working Group

Appendix II. Agenda

***Fourth Meeting of the ECPGR Working Group* on Brassica**
2-4 March 2010, Linguaglossa, Catania, Italy

Monday 1 March 2010

Arrival of participants
Dinner at Borgata Baldazza

Tuesday 2 March 2010

8.30–10.30	**Introduction** • Welcome address and opening remarks *(convener, F. Branca)* • ECPGR , including AEGIS update *(L. Maggioni)*
10.30–11.00	*Coffee break*
11.30–13.00	***Brassica* WG project** • Wild *Brassica* species *(F. Branca)* • Discussion
13.00–14.30	*Lunch at Borgata Baldazza*
14.30–16.30	***Brassica* WG project (continued)** • *B. rapa (N. Bas)* • Discussion
16.30–17.00	*Coffee break*
17.00–19.00	**Activities and projects on *Brassica* conservation** • Status of wild *Brassica* conservation at BGV-UPM, Madrid, Spain • AEGRO project *Dinner at Borgata Baldazza*

Wednesday 3 March 2010

8.30–13.00	**Visit to the wild *Brassica* fields** • Visit to the wild *Brassica* fields of the ECPGR Phase VIII project of the *Brassica* WG located at the Experimental Farm of Catania University *(F. Branca)* • Discussion on descriptors to use for the characterization work
13.00–14.30	*Lunch (trattoria Rosalba)*
14:30–16.30	***Brassica* WG programme related to AEGIS, including AQUAS** *(N. Bas)*
16.30–17.00	*Coffee break*
17.00–19.00	• Assessment of the generic standards used in the conservation of *Brassica* germplasm **Election of Chair, Conclusion**
18.00–22.00	*Social dinner (Restaurant Al Pescatore, Fondachello)*

Thursday 4 March 2010

8.30–19.00	**Excursion to Nebrodi Parks (GR conservation *in situ*)** *Lunch (restaurant L'Agostiniana)*
20.00–22.30	*Dinner at Borgata Baldazza*

Friday 5 March 2010

Departure of participants

Appendix III. List of participants

Fourth Meeting of the ECPGR Working Group on Brassica *2-4 March 2010, Linguaglossa, Catania, Italy*

N.B. Contact details of participants updated at time of publication. However, the composition of the Working Group is subject to changes. The full list, constantly updated, is available from the Brassica *Working Group's Web page (http://www.ecpgr.cgiar.org/Workgroups/brassica/brassica.htm).*

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