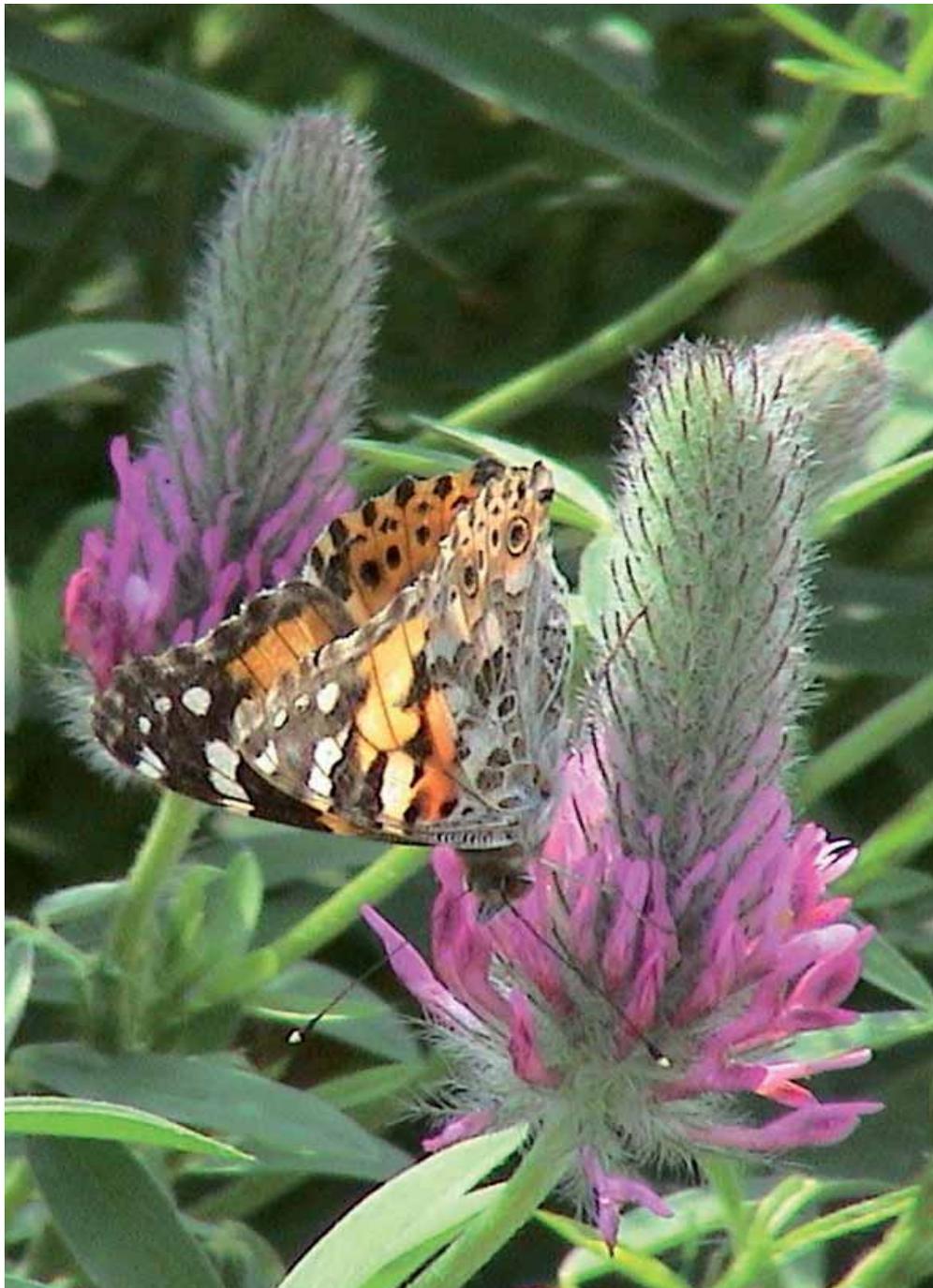


# Report of a Working Group on Forages

Tenth Meeting, 28-29 April 2010, Poel Island, Germany  
L. Maggioni, M. Veteläinen, E. Willner and E. Lipman







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**The European Cooperative Programme for Plant Genetic Resources (ECPGR)** is a collaborative programme among most European countries aimed at contributing to national, sub-regional and regional programmes in Europe to rationally and effectively conserve *ex situ* and *in situ* Plant Genetic Resources for Food and Agriculture and increase their utilization. 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. The Coordinating Secretariat is hosted by Bioversity International. 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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#### **Citation**

Maggioni L, Veteläinen M, Willner E, Lipman E. 2011. Report of a Working Group on Forages. Tenth Meeting, 28-29 April 2010, Poel Island, Germany. Bioversity International, Rome, Italy.

#### **Cover illustration**

Butterfly feeding on *Trifolium purpureum*. Courtesy © A. Inal, AARI, Izmir, Turkey.

Acknowledgements to M. Shah for English language editing.

ISBN 978-92-9043-892-2

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*Bioversity International* is the operating name of the International Plant Genetic Resources Institute (IPGRI).

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## SUMMARY REPORT OF THE MEETING

### Introduction

#### ***Welcome by the local organizers and opening remarks***

Evelin Willner welcomed the Working Group on Forages of the European Cooperative Programme for Plant Genetic Resources (ECPGR) to Poel Island for its tenth meeting. Mr Karsten Pellnitz, representative of the Ministry of Agriculture, Environment and Consumer Protection, State of Mecklenburg-Vorpommern, also welcomed the Group; his presence was evidence of the importance attached to the meeting.

#### ***Update on ECPGR***

Lorenzo Maggioni, ECPGR Coordinator, gave an update on the ECPGR Programme during the ongoing Phase VIII (2009-2013). The main decisions of the last Steering Committee meeting held in 2008 were summarized, including the priorities for the Phase (the highest being the sharing of responsibilities), the budget and its planned use by the Forages Network. He added that the ECPGR Independent External Review commissioned by the Steering Committee would take place in July 2010 at Bioversity's headquarters in Rome.

#### ***Working Group on Forages: Chairperson's report***

Merja Veteläinen reported on activities carried out by the Working Group (WG) since its ninth meeting held on 23-25 October 2007 in Piešťany, Slovakia.<sup>1</sup>

An ad hoc meeting of the Forages Network Coordinating Group (NCG) was held on 11 May 2009 at La Rochelle, France.<sup>2</sup>

At its Eleventh Meeting in 2008, the ECPGR Steering Committee (SC) had requested more quantitative outputs. However, the SC also noted that the results of meetings are generally very valuable, although it is difficult to quantify them; they are useful for defining the Most Appropriate Accessions (MAAs). The WG's workplan did include quantitative measures such as determining the most original sample (MOS) and holders of primary collections (PRIMCOLL) for databases. But the outcome of these measures cannot be anticipated. Overall, the criticism of the SC should be taken in a constructive way.

The forages catalogues are fragmented into too many databases (23); the SC therefore encouraged the Network to consider merging some of them, which will be done during this meeting. The Forages Network budget for ongoing Phase VIII was set at € 27 700, which was inadequate for meeting its goals.

The revised workplan for the Network (La Rochelle meeting, 2009) will be reviewed during this meeting:

1. Documentation and information. Progress of Forage Databases (DBs) and assignment of AEGIS accessions were better in priority DBs than in others. Regarding the number of databases, the Group will have to decide at this meeting whether (a) to merge all Forage DBs into a single DB or (b) to merge DBs by taxa/DB Manager.

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<sup>1</sup> Report posted at [http://www.ecpgr.cgiar.org/networks/forages/forages/slovakia\\_2007.html](http://www.ecpgr.cgiar.org/networks/forages/forages/slovakia_2007.html)

<sup>2</sup> Report posted at [http://www.ecpgr.cgiar.org/networks/forages/forages/previous\\_events.html](http://www.ecpgr.cgiar.org/networks/forages/forages/previous_events.html)

2. Characterization and evaluation (C&E) data in the Central Crop Databases (CCDBs). No specific activities were planned, but the Group should take decisions concerning this issue at this meeting.
3. Cross-cutting activities. The WG planned that it would devote more attention to *in situ* and on-farm conservation; the leader of the EU-funded project “An Integrated European *In Situ* Management Workplan: Implementing Genetic Reserve and On-Farm Concepts” (AEGRO) was invited to this meeting to inform on developments in this field.
4. Other items that should be discussed during this meeting were the development of forage crop portals to facilitate increased use of forage plant genetic resources (PGR) and support to genotyping initiatives for forages.

Several Forages WG members had been involved in the preparation of the EUROGENEBANK project proposal, which had unfortunately not been approved. Some of the forage-specific tasks contained in the proposal are:

1. Task 4.4: Analyse the national lists of proposed candidate forage accessions and suggest a list of MAAs to be included in the European Collection.
2. Task 7.1: Create crop portals for a number of model crops (*Lolium*).
3. Task 9.3.2: Develop technical standards for seed-propagated, wind- and cross-pollinated crops. Model crops: forage grasses.
4. Task 11.1: Improve seed storage behaviour.

### *Discussion*

Jan Engels, who coordinated the preparation of the EUROGENEBANK proposal, thanked all who had participated in the effort. He regretted that the proposal had not been approved for funding, even though it had met all the eligibility criteria. He stressed the need to lobby in Brussels to ensure that the proposal could be submitted again in a future call.

### ***Aims and schedule of the present meeting***

M. Veteläinen presented the aims of the current meeting:

- Decide on the management of the European Central Forage Databases to ensure the dataflow between Database Managers and collection holders.
- Reflect on the selection criteria for forage MAAs, taking into account the definitions of MOS and PRIMCOLL and enhance task sharing in conservation of forage crops in Europe (AEGIS grant scheme 2010).
- Enhance *in situ* and on-farm conservation of forages in Europe.
- Review the current status of national collections, collecting activities, minimum standards for regeneration in use and ongoing research activities.
- Agree upon a workplan for the remaining part of the ongoing ECPGR Phase VIII.

## **European Central Forage Databases**

### ***Comparison of the representation of forage crops in the European Central Crop Databases and the European Plant Genetic Resources Catalogue (EURISCO)***

Helmut Knüpfper, Leibniz Institute of Plant Genetics and Crop Plant Research (IPK), Germany, presented an analysis carried out together with Theo van Hintum, Centre for Genetic

Resources, The Netherlands (CGN).<sup>3</sup> According to the ECPGR Web site, 23 of the 60 CCDBs, are forage CCDBs (12 forage grasses and 11 forage legumes).

The CCDBs vary considerably in size, coverage (countries, contributing genebanks), existence and accessibility. During January-March 2010, Th. van Hintum either downloaded (where possible) the complete CCDBs or requested them from the respective Database Managers. By mid-April, 40 of the total 60 DBs were received, including 8 forage CCDBs (out of a total of 23). Regarding availability and functionality, several forage DBs had Web site errors, were not available or could not be downloaded.

Figures related to the number of forage grasses and forage legumes accessions conserved were derived from EURISCO (March 2010; April 2010 in the case of *Poa*) and from the CCDB analysis by Th. van Hintum. A "European Minor Forage Grasses Database" had been proposed at the seventh meeting of the Forages WG (18-20 November 1999, Elvas, Portugal); it would have comprised a list of more than 40 genera of potential interest. But the database was not developed.

The results of the comparison of the eight forage databases (Grasses: *Agrostis*, *Bromus*, *Lolium*, *Phalaris*, *Phleum*, *Poa*; Legumes: Minor Forage Legumes, *Trifolium pratense*) and EURISCO by Th. van Hintum can be summarized as follows:

- 89 contributing institutions from 33 countries are present in EURISCO and the CCDBs taken together;
- 42 institutions from 25 countries represented in the CCDBs;
- 70 institutions from 31 countries represented in EURISCO;
- 48 340 accessions in EURISCO, 25 205 in the CCDBs, 59 895 in total;
- Hence at least 11 555 accessions documented in these CCDBs are not included in EURISCO.

The analysis concluded that

- Several DBs do not exist, or they are inaccessible;
- Information on the ECPGR Web site is often not up-to-date regarding the number of accessions, name and institution of the DB Manager, etc.;
- Dead links are not updated when the DB moves to a different URL;
- Some CCDBs do not have a standard entry page;
- The very small DBs should be grouped into a few larger ones;
- The scope (genera) of "Minor" Forages DBs should be defined
- CCDB Managers should check EURISCO, FAO's World Information and Early Warning System (WIEWS), and the Bioversity Germplasm Holdings database for the missing contributing genebanks.

It was also concluded that commitments from institutions are needed, since commitments from individuals are not sufficient.

### *Discussion*

Merja Veteläinen reported that she and Beat Boller had submitted an analysis of Forage DBs to the European Association for Research on Plant Breeding (EUCARPIA)<sup>4</sup> and they had obtained similar results. However, in their analyses they found that some CCDBs contained

<sup>3</sup> Presentation posted at

[http://www.ecpgr.cgiar.org/networks/forages/forages\\_wg\\_germany\\_2010/presentations.html](http://www.ecpgr.cgiar.org/networks/forages/forages_wg_germany_2010/presentations.html)

<sup>4</sup> Boller B, Veteläinen M. 2010. A state of the art of germplasm collections for forage and turf species. In: Huyghe C, editor. Sustainable Use of Genetic Diversity in Forage and Turf Breeding. Springer, The Netherlands. pp. 17-28. (Doi: 10.1007/978-90-481-8706-5\_2).

more accessions than EURISCO. Also certain accessions may be found in only one of the sources (EURISCO or CCDBs).

Petter Marum pointed out that data about *Phleum* were either not complete or not updated, or both, in the Central *Phleum* Database.

Discussion on these issues was postponed until after the other related presentations.

Ian Thomas informed that “Google Fusion” is a table-sharing facility with 250 MB of storage. Data from EURISCO can be downloaded and inserted in the Google Fusion table. In this way, the downloaded EURISCO data can be transferred to the CCDB. Google Fusion has a good visualization tool that allows easy identification of errors. Latitude and longitude errors are the most common. Since the data can be easily mapped on Google Fusion, such errors can be spotted at once. He was, however, uncertain about the intellectual property implications of making the data available on Google Fusion. But according to the EURISCO Data Sharing Agreement, EURISCO contains only data that can be made publicly available and that can be used without limitations or restraints. Bioversity is also allowed to make the EURISCO data available to other portals. Therefore, data from EURISCO can be uploaded to Google Fusion tables.

### **Management and restructuring of the European Central Forage Databases**

According to M. Veteläinen, since EURISCO includes only passport data, the ECCDBs are the main tool for managing crop-specific data and for enhancing task sharing in Europe. However, task sharing (i.e. identification of PRIMCOLL) could be hampered by the large number (23) of existing forages DBs. A decision was taken in 2010 by the Network Coordinating Group to reorganize the DBs. An email inquiry was sent to the DB Managers about possible merging, but only a few responses were received. A proposal was made to combine all DBs into one single Forages Database, or alternatively to merge databases by taxa/genera into nine databases (*Lupinus* and *Vigna* being the responsibility of the Grain Legumes WG):

1. Minor Forages (former minor grasses and minor legumes): *Agropyron*, *Agrostis*, *Arrhenatherum*, *Bromus*, *Phalaris* and *Trisetum* (other minor forages could be added at a later stage)
2. *Dactylis* and *Festuca*
3. *Lathyrus*
4. *Lolium*
5. *Medicago*
6. *Phleum*
7. *Poa*
8. *Trifolium*
9. *Vicia*

### **Discussion**

Jean-Paul Sampoux confirmed that Stéphane Fournier, who managed the Perennial *Medicago* Database at INRA-Lusignan, France, was willing to continue with this commitment. He made an attempt to assign “originality” to the accessions using the appropriate algorithm and to propose holders of primary collections (PRIMCOLL). In September 2009, the results were sent to the WG members in various countries for feedback, but no answers were received. Updates of national collections were then requested in January 2010; many answers were received but with no data (except from Germany) on the “ORIGINALITY” descriptor, which was disappointing. About 100 accessions in France were accepted by the proposed

primary holders, but others did not respond. The two *Medicago* Databases could be merged, but it would not necessarily solve the problem. It would be better if collection holders could quickly accept responsibility for a few accessions in order to have the feeling of moving on.

J.-P. Sampoux also suggested that only new accessions and not entire lists should be sent for updates.

S. Fourtier checked whether all cultivars in the Perennial *Medicago* Database are still included in the national lists or not.

Magdalena Ševčíková said that the Databases maintained by the Crop Research Institute in Czech Republic (*Arrhenatherum* and *Trisetum*) were currently dormant. They were developed through national grants in 2002, but subsequent updates were stored only on the local computer, not the hosting server. She also pointed out that some data in EURISCO are clearly wrong; for example, some accessions from Ukraine are not true *Arrhenatherum*. The Institute is unable to continue maintaining the Databases due to lack of research funds from the government; moreover M. Ševčíková is due to retire.

E. Willner said that the *Poa* Database was updated this year (2010).

Włodzimierz Majtkowski reported the changes in the *Dactylis* and *Festuca* Databases, having 13 141 and 12 183 accessions, respectively. The European *Festuca* Database contains nearly 100 species, but only 4 species (*F. pratensis*, *F. arundinacea*, *F. rubra* and *F. ovina*) account for more than 97% of all records. The European *Dactylis* Database consists of only 3 species (*D. glomerata*, *D. marina* and *D. polygama*) with *D. glomerata* accounting for 99.7% of the records. The presence of a few names of non-existing species was a problem. The Plant Breeding and Acclimatization Institute (Poland) agreed to continue maintaining the Databases.

Gert Poulsen wished to know whether the *Dactylis* and *Festuca* Databases were hosted on a Polish site, in which case NordGen could delete them from its site. W. Majtkowski replied that the Databases were not hosted on a Polish site and should possibly continue to be hosted on the NordGen Web site.

### **Relationship with EURISCO – update after previous WG meeting**

L. Maggioni informed that EURISCO contained data on more than 1 million accessions from 41 countries. Countries can now indicate their designated Multilateral System accessions in EURISCO. Nearly 212 000 European Accessions had been designated so far by 13 countries. The Documentation and Information Network of ECPGR has elaborated a concept to include non-standardized characterization and evaluation data into EURISCO. EURISCO will contribute its data to a global information system, which is being developed at Bioversity with funds from the FAO, Treaty Secretariat, Bioversity and Global Crop Diversity Trust. This system, called GENESYS, compiles data from the System-wide Information Network for Genetic Resources (SINGER) of the Consultative Group on International Agricultural Research (CGIAR), the Germplasm Resources Information Network (GRIN) of the United States Department of Agriculture (USDA) and Canada, and EURISCO.

The relationship between EURISCO and the CCDBs had been discussed at the EPGRIS3 activity meeting held in Bonn in March 2008. Data discrepancies between the ECCDBs and EURISCO are partly due to their different roles (historical data in ECCDBs, national data in EURISCO). Maintaining the ECCDBs is justified by the service they offer to users. A paper

was subsequently published, describing the European *ex situ* PGR Information landscape.<sup>5</sup> According to this vision, EURISCO is expected to cover passport, characterization and evaluation, distribution and use data and could develop interfaces to crop portals. ECCDB Managers could develop user-oriented crop portals, including information required by the breeders. The portals would then upgrade from gathering and compilation of passport data, to data analysis:

- Crop-specific searches/visualization (geographic information system (GIS) tools; queries and results in various formats);
- Crop-specific data analysis (MAAs; duplicates and gaps; core collections; management needs);
- Additional type of data (cultivar data, synonyms, images, taxonomy, pedigree, molecular markers, quantitative trait loci (QTLs), genes, patents).

EURISCO is expected to become the most reliable source of passport data. To achieve this goal, the role of National Inventories should be strengthened and national systems should provide all relevant data to EURISCO. WGs can play the role of facilitators in this process.

### *Discussion*

A question was raised about the added value of CCDBs compared with EURISCO. Would it be sufficient to have only EURISCO and extract genus-specific data from it? How can contributors to CCDBs be encouraged to submit the same data to EURISCO?

I. Thomas was in favour of EURISCO remaining the leader in providing the data. Also, taxonomy and geographic coordinate errors should be reported to the National Inventory Focal Points and then be delivered to the data managers in the respective holding institutes.

G. Poulsen agreed with I. Thomas, adding that data gaps in EURISCO should be filled. Also, a decision should be taken on data flow before dealing with the *Agrostis* and *Phalaris* Databases.

E. Willner thought that EURISCO could be used as a first step to update the CCDB, followed by direct contact with curators since more information is required than what is available in EURISCO. Missing data in EURISCO remain a problem.

H. Knüpfner reported that a task force of the Documentation and Information Network had looked at 40 000 taxonomy combinations in EURISCO, which were spell-checked against GRIN Taxonomy, Mansfeld taxonomy and the International Plant Name Index. The intention was to build a "translation table" between EURISCO and a "preferred" EURISCO name. Such a translation table connected to EURISCO will reduce the urgency to correct the original data. In the same context, "crop names" will be assigned to "preferred EURISCO taxon names", thus allowing for an automatic translation of scientific names into standardized crop names. With the system of C&E data being developed for EURISCO by the Documentation and Information Network, each genebank will no longer have to deal with many different requests, should each CCDB develop its own system.

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<sup>5</sup> Hintum Th van, Begemann F, Maggioni L. 2010. The European *ex situ* PGR Information Landscape. In: Maurer L, Tochtermann K, editors. Information and Communication Technologies for Biodiversity Conservation and Agriculture. Shaker Verlag, Aachen. pp. 155-171.

Petter Marum opined that all data should be included in EURISCO, and the data analysis for the identification of MOS should be based on it, since it is too difficult to operate with two systems. However, for the time being, scientists should use what is available.

M. Veteläinen summarized the discussion and conclusion as follows:

1. EURISCO should be used as a starting point for data analysis.
2. Curators should be encouraged to fill data gaps in EURISCO.
3. The CCDBs should be retained in this Phase to compile data by using EURISCO as a backbone; to define the MOS; and to help fill data gaps in EURISCO.
4. A number of commitments and non-commitments were made for maintaining DBs and a few suggestions for mergers were also put forward:
  - Poland will continue with *Dactylis* and *Festuca*
  - NordGen will continue with *Phleum*
  - Germany will continue with *Poa*
  - France and Spain will continue with *Medicago* (perennial and annual)
  - Austria will continue with *Vigna*
  - UK will continue with *Lolium*
  - *Trifolium* should be merged: all to UK, except *T. subterraneum*, which remains in Spain
  - Czech Republic will not continue with *Arrhenatherum* and *Trisetum*
  - *Lupinus* should be removed from the Forages list
  - *Lathyrus* should be moved to Minor Legumes
  - *Vicia* should be moved to Minor Legumes.

The Group recommended that the following Databases be maintained:

1. "Minor Forage Grasses", including also former *Agropyron*, *Agrostis*, *Arrhenatherum*, *Bromus*, *Phalaris* and *Trisetum*: NordGen
2. "Minor Forage Legumes": contact Italy, if not ask WG members (Slovenia); Hungary later confirmed the responsibility for this DB
3. *Dactylis* and *Festuca*: Poland
4. *Lolium*: UK
5. *Medicago*, annual: Spain
6. *Medicago*, perennial: France
7. *Phleum*: NordGen
8. *Poa*: Germany
9. *Trifolium*: UK
10. *T. subterraneum*: Spain
11. *Vigna*: Austria.

The final list, including details of DB Managers is presented in Appendix II (p. 24).

Valeria Negri suggested that the term "minor" for legumes should not be used, since they are not minor in some situations. She also suggested including *Onobrychis* and *Hedysarum*. B. Boller explained that the term "minor" was acceptable as it referred to the importance of the particular legumes relative to world crops

The tasks of the DB Managers were summarized as follows:

- Use EURISCO as a data source for the Central Crop Databases;
- Include forage-specific descriptors and lobby for inclusion of these descriptors in EURISCO in the long run;
- Identify MOS and PRIMCOLL in collaboration with data providers;
- Help in filling passport data missing in EURISCO.

### **Workplan**

1. Database Managers to confirm **by 31 May 2010** that they take responsibility for the database assigned to them by the WG (inform by email: [merja.vetelainen@mtt.fi](mailto:merja.vetelainen@mtt.fi) and [l.maggioni@cgiar.org](mailto:l.maggioni@cgiar.org)).
2. In case DB updates are not received from countries, update the DB on the basis of EURISCO **by September 2010**.
3. Start the establishment of the Minor Forage Grasses and Minor Forage Legume DBs.
4. DB Managers to identify MOS and PRIMCOLL from received data **by December 2010**.
5. DB Managers to send a progress report to WG Chair **by the end of January 2011** (ahead of NCG and SC meetings).

### **NordGen SESTO trait evaluator**

G. Poulsen presented the software used at NordGen to document characterization and evaluation data on the genebank accessions. Evaluation data can be browsed by dataset and experiment, descriptor and methods, or by genotype. All data are available on open source: ([http://sesto.nordgen.org/sesto/trait/index.php?scope=sesto\\_obs&app=trait&mpr=1955358798](http://sesto.nordgen.org/sesto/trait/index.php?scope=sesto_obs&app=trait&mpr=1955358798)).

## **AEGIS and sharing of responsibilities**

### **General status of AEGIS**

The background, objectives and perceived benefits of the initiative for A European Genebank Integrated System (AEGIS) were summarized by J. Engels. The following milestones were listed for AEGIS: the *Strategic Framework Policy Guide*, document endorsed by the Steering Committee in 2008 and the Memorandum of Understanding (MoU), i.e. the legal document that was sent for signature to all ECPGR member countries in the first half of 2009. As of now, 18 countries have signed the MoU and become members of AEGIS. An important agreement was reached on the development of the AEGIS Quality System (AQUAS); a discussion paper on its principles is available online.<sup>6</sup> The Steering Committee reached an agreement on the requirements for the European Accessions, thus establishing the scope of AEGIS. The material should be:

- under the management and control of governments,
- in the public domain and offered by the Associate Members for inclusion into AEGIS,
- genetically unique to the best available knowledge,
- plant genetic resources for food and agriculture as defined in the International Treaty, or medicinal and ornamental species,
- germplasm of European origin or introduced in Europe and germplasm that is of actual or potential importance to Europe (for breeding, research, education, or for historical and cultural reasons).

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<sup>6</sup> <http://aegis.cgiar.org/aquas.html>

A Competitive Small Grant Scheme was launched by the ECPGR Secretariat in 2009 to facilitate the establishment and operation of AEGIS. Eighteen proposals were received and three awarded. A new call for proposals is foreseen for late autumn 2010.

The EUROGENEBANK proposal for the implementation of AEGIS was submitted to the European Commission in response to the Research Infrastructure Call of the Seventh Framework Programme (FP7) in 2009. The proposal met the threshold, but was not selected for funding. It will be re-submitted in 2012, provided a new, suitable call is launched.

The European Collection will be the main product of AEGIS; consisting of dispersed Most Appropriate Accessions (MAAs), it is a virtual European genebank. By signing the MoU, countries accept responsibilities for long-term conservation and availability of the European Accessions and for conservation and management of the accessions according to the quality standards. Conservation and management strategies for each crop need to be prepared by the respective Crop WG/NCG and approved by the Steering Committee.

### ***Progress since the previous meeting on Most Original Samples and primary holder, and assigning values for the European Forage Collection***

M. Veteläinen reported on progress in identifying the Most Original Samples (MOS) and primary holder (PRIMCOLL) and in assigning values for the European Forage Collection (EFC). Among the issues to be considered, she listed the need to send updates more regularly when changes occur in the collections. Collection holders are often very slow in responding to requests for updates. Although the regularity of updates has improved since 2008, the data flow continues to be slow. The coverage of databases also needs to improve (accessions in databases vs. existing accessions in Europe). No information was received regarding *Dactylis* and *Festuca*, but it is expected by the end of this year (2010). Regarding *Lolium*, 71% of MOS values were derived by the DB Manager, without feedback from the data owners. Some Database Managers changed or retired, leaving no successor; the tasks should be passed to the new managers whenever staff changes occur. The question whether cultivars in official variety lists should be included in the collections and databases needs to be discussed. The difference between MAAs and MOS/PRIMCOLL should also be clarified; P. Marum's suggestion to equate MAA and MOS was approved by the Group (see p. 11). The Group should agree on a way to define primary holders of accessions and EFC (AEGIS) accessions.

### ***Discussion***

If DB Managers could meet and analyse the data together, work would progress more rapidly.

Cultivars in the national variety lists are conserved by a reference person. When the variety is struck off the list, the information should be sent automatically to the national genebank. In practice, this does not always happen since it requires permission from the breeder. Moreover, the samples may not have been conserved properly by the reference person. Overall, if these cultivars are not available, there is no interest in keeping them in the databases.

### ***Proposed next steps for implementation of AEGIS – the AEGIS Quality System***

J. Engels summarized the agreed principles for the establishment of the AEGIS Quality System (AQUAS) and the elements being established for its implementation:

1. **Operational genebank manual.** A draft template was prepared by the Secretariat and will be tested by NordGen, Sweden, and any interested legume-/forage-specific genebank. The template, once approved by the AEGIS Advisory Committee, will

have to be filled in by the genebanks of Associate Members so that they can complete their operational genebank manuals.

2. **Generic operational standards.** The standards will be drafted by the Secretariat based on the operational manuals and suggestions by the WGs. This activity will also take into account the ongoing revision of the international genebank standards by the FAO.
3. **Agreed minimum crop-specific technical standards.** All WGs will need to agree on the standards for their respective crops, which will complement the generic standards.
4. **Quality management system procedures.** The WGs, in consultation with the AEGIS Advisory Group, will need to organize a system for record keeping and reporting, and to implement a monitoring system.

### *Discussion*

H. Knüpfner offered the services of the Leibniz Institute of Plant Genetics and Crop Plant Research (IPK), Germany, for testing the template; this was later re-confirmed by Andreas Graner.

I. Thomas also offered to test the template on behalf of the Forages Working Group.

### **Most Appropriate Accessions – the selection process**

J. Engels explained that no definite procedures had been fixed, nor was there any precise definition of Most Appropriate Accessions (MAAs). The process for identifying MAAs among sets of duplicates requires the WG's agreement on the "selection criteria" for each crop or crop group. This process can start from two sides: a proposal from the WG on the basis of its knowledge of existing unique and most appropriate accessions; and a selection of "candidate" accessions at the national level based on the selection requirements and offers for long-term maintenance. The two need to come to an agreed conclusion in an iterative manner. The process is, however, not yet completely defined as it requires empirical testing, and alternatives to the above approach can be considered.

It is proposed that the WG take the following actions:

1. Proceed with formulating the final list of selection criteria;
2. Strive to ensure that missing data are provided to EURISCO as soon as possible;
3. Assist countries and their Associate Member institutes in identifying "candidate" MAAs in their collections;
4. Develop a crop-/genepool-specific list of MAAs on the basis of the candidate accessions, using the selection criteria;
5. Where necessary, suggest any additional accessions to countries;
6. Establish a final list of European Accessions for a given crop genepool and confirm the final decision with National Coordinators.

### *Discussion*

M. Veteläinen informed that the Forages WG has started with an analysis of the CCDBs. This approach gives a general overview of all the existing material, which would otherwise be lost if the process is based on bilateral approaches.

### **Selection of Forages MAAs**

P. Marum summarized the progress made over the years by the Forages WG towards defining a European Forage Collection. At its sixth meeting in Beitostølen, Norway (1997), the WG defined the objectives and scope of the collection, as well as the type and status of

material to be included. Responsibilities of the Database Managers, WG members and hosting genebanks were also defined. In the seventh meeting in Elvas, Portugal (1999), a procedure to identify Most Original Samples was proposed and an algorithm to identify them was developed. The WG agreed on a mechanism for handing over responsibility for the maintenance of MOSs identified in the forage collection. In the eighth meeting in Linz, Austria (2003), the WG noted that little progress had been made with the proposed mechanism because of problems in the application of the algorithm and due to missing data in the CCDBs and EURISCO. CCDB Managers were invited to make a proposal for "Holder of primary collection" (PRIMCOLL), with focus on the priority crops *Dactylis*, *Festuca*, *Lolium*, *Medicago*, *Phleum*, *Poa* and *Trifolium*. In the ad hoc meeting of the NCG in Lindau, Switzerland (2005), progress was made in defining MOS of the priority crops; it was suggested that the "Primary holder" should be the genebank in the country where the accession was bred or collected. Forage-specific descriptors were revised. In the ninth meeting of the WG in Piešťany, Slovakia (2007), work advanced mainly for *Poa* and *Phleum* and only partially for the other crops.

The establishment of AEGIS raises the need to define selection criteria for Forage MAAs. Equating the MOSs with MAAs has been suggested. Other selection criteria could be:

- Maintained in "Country of origin"
- A known origin
- Comprehensiveness of passport information
- Number of regeneration cycles
- Health status
- Existence of morphological/molecular characterization data.

It would be preferable to use EURISCO for the selection procedure, but it does not contain descriptors for MOS, while the Forage CCDBs have descriptors for ORIGINALITY (MOS), PRIMCOLL and EFC. A few descriptors could, however, be added in the CCDBs. ORIGINALITY and PRIMCOLL are already partly registered in CCDBs.

The assignment of PRIMCOLL could take place as follows:

1. Post the CCDBs as a simple spreadsheet on a server to which WG members and DB Managers have access;
2. WG members, on behalf of their national programmes, flag the accessions they offer to maintain;
3. DB Managers flag accessions they suggest for inclusion in a European Collection;
4. Steps 2 and 3 could be carried out simultaneously;
5. Where WG members and DB Managers agree, the accessions are flagged as European Accessions.

### ***Discussion***

B. Boller suggested that if the PRIMCOLL descriptor were assigned to all accessions of a set of quasi-duplicate accessions, it would indicate that the accession already has a primary collector; a column could be added to link each accession to the primary accession.

I. Thomas, B. Boller and E. Willner fully supported the idea of equating MAA with MOS as the basis for choosing the MAAs for AEGIS, and the Group agreed.

B. Boller further suggested that the proposed additional criteria should also be considered to facilitate selection from among groups of probable duplicate accessions, such as a set of populations from the Rhodopi Mountains.

I. Thomas remarked that in any case, samples that are not suggested for the European Collection would not be lost.

### **Workplan**

6. P. Marum and I. Thomas agreed to use a "Google Fusion Map" and test the methodology proposed by P. Marum in his presentation for the identification of European Accessions.

### **Safety-duplication**

M. Veteläinen presented a table with the storage conditions (as of 2005) of institutes conserving forage accessions and the respective percentages of safety-duplication. An updated version will be uploaded on the ECPGR Web site.<sup>7</sup>

### **Discussion**

The role of the Svalbard Global Seed Vault (SGSV) as a valid location for primary safety-duplicates was discussed. B. Boller thought that it was better to also keep the material in a place where it could be easily retrieved; Svalbard could therefore not be the primary safety-duplication site. M. Veteläinen thought that the main consideration should be that the material is stored at a different site for safety-duplication.

S. Kratovalieva reported that the South East European Development Network on Plant Genetic Resources (SEEDNet) planned to use both a different genebank in the region and Svalbard for the second safety-duplication.

M. Veteläinen concluded that AEGIS allowed different arrangements to accommodate different views. What prevails is that the material is safety-duplicated.

## **Introduction to the Leibniz Institute of Plant Genetics and Crop Plant Research (IPK)**

The presentation by A. Graner is available online.

## **Research activities linked to the IPK forage collections**

The presentation by K. Dehmer is available online.

## **Reports on national collections and collecting activities**

National reports were received from Austria, Belarus, Bosnia and Herzegovina, Bulgaria, Czech Republic, Estonia, France, Germany, Italy, Macedonia FYR, Poland, Turkey and the United Kingdom. They included information about genebank infrastructure and quality management, collection status, documentation, characterization and evaluation, regeneration and research. Very few concerns were mentioned. More than 4000 new accessions were collected in the past few years; a summary of the collecting activities (Austria, Bosnia and Herzegovina, Bulgaria, Czech Republic, Estonia, Germany, Macedonia FYR, Norway and Poland) was presented.

Reports of national activities are available online.

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<sup>7</sup> [http://www.ecpgr.cgiar.org/networks/forages/forages\\_wg\\_germany\\_2010.html](http://www.ecpgr.cgiar.org/networks/forages/forages_wg_germany_2010.html)

### **Discussion**

National priorities prevail for collecting activities; as a result they are not coordinated on a regional level. However, Vladimir Meglič informed that four species were given collecting priority at SEEDNet level.

The concern about collecting procedures was whether correct terms of guidance were being followed in the collecting steps. Some doubts were raised about the quality and documentation of the collected material. Also, replacement, if any, of old material in genebanks with new material was not reported. The quality of collecting activities and the treatment of samples were stressed once again.

J. Engels raised the issue of the relationship between *in situ* and *ex situ* conservation.

P. Marum affirmed that collecting was an important activity as it supplied material for breeding.

M. Veteläinen reported that attempts were being made to obtain a good coverage of diversity in the collection.

G. Poulsen thought that *in situ* conservation had high potential, but in certain regions a lack of suitable areas made it difficult. He gave the example of an inventory of wild species carried out in Denmark, which showed that in this predominantly agricultural landscape with a heavy load of airborne nitrogen, good populations for *in situ* conservation are seldom found in protected areas, and often only one species is found per site. Also, in the light of climate change, *in situ* conservation has both advantages and drawbacks, since it will result in the selection of material that is adapted to the new climatic conditions, but it could also cause the disappearance of some accessions and genotypes that are unable to adapt, and with them the loss of other desirable traits. Therefore, *ex situ* conservation is also needed.

S. Kratovalieva informed that the SEEDNet strategy required all collected material to be grown in the field for regeneration and multiplication.

E. Willner mentioned that due to the absence of Material Acquisition Agreements in some cases (earlier collecting trips between 1993 and 1998), some samples were not available for distribution. The genebanks of the countries of origin need to agree to allow free access and dissemination for all the collected accessions so that they can be further distributed.

E. Willner added that collecting should be undertaken only when there is a specific need (e.g., breeding for or research on missing morphological or agronomic traits in existing accessions and collections) or to fill gaps in species. Maintaining all accessions in a collection is the most important task.

## **International cooperation**

### ***International cooperation in collecting activities***

M. Ševčíková described three international collecting missions organized for two bilateral projects: (a) Czech-Slovenian cooperative research and development project during 2007-08 (collecting in South East and South West Slovenia) and (b) Czech-Hungarian cooperative research and development project during 2009-10 (collecting in South East and Central Hungary).

### ***Niche modelling of the spontaneous diversity of forage and turf species***

*J.-P. Sampaoux*

Rational sampling of the spontaneous diversity of forage and turf species requires prior knowledge of the range of environmental conditions suitable for these species. The environmental range can be determined by empirical modelling of the ecological niche of the

species. A function of environmental parameters predicting the presence of a species is built from a calibration dataset comprising observed presence/absence or abundance records of the species and environmental data at the observation sites. Data from collecting campaigns by plant breeders can supply valuable information for niche modelling. Spatial projections of niche models obtained by the means of GIS software can be used for organizing collecting campaigns. Niche models predicting the probability of presence of a species can also be useful for the selection of core collections. Such models help to delineate geographically isolated areas of presence of the species that should be sampled separately for selecting a core collection. In each isolated area of presence, accessions can be clustered according to the predicted probability of presence of the species in collecting sites, and accessions can then be selected from each cluster. Niche models can also help to optimize *in situ* conservation networks. The efficiency of niche modelling depends on the coverage by calibration data of the range of environmental situations suitable for a species. Gathering information from different Europe-wide collections would therefore be an efficient means for setting up relevant niche models for the improvement of genetic resource collection and conservation.

### *Discussion*

H. Knüpffer suggested that, in addition to EURISCO, the Global Biodiversity Information Facility (GBIF) can also offer coordinates of collecting points of herbarium specimens (millions of records). GBIF will most probably yield more information regarding forage species distribution. The GBIF portal (<http://www.gbif.net>) also includes a functionality for niche modelling based on search results.

## **Current minimum standards for regeneration**

Inputs were requested from each WG member for an update on the use of regeneration standards.

Wilhelm Graiss (Austria). The protocol is: 3 accessions per species per year, 40 plants per accession, isolation distance more than 100 m, 40 cm between plants. Post-harvest practices are: drying at 38°C with silica gel to reach a moisture content of 3-5%.

An Ghesquiere (Belgium). Regeneration, except for breeding, has been stopped since a long time. The protocol is: 81 plants per accession, isolation distance 15 m, unbalanced bulk harvesting.

B. Đurić (Bosnia and Herzegovina). The team was trained by P. Marum. The genebank is scheduled to open next month (May 2010). No regeneration has been carried out so far.

M. Ševčíková (Czech Republic). The protocol for grasses is: isolation plots with triticale as the barrier crop, isolation distance 30 m, 49 plants per accessions, unbalanced bulk harvesting. Post-harvest practices are: drying in a room; combined threshing and cleaning. The final drying depends on the genebank in Prague, to which samples are sent for long-term conservation.

D. Fasoula (Cyprus). *Medicago* and *Vigna* are characterized during regeneration.

R. Aavola (Estonia). For grasses the protocol is: 49 plants per accession, isolation distance 30 m (sometimes less), winter rye as barrier crop. For legumes, the protocol is: minimum isolation distance 150 m, several harvests as unbalanced bulk. Post-harvest practices are:

manual threshing, mechanized seed cleaning drying room. The seed moisture content is kept below 7%. Germination tests are performed. But the regeneration capacity is very limited, raising the risk of material loss.

J.-P. Sampoux (France). The protocol for legumes is: field cages or isolation plots according to standards, use of pollinators, isolation distance 100 m. For grasses and triticale, the isolation distance is 30 m. At least 100 plants are used per accession. The material is harvested several times as unbalanced bulk. Drying and threshing are mechanized. Moisture content is not checked, but germination tests are performed.

E. Willner (Germany). The protocol is: isolation distance 30 m, 49 plants per accession, manual harvesting as unbalanced bulk. Various agronomic and morphological traits are scored. For legumes isolation, there are ten cabins in the greenhouse and isolation tents in the field; bumblebees are used. The number of plants was increased from 50 to 100 for red clover and alfalfa. Post-harvest practices are: mechanized threshing and cleaning of seeds, use of drying room. The seed moisture content is kept below 8%. Germination tests are performed and thousand-grain-weight (TGW) is determined. The sample is split into three parts for safe, base and active collections.

S. Barth (Ireland). Plants at low germination are regenerated using the following protocol: isolation distance 30 m, 100 plants per accession.

V. Negri (Italy). Regeneration is avoided as much as possible. Instead, very large samples are collected and stored in base conditions at -20°C.

Cabinets were tried for storage, but they did not work properly in the high-temperature local conditions; they were also expensive to maintain. The system was therefore changed; big plastic containers (3.5 m cubes) open at the top are used for grasses. Regeneration of legumes was undertaken recently using the following protocol: isolation distance of 30 m, 200 plants per accession (*Medicago*), bulk harvesting. Drying equipment is used. Seed moisture content is 6%.

S. Kratovalieva (Macedonia FYR). The protocol is: isolation distance not less than 30 m, 30 cm between plants. For legumes, the protocol is: cages, pollinator bees, 49 plants per accession (7 rows with 7 plants). The time of flowering is scored. Harvesting, threshing and cleaning are manual, drying is mechanized. The final moisture content is not less than 6% (legumes not less than 7%). Standards are those acceptable for base and active (bulk) collections.

P. Marum (Norway). The isolation distance is 50 m.

W. Majtkowski (Poland). The protocol is: 30 plants per accession, isolation distance 30 m. Post-harvest practices are: use of drying room, mechanized cleaning. The final moisture content is 6%.

Z. Tomić (Serbia): The protocol is: isolation distance 30 m, 50 plants per accession.

V. Meglič (Slovenia). The protocol is: cages and one or two isolation fields, 35-42 plants per accession in cages with bumble bees, bulk harvesting. A drying room is used, and viability is checked. Part of the sample is stored for the working collection (+4°C) and part at -20°C for long-term storage.

F. González (Spain). The genebank only works with legumes. The protocol is: 500 plants per accession, use of drying room, manual cleaning.

B. Boller (Switzerland). The protocol is: isolation distance 30 m, 100 plants per accession.

Hüseyin Özpınar (Turkey). The protocol for grasses is: isolation distance more than 60 m, not less than 30 plants per accession, bulk harvesting. The greenhouse is used for drying; threshing is manual or with machines. For legumes, the protocol is: isolation cones, same number of plants as for grasses, unbalanced bulk harvesting. Post-harvest practices are the same as for grasses. Genebank standards are then followed.

I. Thomas (United Kingdom). Due to financial cuts, it is unlikely that isolation space can be used in the future.

### **Discussion**

It was concluded that almost all national programmes were following the agreed standards.

Regarding the number of plants per accession, B. Boller highlighted the need to avoid using very few plants for regeneration. When individual plants were harvested for 20 accessions of *Lolium multiflorum*, the yield from the biggest plant was 2-3 times higher than that of the average plant. Therefore, bulk harvesting of 100 plants is as efficient as harvesting 30 plants individually (this has been published<sup>8</sup>). If only 50 plants are used, it is better to prune the three largest plants, in order to remove the excess seed produced by them.

## **On-farm/*in situ* conservation**

### ***Development of an in situ database inventory – towards a Swiss solution for forages***

*B. Boller*

A concept for *in situ* conservation of forage plants was developed based on previous project results. Forage germplasm maintained *in situ* should reflect the high genetic variation within the site. Sampling diverse habitats increases chances of retrieving extreme trait values. Diversity of habitats can be assessed by classification of vegetation. Grassland plant alliance and biogeographical region are basic criteria for selecting sites to be inventoried. Five to nine sites should be selected for describing (and perhaps eventually protecting) each alliance in each biogeographical region. The “Northern Foothills of the Alps” were investigated in a pilot project.

A database was developed to allocate vegetation and site characterization data. It is based on and integrated in the national *ex situ* inventory (<http://www.bdn.ch>).

The concepts were developed by the national “Working Group on forages” of the Swiss Commission for the Conservation of Cultivated Plants (SCPC). Input data were derived from farmer questionnaires, GPS and other site data, and botanical surveys. The “accession” is defined as the population of plant genotypes of a given species occurring at a given site. For each site, two lists are stored in the database: one list of site data and one list of species

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<sup>8</sup> Boller B, Peter-Schmid MKI, Tresch E, Tanner P, Schubiger FX. 2009. Ecotypes of Italian ryegrass from Swiss permanent grassland outperform current recommended cultivars. *Euphytica* 170:53-65.

occurring at the site. Data of the pilot project were made available online. These data and the descriptors can be downloaded from <http://www.bdn.ch/>.<sup>9</sup>

### **Discussion**

J.-P. Sampoux asked whether there could be any relation between trait diversity and diversity of vegetation, to which B. Boller replied that there is actually an inverse correlation.

It was clarified that each site varies in size between 0.3 ha and 3 ha, but there are not enough funds to subsidize all potential sites of interest.

### **A database of European Institutions working on on-farm/in-garden conservation**

V. Negri presented a new Web site of on-farm/in-garden contact databases, funded by the DIVERSEEDS project and maintained at the University of Perugia, Italy, on behalf of ECPGR. Its aim is to facilitate exchange of information among institutions working on on-farm/in-garden conservation. Registration is very simple and all relevant institutions are invited to join the database at [www.sharinginformation.eu](http://www.sharinginformation.eu).

### **Towards a European network of genetic reserves for crop wild relatives**

Lothar Frese presented the activities of the ongoing EU-funded GENRES project "An Integrated European *In Situ* Management Workplan: Implementing Genetic Reserve and On Farm Concepts" (AEGRO), which ends in 2011.

Among the project results, which will be available for all the ECPGR Networks, the following can be listed:

1. A tested *in situ* conservation and management concept;
2. A public Web-based crop wild relatives (CWR) *In Situ* Strategy Helpdesk, which supports the planning of genetic reserves for a wider range of species and a genetic reserves network in Europe;
3. A set of sites recommended for the establishment of genetic reserves for CWRs (*Avena*, *Beta*, *Brassica*, *Prunus*);
4. An extension of the CWR Information System (CWRIS PLIS) with a CyberTracker application for recording data in the habitat;
5. Refined methodologies, novel information;
6. Increased visibility of CWRs in their natural surroundings.

A final dissemination symposium will be organized in Madeira in September 2010.

### **Discussion**

The AEGRO task ends when recommendations can be made; their implementation is then the responsibility of the administrative body.

The difference between the crop approach (sites are chosen with one population or species) and the multi-species approach of the Forages WG was noted. Both approaches are justified, since it might be better to protect communities rather than species in the case of forages, as for forest genetic resources.

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<sup>9</sup> (click on *Forages*, then *Vers la conservation in situ/ Zu der in situ Erhaltung*, then *Vers les descripteurs in situ/ Zu den in situ Deskriptoren* or *Vers les données des parcelles décrites / Zu den Daten der beschriebenen Parzellen*.)

L. Frese clarified that sometimes the prioritized species (rare and threatened) are those with the least remaining diversity. Prioritization should therefore be adjusted to encourage identification of other traits.

Various opinions were expressed on whether or not forage species should be considered “crop wild relatives”. B. Boller specified that breeders prefer to regard their species as crops (not relatives).

### ***National experiences***

M. Veteläinen summarized information received from the WG members on national experiences concerning on-farm/*in situ* conservation:

- Bulgaria (in collaboration with Switzerland): Habitat documentation for conservation purposes;
- Italy: Preserving and promoting forage wild populations and landraces in Central Italy (the Abruzzo Region approach);
- Norway: On-farm conservation of the forage species timothy, meadow fescue and red clover. Creating new “landraces”.

### **Research activities**

The following presentations were made and are available on the ECPGR Web site:

- The reconstruction of gramineous phytocenosis in the Botanical Garden of the National Centre of Plant Genetic Resources of the Plant Breeding and Acclimatization Institute in Bydgoszcz 2008-09 (by Włodzimierz Majtkowski);
- On-farm conservation of the forage species timothy, meadow fescue and red clover. Creating new “landraces”(by Petter Marum);
- Fodder crops research activities in Bosnia (by Branko Đurić).

### **Conclusions**

#### ***Workplan***

The workplan for the rest of Phase VIII was agreed upon, and it is summarized in Appendix I (p. 23). A summary of decisions taken is given in Appendix II (p. 24).

#### ***Other business***

H. Knüpffer commented that publication of the FAO/Bioversity PGR Newsletter, which had ceased, should be resumed, preferably in print rather than electronic format.

Susanne Barth informed the Group that the next EUCARPIA meeting on forages will be organized in September 2011 in Ireland.

***Election of the Chairperson and composition of the Network Coordinating Group***

Merja Veteläinen was unanimously confirmed as Chair of the Working Group. Evelin Willner agreed to continue as Vice-Chair. It was suggested that Ian Thomas replace Chris Kik in the list of NCG members and that membership of Lajos Horváth be verified. All current NCG members present at the meeting agreed to continue in their role, with the exception of Valeria Negri, who wished to be excused due to other commitments. Participants proposed that Vladimir Meglič be invited to join the NCG as a representative of the Mediterranean region. The Chair will contact the respective persons to verify and confirm their membership.<sup>10</sup>

***Closing remarks***

The Group thanked Evelin Willner and all the staff of the IPK Genebank Department in Malchow/Poel for their efforts in organizing an excellent and pleasant meeting and in arranging the visit of the genebank facilities.

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<sup>10</sup> At the time of publication (July 2011) the NCG is made up of the following members: M. Veteläinen, E. Willner, P. Marum, I.D. Thomas, V. Meglič and B. Boller.



## APPENDICES

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## Appendix I. Workplan for the second part of Phase VIII (2010-2013)

### Documentation, Information and Task Sharing

Action	Carried out by	By when
Database Managers confirm that they take responsibility for the databases assigned to them by the WG (Email: merja.vetelainen@mtt.fi and l.maggioni@cgiar.org)	Database Managers	31 May 2010
In case updates of the DBs are not received from the countries, update the DBs on the basis of EURISCO	Database Managers	September 2010
Consider adopting the "Google Fusion Table" sharing facility for downloading data from EURISCO and transferring them to the DBs	Database Managers	Ongoing
Start establishment of databases on Minor Grasses (NordGen) and Minor Legumes (RCA Tápiószele)	Gert Poulsen (NordGen) Lajos Horváth (RCA Tápiószele)	Ongoing
Analyse the data received in order to identify MOS and PRIMCOLL	Database Managers	December 2010
Send a progress report to WG Chair	Database Managers	End of January 2011
Submit a project proposal to the AEGIS Grant Scheme, aiming to: <ul style="list-style-type: none"> <li>- Support an activity leading to the definition of the European Forage Collection</li> <li>- Organize a workshop to train new DB Managers to achieve the required goals (could also concern technical standards for forages)</li> </ul>	WG members under the coordination of Chair	31 December 2010
Test the Google Fusion Table methodology for the identification of European Accessions	Ian Thomas and Petter Marum	Carried out within the AEGIS Grant Scheme project, if approved ( <i>the project was approved, start date August 2011</i> )
Start creating the <i>Lolium</i> Crop Portal	Ian Thomas	Carried out within the EUROGENEBANK project, if approved ( <i>the project was eventually not approved</i> )
Adopt the existing applications for inclusion of C&E data into the databases; contact NordGen (free application) or IPK (Oracle-based application)	Interested DB Managers	Ongoing
Circulate the table of storage conditions and status of safety-duplication for updating by the Group; upload the updated version	Secretariat and all WG members	End of March 2011

### *In situ* and on-farm conservation

Action	Carried out by	By when
Upload WG meeting presentations on WG Web site as examples of ongoing on-farm <i>in situ</i> actions	Secretariat	By the end of May 2010

### Characterization and evaluation

Action	Carried out by	By when
Support genotyping and carry out duplicate identification and diversity studies, utilizing knowledge presented at the meeting	WG members	Ongoing

## Appendix II. Summary of decisions

1. The Group agreed to maintain the following databases:

	Database	Maintained by		Database Manager
		Institute <sup>1</sup>	Country	
1.	Minor Forage Grasses ( <i>Agropyron</i> , <i>Agrostis</i> , <i>Alopecurus</i> , <i>Arrhenatherum</i> , <i>Bromus</i> , <i>Phalaris</i> and <i>Trisetum</i> )	NordGen	Sweden	Gert Poulsen (gert.poulsen@nordgen.org)
2.	Minor Forage Legumes ( <i>Astragalus</i> , <i>Anthyllis</i> , <i>Coronilla</i> , <i>Desmodium</i> , <i>Hedysarum</i> , <i>Melilotus</i> , <i>Lotus</i> , <i>Onobrychis</i> , <i>Ornithopus</i> , <i>Physanthyllis</i> , <i>Tetragonolobus</i> and <i>Vicia</i> )	RCA	Hungary	Lajos Horváth (lhorvath@agrobot.rcat.hu)
3.	<i>Dactylis</i> and <i>Festuca</i>	IHAR	Poland	Bartosz Tomaszewski (b.tomaszewski@ihar.bydgoszcz.pl)
4.	<i>Lolium</i>	IBERS	UK	Ian Thomas (idt@aber.ac.uk)
5.	<i>Medicago</i> , annual	SIDT	Spain	Valentin Maya (valentin.maya@juntaextremadura.net)
6.	<i>Medicago</i> , perennial	INRA-Lusignan	France	Stéphane Fourtier (stephane.fourtier@lusignan.inra.fr)
7.	<i>Phleum</i>	NordGen	Sweden	Gert Poulsen (gert.poulsen@nordgen.org)
8.	<i>Poa</i>	IPK	Germany	Evelin Willner (e.willner@so.hs-wismar.de)
9.	<i>Trifolium</i>	IBERS	UK	Ian Thomas (idt@aber.ac.uk)
10.	<i>Trifolium subterraneum</i>	SIDT	Spain	Valentin Maya (valentin.maya@juntaextremadura.net)
11.	<i>Vigna</i>	AGES	Austria	Wolfgang Kainz (wolfgang.kainz@ages.at)

<sup>1</sup> For full names, see Appendix III

2. The tasks of the DB Managers were summarized as follows:

- Use EURISCO as a data source for the Crop Databases;
- Include forage-specific descriptors and lobby for inclusion of these descriptors in EURISCO in the long run;
- Identify MOS and PRIMCOLL in collaboration with data providers;
- Help to fill missing passport data in EURISCO.

3. In order to define the European Forages collection, the Forages WG has started with the analysis of the Central Crop Databases. This approach can give a general overview of all the existing material, which would otherwise be lost if the process were based on bilateral approaches.

4. MAA = MOS

### Appendix III. Acronyms and abbreviations

AARI	Aegean Agricultural Research Institute, Izmir, Turkey
AEGES	Österreichische Agentur für Gesundheit und Ernährungssicherheit (Austrian Agency for Health and Food Safety), Linz, Austria
AEGIS	A European Genebank Integrated System
AEGRO	An Integrated European <i>In Situ</i> Management Workplan: Implementing Genetic Reserve and On-Farm Concepts (EU project)
AQUAS	AEGIS Quality System
CCDB	Central Crop Database
CGIAR	Consultative Group on International Agricultural Research
CGN	Centre for Genetic Resources, Wageningen, The Netherlands
CWR	Crop wild relative
DB	Database
ECCDB	European Central Crop Database
ECPGR	European Cooperative Programme for Plant Genetic Resources
EFC	European Forage Collection
EPGRIS	European Plant Genetic Resources Infra-Structure
EUCARPIA	European Association for Research on Plant Breeding
EURISCO	European Internet Search Catalogue
FAO	Food and Agriculture Organization of the United Nations
GBIF	Global Biodiversity Information Facility
GEVES	Groupe d'étude et de contrôle des variétés et des semences (Varieties and Seeds Study and Control Group), France
GIS	Geographic information system
GRIN	Germplasm Resources Information Network
IBERS	Institute of Biological, Environmental and Rural Sciences, Aberystwyth, United Kingdom
IHAR	Plant Breeding and Acclimatization Institute, Poland
ILVO	Instituut voor Landbouw- en Visserijonderzoek (Institute for Agricultural and Fisheries Research), Belgium
INRA	Institut National de la Recherche Agronomique (National Agronomic Research Institute), France
IPK	Leibniz-Institut für Pflanzengenetik und Kulturpflanzenforschung (Leibniz Institute of Plant Genetics and Crop Plant Research), Germany
MAA	Most Appropriate Accession
MOS	Most original sample
MoU	Memorandum of understanding
NCG	Network Coordinating Group (ECPGR)
NordGen	Nordic Genetic Resource Center, Alnarp, Sweden
PGR	Plant genetic resources
QTL	Quantitative trait locus
RCA	Research Centre for Agrobotany, Tápiószéle, Hungary
SC	Steering Committee

SEEDNet	South East European Development Network on Plant Genetic Resources
SGSV	Svalbard Global Seed Vault
SIDT	Servicio de Investigación y Desarrollo Tecnológico (Technological Research and Development Service), Badajoz, Spain
SINGER	System-wide Information Network for Genetic Resources ( <i>of the CGIAR</i> )
USDA	United States Department of Agriculture
WG	Working Group
WIEWS	World Information and Early Warning System ( <i>of the FAO</i> )

## Appendix IV. Agenda

### **Tenth Meeting of the ECPGR Working Group on Forages 28-29 April 2010, Poel Island, Germany**

#### **Tuesday, 27 April 2010**

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Arrival of participants  
From 20:00 Dinner

#### **Wednesday, 28 April 2010**

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- 09:00-10:00    **1. Introduction**
- a. Welcome by the local organizers and opening remarks (*Mr K. Pellnitz, representative of the Minister of Agriculture, State of Mecklenburg-Vorpommern; E. Willner and M. Veteläinen*)
  - b. Update on ECPGR (*L. Maggioni*)
  - c. Working Group on Forages: Chairperson's report (*M. Veteläinen*)
    - Activities since ninth meeting
    - Network Coordinating Group meeting, La Rochelle, France, 2009
  - d. Overview of the present meeting: aims and schedule (*M. Veteläinen*)
- 10:00-10:30    *Coffee break*
- 10:30-12:30    **2. European Central Forage Databases**
- a. Management and restructuring (reduction of the number of databases) of the European Central Forage Databases (*M. Veteläinen and Database Managers*)
  - b. Relation to EURISCO – update after previous WG meeting (*L. Maggioni*)
  - c. Characterization and evaluation data into EURISCO and into Central Forage Databases
    - Introduction (*L. Maggioni*)
    - NordGen SESTO trait evaluator (*G. Poulsen*)
    - Comparison of the coverage of European Central Crop Databases and EURISCO with respect to forage crop species (*H. Knüppfer and Th. van Hintum*)
- 12:30-14:00    *Lunch*
- 14:00-15:30    **3. AEGIS and sharing of responsibilities**
- a. General status of AEGIS (*J. Engels/ L. Maggioni*)
  - b. Progress since previous meeting regarding Most Original Samples (MOS) and Primary holder (PRIMCOLL) and assigning values for European Forage Collection (EFC).

15:30-16:00 *Coffee break*

16:00-17:30 **3. AEGIS and sharing of responsibilities (continued)**

- c. Proposed next steps for implementation of AEGIS - AQUAS (*J. Engels and L. Maggioni*)
- d. Most Appropriate Accessions – the selection process (*J. Engels and L. Maggioni*)
- e. Selection of Forages MAAs (*P. Marum*)
- f. Safety-duplication (*M. Veteläinen*)
- g. Conclusions and workplan in relation to decisions to be taken at point 2a.

17:45-19:30 *Excursion: IPK-Genebank, Satellite Collections North, Malchow and Island Poel. Handling of C&E data in the German Genebank Information System GBIS (with online demonstration), and suggestions for handling of C&E data in the European context (EURISCO, CCDBs) (M. Oppermann and H. Knüppfer)*

20:00 *Dinner*

**Thursday, 29 April 2010**

8:30-10:30 **4. Introduction to IPK Genebank** (*A. Graner*)

**5. Research activities on the IPK forage collections** (*K. Dehmer*)

**6. Reports on national collections and collecting activities**

10:30-11:00 *Coffee break*

11:00-12:30 **7. International cooperation** (*Magdalena Ševčíková*)

- Czech-Slovenian cooperation in research and development for period 2007-2008, Project: The evaluation of disappearing genetic resources for agriculture
- Czech-Hungarian cooperation in research and development for period 2009-2010, Project: Exploring and Gathering the Czech and Hungarian Crop Wild Relative and Landraces for Increasing Crop Diversity in Agriculture

**8. Minimum standards for regeneration currently in use**

*No inputs received, a round-table survey will be carried out during the meeting*

12:30-14:30 *Lunch break with visit to nature reserve “Langenwerder” (Vogelschutzinsel = bird protected area, near Gollwitz, one hour walk by foot, if participants are interested)*

**14:30-16:30 9. On-farm/in situ conservation**

- a. Development of an *in situ* database inventory - on the way to a Swiss solution for forages (*B. Boller*)
- b. A database of European Institutions working on on-farm/in garden conservation (*V. Negri*)
- c. A European network of genetic reserves for crop wild relatives (*L. Frese*)
- d. National experiences

16:30-17:00 *Coffee break*

**17:00-18:30 10. Research activities**

- The reconstruction of gramineous phytocenosis in the Botanical Garden of the National Centre of Plant Genetic Resources of the Plant Breeding and Acclimatization Institute in Bydgoszcz 2008-2009 (*Włodzimierz Majtkowski*)
- On-farm conservation of the forage species timothy, meadow fescue and red clover. Creating new "landraces" (*Petter Marum*)
- Fodder crops research activities in Bosnia (*Branko Đjuric*)

**11. Conclusions**

- a. Agreement on the main recommendations (*M. Veteläinen*)
- b. Selection of the Chairperson and composition of the Network Coordinating Group
- c. Closing remarks

19:00 *Departure to visit old historic city of Wismar*

20:30 *Social dinner in an old restaurant in Wismar "Zum Weinberg"*

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**Friday, 30 April 2010**

Departure of participants

## Appendix V. List of Participants

### ***Tenth meeting of the ECPGR Working Group on Forages 28-29 April 2010, Island of Poel, Germany***

*N.B. Contact details of participants updated at the time of publication. The composition of the Working Group is subject to changes. The full list, constantly updated, is available from the Forages Working Group's Web page (<http://www.ecpgr.cgiar.org/networks/forages/forages.html>).*

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