

## **Assessing current practices and procedures to strengthen AEGIS, the initiative for A European Genebank Integrated System**

**Report of a Workshop**

**10-12 December 2018, San Fernando de Henares, Madrid, Spain**

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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 rationally and effectively conserve *ex situ* and *in situ* Plant Genetic Resources for Food and Agriculture, provide access and increase utilization (<http://www.ecpgr.cgiar.org/homepage.html>). 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. The Coordinating Secretariat is hosted by Bioversity International. The Programme operates through Working Groups composed of pools of experts nominated by the National Coordinators. The ECPGR Working Groups deal with either crops or general themes related to plant genetic resources (documentation and information and *in situ* and on-farm conservation). Members of the Working Groups carry out activities based on specific ECPGR objectives, using ECPGR funds and/or their own resources.

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### **Cover illustration**

Workshop participants.

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## Executive summary

The ECPGR Workshop “Assessing current practices and procedures to strengthen AEGIS”, sponsored by the German Federal Ministry for Food and Agriculture and organized in collaboration with the Instituto Nacional de Investigación y Tecnología Agraria y Alimentaria (INIA, Spain), was held at Centro Nacional de Capacitación Agraria (CENCA), San Fernando de Henares, Madrid from 10 to 12 December 2018. The 59 participants, including policy/decision-makers, ECPGR National Coordinators, Associate Member institutes of AEGIS, genebank curators, members of ECPGR Crop Working Groups and a representative from the Crop Trust, were invited based on expressions of interest received from a representative group of countries and institutes, wishing to learn from each others’ experiences with the establishment and operation of AEGIS.

The Workshop was a follow-up to the agreement reached at the Steering Committee meeting in Thessaloniki in 2018, to hold a workshop on AEGIS before the end of 2018. The slow progress of AEGIS had been noted, mainly on the basis of the low number of accessions flagged in EURISCO as part of the European Collection. The agreed objectives of the Workshop were:

1. To provide information at all levels about scope and importance of AEGIS (targeting relevant stakeholders);
2. To offer examples of positive policy engagement;
3. To offer examples of mechanisms to identify accessions to be included in the AEGIS European Collection;
4. To identify reasons why the process had slowed down at different levels and offer solutions; and
5. To facilitate AEGIS activities during Phase X.

The meeting was conducted in a very constructive and positive atmosphere which enabled the achievement of a list of very encouraging Action Points, together with the responsible person/entity and a deadline for the delivery, thus addressing the Workshop objectives.

The main Action Points include the preparation of a letter of intent that would allow France to become AEGIS member during 2019; clarifications and adjustments of the selection and flagging procedures of accessions to be included in the European Collection; implementation of AQUAS elements, including the testing of the proof of concept of a peer review approach; follow-up steps to address the handling of vegetatively propagated crops, including phytosanitary and long-term safety back-up aspects; clarification about the inter-relationship between AEGIS, the International Treaty and the Nagoya Protocol; increasing the visibility of AEGIS activities and accessions; strengthening the capacity of Associate Members to effectively implement AEGIS; approaches to obtain additional funding; and to prepare a letter to the Ministries of Agriculture to highlight the results of the Workshop and to stress the value and importance of AEGIS for European agriculture and food security.

Based on expressed intentions of the participants, the expectation for 2019 is that the membership of AEGIS could be extended at least to France, Serbia and Spain. The European Collection should substantially increase its size, the quality standards are expected to be agreed for most crops and the blueprint of a quality monitoring system should be tested.

## Introduction

*Chair: Luis Guasch*

### Welcome address by local hosts

Luis Guasch, Director of the Spanish Plant Genetic Resources National Center (CRF) of the National Agricultural and Food Research and Technology Institute (INIA) and ECPGR National Coordinator of Spain, welcomed the participants and wished them a fruitful workshop.

Esther Esteban, Director of the INIA, addressed the meeting gathered at CENCA, the National Centre for Agrarian Training of San Fernando de Henares in Madrid. She described the mission of INIA to generate and transfer knowledge in agriculture and forestry, including its activity as National Plant Genetic Resources' Genebank. Spain holds an estimated 5% of the world's biodiversity and started its efforts to preserve plant genetic resources for food and agriculture (PGRFA) in 1977. Spain was also a founder country of ECPGR and continues to support its role and activities. Even though Spain is still not an AEGIS member, it recognizes the value and potential of AEGIS as a common system for the long-term conservation of unique accessions of PGRFA in Europe and as a good framework for collaboration and cooperation among genebanks in the European region. Therefore, this workshop is a very good opportunity to learn and to share experiences. E. Esteban thanked the German Federal Ministry of Food and Agriculture for its generous contribution to the workshop and the ECPGR Secretariat for suggesting Spain to host this meeting.

### Adoption of the agenda and self-introduction of participants

The agenda was presented and agreed upon (see Annex 1), and the meeting went on with a round table introduction of the participants (see Annex 2).

### Why AEGIS? History, policy, strategy

*L. Maggioni*

Experienced difficulties in properly maintaining European collections and the inefficiencies of uncoordinated management were the background to raising a proposal at the 9th ECPGR Steering Committee meeting (Izmir, 2003) for the establishment of an integrated genebank system. Country obligations to efficiently conserve, sustainably utilize and strive for increasing networking efforts were also solicited by the Convention on Biological Diversity (CBD, 1992), Global Plan of Action for Plant Genetic Resources (GPA, 1996) and the FAO-International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA, 2001). It was rather clear from the ongoing discussion within the European genetic resources community that only a decentralized conservation approach could be generally accepted. Specifically, no sufficient support existed to extend to the rest of Europe the experience of the five Nordic countries, which were sharing one single genebank.

Given the insufficient mandate from national authorities, unclear definition of responsibilities and the need for more time and resources than the ECPGR Working Groups (WGs) could dedicate to implement an effective framework with quality standards and facilitated access to material, a feasibility study was launched, based on four model crop

groups, that were used as case studies to discuss options and requirements. The feasibility study was positively concluded after five years, confirming a general preference for a decentralized system, the need for formalization with a clear legal framework to obtain governmental support, the requirement for quality standards agreed by consensus, the need for a strong link between conservation and use and the importance of an effective and transparent documentation system. Also extra funds were deemed necessary to enable activation of such a system. At its 10th meeting in 2006, the Steering Committee was still agitated by some concerns over loss of national sovereignty, the need for an overview of operational costs, the unclear relationship with the International Treaty and worries that rationalization might lead to job losses and closure of institutes. However, the preparation by the Secretariat of a Strategic Framework Policy Guide, a Memorandum of Understanding (MoU) (that would function as a non-legally binding, but clear statement of political commitment) and an outline of the Principles for a Quality System (AQUAS) were key steps to the unanimous recognition at the 11th meeting in Sarajevo (2008) of the importance and urgency of establishing AEGIS in order to develop a more efficient regional system of conservation and sustainable use of PGRFA through the setting up of a European Collection, and to provide a mechanism for regional cooperation in the implementation of the International Treaty on PGRFA.

AEGIS entered into force in July 2009 with the first 10 signatures of the MoU, the first accessions of the European Collection were designated in December 2011 and the membership reached its peak so far in March 2014 with 34 member countries. In the absence of substantial ‘activation energy’ (no success in getting funds from the European Union), the overall implementation of AEGIS unfolded at a slow pace in the last ten years. The Quality System standards, policies, documents and procedures were to a large extent finalized and agreed, but hesitantly implemented as the launching of the agreed reporting and monitoring procedures remained on hold. The difficulties and problems that countries and genebanks have encountered with the selection and flagging process of unique and important accessions are manifold, varying from unawareness of AEGIS and/or of the selection process, technical and administrative issues as well as political constraints. It is for this complexity of issues that this workshop was organized, also considering that AEGIS benefits are not perceived equally strong by everyone. This workshop should provide the best possible opportunity to identify and elaborate targeted solutions.

## **AEGIS – Technical framework: procedures, tools and progress**

*J. Engels*

An overview of the developed technical framework in which AEGIS-related activities are undertaken, including the available tools and methodologies as well as the progress achieved since the establishment of AEGIS were presented. An attempt to assess the impact of AEGIS was not possible as the operations of AEGIS had not yet achieved a critical level, and the size of the European Collection is still too small to notice yet any significant impact.

An overview of the key components of AEGIS was given, including the Strategic Framework Policy Guide, the Memorandum of Understanding with countries and with institutes as Associate Members, the European Collection, the AEGIS Quality System (AQUAS), EURISCO and the dedicated AEGIS website. Details on the AEGIS membership as well as on the growth and current content of the European Collection were presented (at the

end of November 2018 more than 47 000 accessions from 21 countries, maintained in only 20 Associate Member institutes and representing only 7% of their total holdings).

A brief historical overview of the development of the selection and flagging procedures of the AEGIS accessions was given, as well as an overview of the salient features of the existing revised simplified procedure. This included a clear focus on selecting accessions that originated in a given country through collecting and/or breeding, together with the anticipated responsibilities within each country and the listing of some issues identified during the implementation process. Furthermore, an overview of the management of the European Collection using the AQUAS elements was provided with details on the operational genebank manual, the generic operational genebank standards as well as the minimum crop-specific technical standards, the AEGIS safety-duplication policy, the distribution guidelines as well as the agreed but not yet implemented record keeping, monitoring and reporting system. Issues and constraints on each of the elements were mentioned as well.

## **Selected country experiences with the implementation of AEGIS**

*Chair: V. Holubec*

### **Estonia**

*K. Annamaa*

A brief overview of the implementation process of AEGIS in the country was presented and it was noted that no difficulties were encountered to convince the policy-makers as the framework was very clear. The Memorandum of Understanding (MoU) was signed in 2009 and three Associate Member institute agreements followed in 2010. The Jõgeva Plant Breeding Institute and the Estonian Research Institute of Agriculture merged in 2013 to form the Estonian Crop Research Institute (ECRI) in 2013, and therefore a new agreement was signed by ECRI in 2013.

The preparation of the genebank manual did not cause any difficulty and turned out to be a very helpful process for the genebank. No problem was encountered in the selecting and flagging of AEGIS accessions, only the availability of sufficient seeds per accession in the genebank storage led to some doubts and discussion.

The material is recorded in the Nordic Genebank Documentation system, SESTO. There is an automated procedure allowing transfer of data from SESTO to EURISCO: records are flagged as AEGIS in SESTO, and the system will extract the data and load them to EURISCO.

#### *Discussion*

During the discussion it was clarified that Estonia expects a little bit over 20% of its total accessions to be unique for inclusion in the European Collection. It was further clarified that the Estonian national PGR programme does not experience problems with funding by the government and does not foresee problems with making long-term conservation commitments. The inclusion of vegetatively propagated material (i.e. potato accessions) in the European Collection was delayed because of quarantine rules.

## Slovenia

*J. Cvelbar and J. Šuštar Vozlič*

The presentation ‘New Slovenian Legislation and Slovenian experiences with the implementation of AEGIS’ referred to the history of the Slovene Plant Gene Bank which activities were initiated some 60 years ago. Since 2018 the Slovene Programme on Plant Genetic Resources is operational and is financed through the Public Service on Plant Genetic Resources. It is responsible for the coordination of PGRFA activities and for the central database. Together with four research institutes and other germplasm holding institutions it manages 5440 accessions of 248 species of which vegetables and forages are the crop groups with most accessions.

As part of the Agriculture Act - Public Services 2018 the legal foundation for, among others, the conservation and sustainable use of genetic resources for food and agriculture as well as for the selection and breeding of new varieties has been provided. The new regulation on the ‘plant genebank public service’ provides a supportive legal and administrative framework for the implementation of the national PGRFA programme; it spells out the tasks of the Plant Gene Bank, including the selection and flagging of accessions and the implementation of AQUAS activities by the Associate Member institutes. A detailed description of all the obligations and tasks of the Plant Gene Bank is made in the presentation, including a reference to the International Treaty and ECPGR as well as of the funding of the operations. It also provides an overview of the assignment of conservation responsibilities of the two publicly funded research institutes that belong to the Ministry of Agriculture, Forestry and Food.

The presentation concluded with a listing of the Slovenian priorities related to AEGIS and AQUAS that largely coincide with the agreed routine operations of establishing and operating AEGIS and implementing AQUAS.

### *Discussion*

During the subsequent discussion it was mentioned that no financial consequences for the national budget were foreseen by signing the AEGIS MoU. It was mentioned that it would be helpful to establish and agree on the benefits triggered by the implementation of AEGIS.

## Spain

*L. Guasch*

The Spanish national plant genetic resources network was presented, consisting of 35 collections with more than 3400 species and over 1000 genera from 141 countries, with 73% of the almost 80 000 accessions of Spanish origin. The network consists of 14 super nodes of 11 vegetatively propagated and 3 seed-conserved species groups of the main crop groups and their respective links to the ECPGR Crop Working Groups. The Spanish national network includes four modules, i.e. conservation, information and use, research and policy and three supervisory planning, advisory and technical/access committees.

The perceived benefits (or non-benefits) of AEGIS were presented along with some observations:

- A true benefit is to be part of a qualified system (however, the commitment does not come from AEGIS);



- The access and extension of the multilateral system are no convincing elements;
- Agreed standards are one of the best arguments;
- Reduced risk of loss of germplasm through systematic safety-duplication;
- Prioritization of collecting is not convincing, as there are no extra funds for priority collecting missions;
- There are resistances to reduce the number of samples (i.e. rationalization of collections) in genebanks;
- Cost savings are not really perceived but might be obtained through a better use of funds.

Encountered or perceived difficulties were presented. These include:

- Selection of the Most Appropriate Accessions and characterization and evaluation (C&E) data create more workload;
- The implementation of the MoU requires additional bureaucratic work to inform WGs;
- Non legally established basis for extension of Annex 1;
- Quality standards implementation
  - Increased workload
  - Resistance to modify procedures
  - Auditing work
- Modification of protocols to select material for multiplication to focus on high rated material;
- Neither calls linked to unique or well characterized material, nor extra funds for implementation. No differences among all rated collections without extra funding perspectives;
- High resistance and/or hesitation to lose material. High numbers reduction maybe linked to funding reduction.

In conclusion, Spain is in line with AEGIS but why are we not members? We need to convince the national PGRFA network!

### *Discussion*

During the subsequent discussion it was suggested that the inclusion of accessions in the European Collection can avoid their ‘exposure’ to the Access and Benefit-Sharing (ABS) conditions of the Nagoya Protocol. It was questioned whether or not it would be legally correct in Spain to distribute non-Annex I material with a standard material transfer agreement (SMTA). This point should be clarified. Furthermore, Spain seems to prefer adherence to the Nagoya Protocol by different means than using the AEGIS SMTA, which is not regarded in this case as an adequate instrument for compliance.

## **Serbia**

*M. Savic*

The objectives of this presentation were to show the actual status and the challenges in managing plant genetic resources in Serbia as well as running the Plant Gene Bank of Serbia, addressing the legal and institutional framework of Serbia, the *in situ* and *ex situ* collections, the existing databases as well as to share experience and constraints with the AEGIS implementation. A brief introduction on the PGRFA in Serbia was given as well as the activities that have been undertaken with respect to their conservation as part of the national genebank. It is foreseen that the Serbian membership for Phase X will be signed soon and

that the signed AEGIS MoU will be implemented, including the respective Associate Membership agreements.

A summary of the national legal framework was presented, including the adoption of the strategy for agriculture and rural development, the National Biodiversity Strategy for 2017-2022, the establishment of the National PGRFA Committee in 2015, the preparation of the law on PGRFA management for adoption by the Parliament, and the final draft of the National Programme for PGRFA Conservation and Sustainable Use to be adopted by the Government. Serbia is following the EU PGR legislation as a candidate for the EU membership, including the harmonization with EU PGR directives. Furthermore, Serbia participates in the international and regional PGR networks.

The role, responsibilities and challenges of the National PGR Committee were presented. The membership does not include the non-typical stakeholder groups such as the private sector, relevant governmental programmes and agencies involved in agricultural and environmental protection, non-governmental organizations (NGOs), botanic gardens, farmer organizations, etc.

A brief description of the National Plant Gene Bank, established in 2015 was provided. The current holdings are 4238 accessions of the major Serbian food crops. It is estimated that around 15 000 seeds samples and about 3500 samples of fruit trees and vines, originating mainly from Serbia and the Western Balkans, are kept in all national agricultural institutions. A manual for seed handling in the genebank was completed in 2017. Serbia has not yet completed its National Inventory as the National Plant Gene Bank lacks hard and software as well as an IT person. The maize germplasm data have been included in EURISCO and the *Phaseolus* collection data have been recently added. Serbia is hosting the European Crop Database for Maize.

The activities with respect to the safety duplication of germplasm, including in Svalbard are being addressed. Serbia has made an offer to the region for storing safety duplicates in its national genebank.

Specific points on AEGIS included the statement that Serbia is keen to implement AEGIS:

- All necessary documents have been prepared;
- Informal translation of the AEGIS MoU has been made;
- Justification/explanation for decision-makers have been prepared;
- Associate Members have been advised about the importance of AEGIS;
- But... the weak national system and genebank organization hampers progress;
- Example: the Gene Bank is part of DNRL Laboratories for Food Safety, but other laboratories obtain financial and organizational priority; the Gene Bank would better be associated with institutes and faculties that have human capacities/researchers and with the Ministry to conduct the PGR policy;
- The budget is more and more restrictive every year;
- In 2019 the Gene Bank can operate only on spendable costs;
- There is no budget for regeneration and multiplication, duplication etc.
- Subsidies for PGR in 2018 were limited to about 16 600 EUR (whereas in 2017 it still was about 40 000 EUR and 10 years ago it was 200 000 EUR);
- 2019 is still a question mark.

The major challenges that may hinder the efficient implementation of the AEGIS are mostly inherent to the limited understanding of the overall importance, the limited financial and human resources, and other capacities available.

## The Netherlands

*Th. Van Hintum*

The Netherlands is a major contributor to AEGIS (second after Germany) in terms of number of accessions. A total of 5845 accessions have been flagged in EURISCO as AEGIS accessions. This represents 12.5% of the total number of AEGIS accessions and 22.4% of the total holdings of the Centre for Genetic Resources, the Netherlands (CGN). Unfortunately no accessions from the second Dutch Associate Member (Radboud University Nijmegen) have been included.

CGN holds 25 crop collections and the total number of accessions is 23 056 accessions. These originated from more than 100 countries, with a focus on vegetables and potato as well as on small numbers of accessions of high quality.

The criteria used for selecting the AEGIS accessions were related to the origin of the material and coincided with those applied by Germany: 1. origin in the Netherlands (3456 accessions = 15.3%); 2. collected by CGN or its predecessors outside the Netherlands (2462 accessions = 10.9%); 3. donated to CGN for safekeeping (186 accessions = 0.8%); and 4. 240 accessions (1.1%) fell in the first two categories. As the originally proposed selection procedures were found too complicated a simplified procedure had been developed.

An alternative selection procedure is being proposed: 1. genebanks or countries nominate AEGIS material: candidate AEGIS accessions; 2. genebanks with candidate AEGIS accessions are reviewed; AQUAS criteria used by respective genebanks are monitored; 3. once genebanks are certified, AEGIS accessions are confirmed; 4. crop WGs improve/complement list of AEGIS accessions: a. identify duplicates – up to holding genebank to decide on removal of duplicate accession; b. identify omissions – stimulate genebanks to join/include additional accessions.

CGN was the first genebank with an ISO 9001 certification (in 2003) and this greatly facilitated the ground for the preparation of the requested AEGIS operational genebank manual, submitted in 2012.

### *Discussion*

During the subsequent discussions it was clarified that the second Dutch Associate Member is not in a condition to include accessions in the European Collection as it has decided to not continue the conservation of its *Solanum* collection. A suggestion was made to change the ‘conditions’ of black-box duplicated materials into active collection material if and when the original genebank failed to continue its services. The point was raised that many genebanks seem to be in need for help as their funding is limited, but that no request for such assistance was ever heard. CGN does receive such requests regularly but they would need a ‘commitment system’ in place to be able to make meaningful decisions. Whereas CGN does not have an absolute guarantee for the conservation of its collections in perpetuity, they are committed to make its germplasm readily available and keep it for the long term. They see collaboration as a means to save funds and to reduce redundancy.

## Discussing AEGIS benefits

*Chair: R. De Salvador*

### **Can AEGIS increase access to genetic resources and improve use in research/breeding?**

*F. Begemann*

Regarding the AEGIS features that facilitate access to genetic resources, the following aspects were addressed:

1. Well defined standard terms of access. The SMTA is used for AEGIS accessions of Annex I species. As the AEGIS accessions might already be included in the multi-lateral system (MLS) of the International Treaty, AEGIS would not provide additional benefits for those accessions;
2. Nagoya Protocol compliance through access conditions. As the AEGIS accessions of non-Annex I species are exchanged under the same conditions as the SMTA, the users of such material will be Nagoya-compliant, as there is no need to go through Nagoya-related procedures (prior informed consent [PIC] and mutually agreed terms [MAT]). For the genebank, this situation will result in easier management as accessions of Annex 1 and non-Annex 1 species are distributed under the same conditions. Furthermore, a comparison of the Treaty and the Nagoya Protocol was presented and the ABS requirements under the Nagoya Protocol were summarized;
3. Availability of seeds. The Associate Member institutes are encouraged to facilitate prompt access to and the availability of AEGIS accessions. This will require due attention to regeneration and seed quantity.

With respect to the AEGIS features that can improve use in research and breeding, the following elements were addressed:

1. High diversity of crops/species, i.e. non-Annex 1 crops include many “forgotten foods” (neglected and underutilized species [NUS]) as these are even more dispersed than Annex 1 (mainly major crops);
2. Pre-selected diversity in accessions. Their inclusion is based on pre-selection of genetically unique material. Thus, users are presented with pre-selected, genetically diverse international collections from a wide range of genebanks and origins.
3. High quality of material (see also the presentation of Theo van Hintum about quality management). Such high quality accessions are obtained due to the management and regeneration under appropriate crop conditions, expected to be of good viability and unlikely to be mislabelled;
4. Reduced risk of loss of material. This is due to conservation under appropriate storage conditions and special attention for long-term storage as well as proper safety-duplication;
5. Knowledge about accessions. This consists of the inclusion and availability in EURISCO of all passport and non-confidential C&E data; the opportunity to prioritize public funds for characterization and evaluation of public domain European Accessions; the characterization and evaluation across a range of agro-ecological conditions; and accessions evaluated within the ECPGR European Evaluation Network (EVA) are expected to include AEGIS accessions.

Regarding additional features that could enhance access and use, the following aspects were presented: Associate Member institutions should/could offer additional related services such as: evaluation under different agro-ecological conditions, regeneration

capacity, safety-duplication space, and others. Furthermore, opportunities should be explored to strengthen the network.

#### *Discussion*

The discussions included the suggestion to aim at a rewarding system of ‘premium mark’ genebanks in Europe.

### **AQUAS or Quality System for AEGIS – Experiences and opportunities to enhance conservation quality**

*Th. van Hintum*

The rationale of AQUAS is to provide AEGIS with a basis for collaboration between genebanks and thus to reduce redundancies in terms of material and activities. The collaboration is based on trust with the principle that ‘I don’t have to do it if I can rely on you doing it well’.

A system is needed to assure continuity and quality, addressing the basic quality management, the reporting and monitoring processes, and the right norms and standards.

The AQUAS principles include:

- a. A quality management based on ‘PDCA’, i.e. plan–do–check–act;
- b. Consensus. However, the problem is consensus between whom?
- c. Agreed minimum standards, including generic and crop-specific standards;
- d. Capacity building;
- e. To minimize bureaucracy; and
- f. A monitoring system, to assure compliance.

The quality management based on ‘PDCA’:

- i **plan**, record of what you do and how you do it (this coincides with the AQUAS Genebank Manuals);
- ii **do**, i.e. follow the manual and record any deviations from the standard;
- iii **check**, i.e. check/monitor the above (independently); and
- iv **act**, i.e. improve what can or needs to be improved.

The AQUAS or operational genebank manual is a self-assessment regarding the facilities and the procedures and consists of four main chapters, i.e. germplasm acquisition and accessioning; ensuring security; germplasm maintenance; and providing information.

Agreed minimum standards include:

- a. Generic operational standards; they follow the FAO Genebank Standards for Plant Genetic Resources for Food and Agriculture published in 2013 and cover standards, the context; technical aspects as well as references;
- b. Crop-specific standards, to be compiled and agreed by the Crop-WGs.

Capacity building:

1. To help each other reaching the required quality through investment in higher efficiency;
2. There is a high eagerness to attend capacity building meetings/events; however, this is not a good sign per se, selection of targeted events needs to be made;

3. Need for prioritization within AEGIS system: e.g. focus on genebanks/countries that are below standards but clearly want to get above standards; important aspects are to provide transparency (genebank manual, distribution data) and wanting to comply with the rules and standards (also at government level, e.g. ABS arrangements).

The monitoring system is to be based on record-keeping. In ISO systems the monitoring is done by accredited agencies, e.g. ISO 9001 performs an annual external audit (plus an internal audit). In AEGIS the monitoring system is only available on paper, i.e. "Record keeping, reporting and monitoring of the European Collection" published January 2016. It is not implemented anywhere. There are some assumptions related to monitoring, i.e. most of the genebanks try to do the right thing and have nothing to hide; all genebanks can learn from each other!

A proposed monitoring approach for AEGIS is based on a voluntary genebank peer review system. Three genebanks are involved at a time. Each genebank is represented by one expert. Three experts review each other sequentially, based on available information such as self-assessment as well as other information and following a prior agreed review protocol. A review report is written and to the extent possible published; such a report can be used in fund-raising for improvements (e.g. with assistance from ECPGR); ECPGR can target and facilitate capacity building.

An additional issue (not necessarily part of AQUAS) is the continuity of AEGIS accessions; we need an assurance that the 'plug will not be pulled out', for instance imagine a country saying 'nothing leaves the country'!? Since this continuity cannot be guaranteed, operational provisions could be made, e.g. in the case of safety-duplicate collection agreements, changes to the agreement could be made to assure continued access to the material by accepting that black-box safety-duplicated accessions can be used by the recipient genebank in case the providing genebank cannot guarantee any longer its availability.

Finally, only a fraction of the 1.2 million accessions included in EURISCO are available upon request under an SMTA; one could ask the question "How many will still exist 50 years from now?" If we do not improve the current situation, AEGIS is doomed to fail! Therefore, let us work hard in getting these improvements made!

### *Discussion*

During the discussion a number of issues and matters were addressed, including the fact that through AEGIS we can overcome the Nagoya Protocol problems for accessions that are included in the European Collection as the PIC and MAT requirements would be fulfilled. However, this approach was questioned; it will depend on the availability of national legislation. What about ornamentals with respect to this issue?

It was asked whether we need an operational genebank manual for each and every institute, even if they use the same procedures as other institutes of a given national programme. The meeting felt that this would not be required as long as it is made clear to the reader where the corresponding manual can be found. The benefits of AEGIS and its advantages seem to be clear; they seem not to be a difficult thing to achieve. If you have a system in place it eventually will save funds and it does not cost much to be implemented. There are no legal issues that impede its implementation. Such a system will facilitate fund raising, even if you didn't manage so far. For an international system (like the Genebank

Platform of the CGIAR), quality is a key requirement for permanent funding, thus a strict quality management system has been developed and is operational.

The Dutch government required CGN to put an ISO certified system in place in order to ensure that the tax money is well spent.

AEGIS should not be seen as a burden, in fact it is fully integrated in what you should be doing daily, it is ‘only’ a supporting element to help you increase quality, rationalize, save money and resources. The importance of giving visibility to AEGIS and its related operations was stressed, including the distribution of materials. There is a tendency that only a handful of genebanks in Europe distribute germplasm; this should be changed as every genebank has to demonstrate its value and usefulness, and AEGIS can be of great help to achieve this change. Participants were invited to start the implementation and operation of AEGIS ‘at home’, to communicate better within the national system and to do their “homework”.

## Discussing AEGIS constraints and problem areas

*Chair: K. Annamaa*

### Do quality requirements present an obstacle to join / implement AEGIS?

*M. Ordidge*

In preparation for this presentation a very brief survey was conducted with partner institutes in the UK and all of the ECPGR WG Chairs. For barley a “lack of funds for germination tests” was reported and for cucurbit “AEGIS is a limitation”. Some anonymous responses regarding AEGIS: “naturally, some of our accessions do not live up to these standards, but..”; “sample size...restricts [what] genebanks can offer”; “sample size, for crop wild relative lines and lines with reduced fertility”; and “(slightly) different standards within a multi-crop genebank”.

In assessing the crop-specific genebank standards it was questioned why a number of crop (groups) do not have such agreed standards. In case of the *Prunus* WG, crop-specific standards have been agreed but it was noted that for many standards the mention ‘as appropriate’ was included and this might not be seen as sufficiently rigorous. Also the fact that only 8 out of 66 Associate Member institutes have developed an operational genebank manual was questioned. Some of these ‘slow’ development aspects have not helped to further progress with the implementation of AEGIS in the UK.

#### *Discussion*

During the discussion the lack of an acquisition policy for many genebanks was also seen as an obstacle and should be addressed. It was noted that a proper genebank manual could take care of this aspect. However, it was remarked that not all countries would allow preparing policy drafts and it was asked how we should proceed in such cases. In any case it was noted that the genebank manual would provide an opportunity to state whether or not policies for specific areas are available and thus to create transparency. With respect to genebank manuals the issue of translation into either the local language or into English was noted. On the issue of funding security for genebanks it was noted that, for example, in the UK contracts for the management of collections are often managed as fixed-term agreements and that this ‘horizon’ does not always align with long-term strategies.

## **Obstacles from French national legislation**

*M. Omrani*

A brief overview of the French organizational set-up for the conservation and use of PGRFA was provided. Not less than 120 main actors at the local and national level exist. It was noted that no clear overview on PGR conservation in France is available. However, since 2016 increased attention and dynamics with respect to conservation efforts in France have been observed, including a clear division of responsibilities between the Ministry for Agriculture and Food, the Groupe d'Etudes et de contrôle des Variétés Et Semences (GEVES) and the Section for PGR and crop wild relative (CWR) conservation of the Comité Technique Permanent de la Sélection (CTPS). Thus, a keen interest of France to join AEGIS was noted and the close links between the (existing) national collection, AEGIS, EURISCO and the MLS of the International Treaty was presented.

Despite its institutional complexity, it was mentioned that the concept of Associate Members of AEGIS could well work in France, at least at the level of the Centres de Ressources Biologiques (CRBs) managed by public research institutes such as CIRAD, INRA and IRD, as their conservation standards are in agreement with the AEGIS standards. Despite the existence of a national PGRFA programme and a traditional focus on collecting and conserving PGRFA, some difficulties were encountered to join AEGIS. The main stumble block has been a legal issue concerning the fact that in accordance with a Circular of the Prime Minister of 30.05.1997, all agreements (whatever their denomination) signed by the French government are legally binding. This would not be compatible with the fact that the AEGIS MoU is a legally non-binding instrument. In order to overcome this 'blockage' it is proposed to look for a solution, possibly to agree on a different terminology for the MoU, e.g. a 'Declaration of Intent'.

### *Discussion*

During the following discussion a solution for the legal problem that France has with formally signing a non-binding agreement was offered: France could sign a declaration/letter of intent stating that it subscribes to the principles of AEGIS as set out in the MoU and would be prepared to follow these principles. It was noted that such an approach would be most likely agreeable to the ECPGR Steering Committee, who will have to sign off on a deviation of the standard MoU as the only form of becoming an AEGIS member. It was agreed to follow-up on this issue during the separate group discussion dedicated to “Legal aspects impacting AEGIS operation”.

## **Integrating vegetatively propagated crops into AEGIS, using *Malus* as an example**

*M. Lateur*

The importance of propagation techniques for vegetatively propagated crops/species was established. Due to clonal propagation of many of these species there is an important issue regarding the question of such samples/accessions to be genetically unique. Furthermore, because of the high level of infection with viruses of vegetatively propagated materials, the presence or absence of quarantine pest and diseases in the materials is a key question for the safe distribution of this type of germplasm. Therefore, the distributed germplasm material needs to be adequately complemented and supported with the relevant information and documentation. A number of topics and issues were listed that would be discussed during



the forthcoming Discussion Group on vegetatively propagated materials. Some of the issues presented were illustrated by the collaborative management of apple collections in Belgium and in Northern France.

#### *Discussion*

During the subsequent discussion the issue of quarantine diseases was given due attention. It was stated that germplasm material that possesses a known quarantine pest or disease cannot be distributed. Consequently, it was noted that only healthy germplasm should be included in the European Collection. Furthermore, part of the conservation strategy of vegetatively propagated material includes the safety duplication of such material in a genebank in another country.

Due to the risk of pest and diseases for vegetatively propagated germplasm, it was suggested to look for alternative approaches to the conservation in a field genebank. On-farm conservation was mentioned as one of such alternative approaches, although also in this case exposure to pests and diseases would not guarantee a safe conservation. Yet another aspect is the country of origin of the fruit tree material. It was noted that for instance for *Pyrus* most of the varieties originated from Belgium. It was confirmed that Belgium has accepted a significant responsibility for pear germplasm conservation.

### **Open discussion on AEGIS problem areas**

A lively discussion on the identified problem areas of AEGIS evolved. Important issues and points that were noted included:

- Constraints such as long-term uncertainties and health conditions of vegetatively propagated crops have to be overcome and genebanks/countries should decide to include accessions in the European Collection.
- One important aspect to make this happening is that the respective National Coordinator should explain and convince the decision- and policy-makers at home to commit to AEGIS and make it a reality.
- It was also questioned whether or not the support from the Secretariat for the implementation and operation of AEGIS has been sufficient.
- The complexity of getting the MoU signed by the ministry was questioned. It was answered that one has to be well prepared and that the pros and cons of joining AEGIS have to be explained and a strong case needs to be made that no fundamentally new aspects are added to the conservation by joining AEGIS. In fact, any encountered problem has a solution; sometimes you might need the help of others.
- The inclusion of ornamental and medicinal crops/species was questioned and a number of thoughts were presented on how to deal with that in the context of being a 'PGRFA' or not. Sometimes the re-branding of such collections as genetic resources could be the solution.
- It was suggested to publicize more successes that have been obtained within (or sometimes outside) the context of AEGIS. The question of benefits to be obtained through AEGIS has been a recurrent topic.

## Discussion Groups

Discussions were held in parallel in seven groups, each guided by two facilitators, as indicated below. Each group conducted two or three rounds of 60 minutes-discussion with rotating participants. Reports prepared by the facilitators from each group were then presented in plenary.

*Chair: M. Lateur*

### **Group 1. How to technically handle vegetatively propagated crops?**

(Note that discussion centred on perennial fruit crops)

*M. Lateur and M. Ordidge*

The first item discussed was the selection of priority accessions and a recommendation to follow the revised simplified procedure was made, albeit with initial selection possibly led by curators rather than National Representatives. It was generally felt that there was a higher level of risk associated with field collections (due to lower replicate number and exposure to the environment) and that no ‘black box’ safety duplication (comparable to the Global Seed Vault) was available; tissue culture, cryopreservation and seed conservation were all discussed and it was felt that a cryo equivalent of the Global Seed Vault would be a valuable asset (tissue culture had value for supplying clean material but was deemed unlikely to be efficient on a wide scale). The potential to include sports and clones within AEGIS and for these to also act as valuable duplication of the basic genotype was identified.

It was noted that by identifying safety duplicates as matching trees in existing collections, the duplication would inevitably be at the cultivar rather than accession level (in comparison to dividing lots from seed collections) and that minor differences may be inevitable.

Phytosanitary issues were discussed and it was accepted that consideration should be limited to quarantine issues; the plant passport requirements should be used as a standard. It was noted that many genebanks are not within protected zones and it is likely that AEGIS material will therefore also not be. It was noted that since field genebanks carry higher risk and no safety ‘black box’ is available, the standard of nominating single safety duplicates may need further consideration. It was also noted that, since perennial tree fruit crops can take a number of years to produce fruit, there was a value within elements of redundancy, since they increase access to material.

It was also noted that field genebanks often act as a ‘showcase’ for genetic diversity to both users and the public. It was noted that the Working Groups are potentially out of touch with the latest thinking and that the *Malus/Pyrus* WG had not formally met since 2012 (before a number of policy changes within AEGIS). The role of Central Crop Databases and assessment of duplication and synonymy by SSR was felt important for optimizing, but should be considered a secondary element to the initial nomination of material; synonymy was felt a matter for the WG to consider. It was felt that distributed and federal approaches were more likely to be of value for field collections and that they presented both challenges and opportunities (depending on the standards within each system).

## Group 2. Selection and flagging procedures

*V. Holubec and W. Podyma*

The facilitators introduced the routine selection and flagging procedures as well as the selection criteria, i.e. 1. maintained in the country of origin/ development/ breeding; 2. comprehensiveness of passport information, including a known origin; validated accession name (particularly relevant for perennial clonal crops where the same name can be attributed to different accessions; history of individual accession; synonyms and homonyms); meeting the criteria of AQUAS; existence of characterization and evaluation data; and existence of adequate management procedures. Thereafter they asked the participants in the Group discussions ‘What are the problems of selection and flagging?’

The conclusions of the discussions are presented below, together with some additional remarks:

- Need to generate a short but comprehensive list of priority criteria to help NC to decide which PGR meet those criteria for flagging (e.g. 8, maximally 10 points such as: 1. Landraces (LR) of domestic origin, 2. Crop wild relatives (CWR) of domestic origin; 3. Cultivar of domestic origin; 4. Passport data available; 5. C&E data available; 5. Safety duplication undertaken; 7. Cultivar of foreign EU origin, not declared by original country; 8. Cultivar of origin outside of EU having high value for EU; etc.).
- To consider proposing an algorithm for choosing AEGIS accessions from national databases.
- Automated process of the first selection of candidate accessions.
- Core collections could be a first step for initial selection of accessions.
- Flagging processes:
  - One-step process: flagging all possible candidate accessions (i.e. domestic and other) with optional deflagging
  - Two-step process: first flagging priority and incontestable accessions and later on other materials
- WGs did progress in development of guidelines and selection criteria of accessions for AEGIS. WGs should provide feedback to NC and he/she should use experience of WGs.
- Training on selection and flagging for some countries was requested.
- Elements of uncertainty have affected the selection of AEGIS accessions, owing to discrepancy between simplified flagging procedure and the suggestions made by some Working Groups (such as required safety-duplication and C&E data).

The above-listed conclusions and remarks were discussed and as such supported by the meeting.

## Group 3. AQUAS (current issues and suggestions for a realistic implementation)

*K. Annamaa and Th. Van Hintum*

Group 3 discussed issues related to AQUAS, the quality system of AEGIS and made a number of general observations:

- Attention to quality management (QM) in European genebanks appears to increase. Several genebanks have ISO 9001 certification, or are working on it; others show eagerness to start working on the AQUAS Genebank Manual. However, also many genebanks appear to be at the very starting point of QM, e.g. yet without any written procedures. Even so, the need to document processes is felt broadly as an important matter, also for non-AEGIS associated genebanks.
- It was agreed that the AEGIS Genebank Manual is a good starting point for QM to record the current situation of the genebank operations; it does not assume the genebank to meet the standards but it can be used as a basis for improvement. . Several genebanks have already completed their operational genebank manuals; however, some others fear the workload involved, and another expressed reluctance to give the required transparency (as it might not comply with the expectations of the funding organization). Genebanks with experience in QM indicated otherwise, the workload is limited and transparency appears to be a good first step toward proper funding. The genebanks with ISO 9001 expressed all, after initial reluctance, to be happy with the system. Some genebanks look for alternatives to ISO 9001 to avoid the associated bureaucracy. Because some genebanks expressed that the translation of QM documents into English was an additional difficulty, members were encouraged to provide collaboration and assistance in this matter.
- Genebank operations are becoming more and more complex, and the expertise and capacity required to manage this complexity is considerable. As a result, some small genebanks (and working collections) might lack the critical mass to cope with all QM requirements. They might not be able to meet these requirements in terms of legal, phytosanitary and biological aspects.

The Group recommended that:

- Clarity should be given regarding steps to be taken toward proper QM. Issues to consider are the principles of QM, AQUAS Genebank Manuals, the AQUAS standards, and options for various QM-systems. Access to this information on the AEGIS website should be improved. Dedicated capacity building activities might be required and could be part of the ECPGR Grant Scheme.
- Peer Reviews should be organized, tested and promoted, as an alternative to external audit. The Peer Reviews appear to be a promising approach for creating transparency, improving quality and building capacity as during these Peer Reviews, colleague experts visit, discuss and learn from each other. However, also some concerns were formulated: some genebanks think it is still too early for them to participate in this peer review process, others feared the costs involved, some had difficulties with the term 'peer review' (as it implied policing), and finally some were concerned that the reports could create too much transparency. But the general attitude was enthusiasm and eagerness to participate.
- Quality management training should be helpful to improve this area of work.

The discussion on this important topic was in general terms supportive of the proposals made. The cooperation among genebanks and countries in Europe was noted as one of the most critical issues for success and QM-related aspects can play an essential role in this. This aspect as well as the benefits that such cooperation can bring to the genebanks was confirmed from an international perspective. It was also mentioned that AEGIS should not be considered to be a burden; in fact it should be providing opportunities that would help the genebanks in their routine operations, among others through a better visibility.

## Group 4. Identifying funding/resources for AEGIS activities

*R. De Salvador and M. Savic*

After the introductory presentation given by the facilitators about the national and international benefits of AEGIS, the Group identified different activities related to AEGIS, involved stakeholders and their possible role in financing. Different options to save costs before asking for and spending financial means were explored.

The role of National Coordinators was emphasized; they need to be proactive in bringing the message of the importance of AEGIS to the decision-makers. Good national cooperation and strong National PGR Programme with national financing are very important. Connections with ongoing national and international projects are very welcome, as well as international cooperation on agreed common activities.

Many public institutions do not have dedicated budget lines for maintaining quality collections and genebanks and thus for operating according to the AEGIS principles. Therefore, some countries tend to rely/hope on seed companies and international organizations for financing AEGIS-related activities: grant schemes, calls for grants, EU common PGR projects with ECPGR support, Global Crop Diversity Trust etc.

A proposal which came up from the Group discussions is to consider providing part of the money to the PGR community from royalties deriving from plant breeders' rights on material exchanged under the SMTA of the International Treaty. This suggestion did not seem very practical, considering that the Treaty Fund is dedicated mainly to developing countries and it can be accessed through project proposals.

From the Group discussions it was concluded that it is important to clearly define activities and related needs; to see what can be done at home first and then lobby for finances at all levels.

Suggestions included:

- exploring possibilities to include in the *ex situ* conservation component of Horizon 2020 projects funding or co-funding for activities such as AEGIS;
- requesting recipients of AEGIS germplasm to return part of the regenerated materials to the genebank that provided these accessions;
- requesting recipients of accessions for evaluation activities to also evaluate some additional accessions for the providing genebank;
- recommending European funding for the system as part of the Agrobiodiversity strategy that is being developed by GenRes Bridge for the attention of the European Commission.

## Group 5. Organizing AEGIS within and across countries

*E. Thörn and A. Didier*

In order to facilitate the implementation of AEGIS the Group proposed to compile a list of frequently asked questions (FAQs) together with answers on the AEGIS website and provide examples of good practice. Assistance from more advanced countries during the implementation process could also be useful. A road map describing the different steps of the AEGIS implementation process was considered helpful. The importance of having an

overview of both national and international legislation when flagging AEGIS accessions as well as having both genebank manuals and crop-specific standards in place was emphasized.

It was proposed to develop AEGIS windows (clearing house mechanism) at the AEGIS website for each member country. Offering a template for calculation of genebank-related costs such as regeneration, characterization etc. would be helpful. Establishment of a training platform providing training material, a pool of experts willing to provide different support and training, etc. was also proposed.

To highlight the value of AEGIS, flagged accessions could be given an exceptional status in a collection. Also designating Associate Member institutions with a specific AEGIS certificate could raise the status. In order to support the National Coordinator, an AEGIS ambassador and/or a technical coordinator for AEGIS activities could be useful.

It was stressed that temporary lack of material for distribution should not hamper the flagging process. However, such accessions should be given a higher priority for regeneration/multiplication. The Group considered that sharing of conservation tasks between genebanks in different countries should be explored. Use of AEGIS accessions should be promoted in projects carried out in the framework of the European Evaluation Network (EVA) and others. This could also provide regeneration and characterization of the used accessions.

The Group considered that awareness raising at all levels is important and should be intensified since first and foremost it is a country responsibility to safeguard the conservation of AEGIS accessions even if the network constitutes a safety valve.

The meeting was in large agreement with the reported propositions on AEGIS. In particular the suggestion to send a letter pointing out the benefits and value of AEGIS to the ministries of agriculture, through the respective National Coordinators, received due attention and support.

## **Group 6. Legal aspects impacting AEGIS operation**

*G. Moore and A. Bedmar*

Bureaucratic issues holding up the acceptance of the MoU establishing AEGIS were discussed, and in particular the difficulties experienced by some countries, including in particular France, in obtaining authorization to sign the MoU, even though it is not legally binding. The Group agreed that the importance of the MoU was as a framework for future cooperation, rather than as a means of establishing legal obligations. The Group agreed that it should be sufficient as a basis for cooperation for a country that wished to join AEGIS to send to the ECPGR Secretariat a letter signed by the National Coordinator or other appropriate authority expressing the intent of the Government to subscribe to the objectives of AEGIS and the General Principles regarding European Accessions, and committing itself to act in accordance with the provisions of the MoU regarding the role of the Members of AEGIS and that of the National Coordinator. Once this letter is accepted by the ECPGR, the country would then be considered as a Cooperating Member of AEGIS. Similar considerations would apply to Associate Members.

The Group also called for clarification of the role of the Working Groups with respect to the designation of European Accessions, as it was not clear what the WG should do when a proposed accession does not meet the requirements. The Group also considered that the AEGIS MoU was clear on the fact that it recognizes the discretionary rights of the AM to decide which accessions to include in AEGIS, including non-Annex 1 PGRFA. With respect to the implications of the Nagoya Protocol, the Groups agreed that non-Annex 1 PGRFA can only be designated as European Accessions if they can be made available under the basic terms of the SMTA.

The meeting was pleased with the suggested way out for France to be able to accept the letter of intent and thus to overcome the difficulty for the French government with a legally non-binding agreement. Discussion pursued to clarify a number of legal questions, including that you don't need a formal permission of the country of origin for non-Annex I materials, as long as absence of such obligations has been verified, and whether or not breeding material with a breeder's right on them can be distributed legally. The latter was confirmed to be possible as breeder's rights do not restrict the use in further breeding. It was furthermore suggested that genebanks should only include new germplasm material that has been received with an SMTA.

## **Group 7. Identification of elements to strengthen AEGIS from the discussion so far**

*F. Begemann and J. Cvelbar*

The facilitators had formulated questions and discussed these with the participants in two sessions.

### **Do European collections – AEGIS accessions benefit research and breeding?**

The Discussion Group agreed that selecting and flagging accessions as AEGIS accessions can benefit research and breeding and that EURISCO would be the respective instrument to search for AEGIS accessions. In addition to passport data, characterization and evaluation data are very important. Hence, AEGIS accessions should preferentially be considered for:

- a. Voluntary characterization at genebank level;
- b. Systematic consideration and inclusion in the ECPGR EVA programme; and
- c. Any other research activities, such as those funded under EC H2020.

### **Do quality requirements present an opportunity to enhance the conservation quality or build an obstacle to join?**

The Group considered that quality requirements might be an obstacle for small genebanks which do not work (yet) in line with international standards. However, it would be useful if each genebank prepared its genebank manual and made it available to ECPGR. Furthermore, it was recommended to create a list of genebanks fulfilling certain quality criteria as an incentive to enhance the genebank operations and hence the recognition of the respective genebanks. It was suggested to consider placing this list on the ECPGR website. The criteria to be fulfilled would need to be discussed before in more detail by a group of interested experts. Potential criteria for the positive list of genebanks to be included could be: a. status of genebank manuals; b. use of AQUAS standards; c. ISO certification; and d. peer review (or whatever monitoring system to be agreed). Furthermore, capacity building might be needed to fulfil the AQUAS procedure and improve the quality criteria. Training Workshops as well

as the establishment of an Information Desk by qualified Associate Members (AMs) (on the list), on a voluntary basis were suggested.

**Do AEGIS and the European collections facilitate access to genetic resources not covered under Annex 1 of the ITPGRFA (SMTA) within the context of the Nagoya Protocol?**

AEGIS could facilitate access to non-Annex 1 PGRFA if no conditions are attached to the material which would hinder their access under an SMTA. However, it is a political decision how to deal with PGRFA in each country. The AEGIS system is compliant with EU regulation 511/2014 on the Nagoya Protocol. In fact it makes use of the International Treaty (ITPGRFA), which “constitutes a specialised international access and benefit-sharing instrument within the meaning of Article 4(4) of the Nagoya Protocol that should not be affected by the rules implementing the Nagoya Protocol”. It was recommended that countries join the ITPGRFA, if they have not done so yet. The participants from Belarus reported that their country is planning to join the ITPGRFA in 2020. For uses other than for food or feed (e.g. ornamentals, pharmaceuticals etc.), it was suggested to discuss this aspect in more detail and establish an ad hoc Working Group of interested experts to consider specific conditions for such AEGIS accessions.

**How can we avoid procedural complications (recognition as AEGIS accession at national level)?**

The Group proposed to facilitate the selection and flagging process of AEGIS accessions. The following criteria could be used at the national level or at the EURISCO level to select accessions, as far as no conditions are attached to the accessions which would hinder the availability to such material via the SMTA:

1. Directly marked as AEGIS by Associate Members: a. Material that originated in the own country; b. The Associate Member carried out the original collecting and there are no conditions attached to the accessions that would hinder the availability of such material with the SMTA;
2. To be proposed to the relevant country/relevant National Coordinators as ‘suggested AEGIS material’, whereby accessions suggested for AEGIS could possibly be made visible in EURISCO or in a separate Excel file just for the National Coordinator of the respective country: a. Additional indication of uniqueness of the accession from further research, such as broad based screening of material (including material from other countries); b. Advanced cultivars from different countries that entered the genebank before 1950.

**Language problems**

The need for translation of the most important ECPGR/AEGIS documents into Russian or any other language (similar to the procedure on the website of the European Regional Focal Point for Animal Genetic Resources) was discussed.

**How can we introduce incentives for AMs to offer more “supporting activities” such as evaluation under different agro-ecological conditions, regeneration, viability testing etc.?**

Several ideas, especially to consider voluntary contributions which could be made by AMs reflecting for instance the comparative advantages arising from their location in a diverse range of agro-ecological environments were discussed. This could be helpful in the further development of the European Evaluation Network EVA.

Other issues discussed included the proposal on peer reviews of genebanks, training of trainers, and the exchange of knowledge.



### **Commitment for long-term conservation of accessions**

The flagging/marking of accessions included in the European Collection as ‘AEGIS accessions’ was identified as another positive impact of AEGIS. Thus, such AEGIS Accessions might carry a higher responsibility and better recognition at the national level.

The subsequent discussions largely supported the results of the Discussion Group. The listing of genebanks that would meet the to-be-established criteria was questioned and it was agreed that this step is only made with the intention to facilitate the implementation of AEGIS and not to expose genebanks that have not (yet) fulfilled the criteria. It should be seen as an encouragement, not as a punishment. The ‘flagging’ of accessions that have been included in the European Collection would provide an opportunity to increase the visibility at the genebank, national and European levels and was suggested to be included in the letter that will be sent to ministries. The ‘legal status’ of ornamentals and pharmaceutical plants as part of AEGIS was questioned and some further clarifications will be required.

## **Conclusion**

*Chair: E. Thörn*

### **Identification of Action Points, wrap-up of decisions made and agreement on Road Map**

The synthesis of the reports from the Discussion Groups was presented to the plenary, organized thematically and grouped into six sections:

- Improving functioning and understanding of AEGIS
- Selecting and flagging procedures
- AQUAS – The AEGIS Quality System
- Vegetatively propagated crops
- Legal matters
- Funding AEGIS.

The document was discussed in detail and some items were amended to meet approval of all participants.

Responsible members or bodies were then identified and the timeframe defined for each Action Point.

After minor editing, the list of Action Points was circulated to all participants shortly after the meeting for final approval and no request for changes were made. The document was then uploaded on the workshop webpage, and it is included in this report as Annex 3.

### **Concluding remarks of the meeting**

Thanks were extended to all participants for their work and constructive collaboration, to the ECPGR Secretariat and the Spanish hosts from INIA and CENCA for the excellent organization of the workshop, and to the German Federal Ministry of Food and Agriculture for funding. The meeting was then closed.

### **Post-meeting activities**

In the afternoon, the members of the Executive Committee held their 12th meeting, while the available participants enjoyed a visit to INIA’s Plant Genetic Resources Centre, the Spanish Genebank located nearby in Alcalá de Henares.

## **Annexes**

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## Annex 1. Agenda

### Assessing current practices and procedures to strengthen AEGIS

10-12 December 2018, San Fernando de Henares, Madrid, Spain

#### Monday, 10 December 2018

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##### Registration

8:30–09:00 Conference venue: Centro Nacional de Capacitación Agraria (CENCA), Camino de la Vega, s/n, 28830 San Fernando de Henares, Madrid

##### 1. Introduction (Chair: Luis Guasch)

09:00–09:15 Welcome address by local host and ECPGR and adoption of the agenda

09:15–09:30 Very short self-introduction of participants

09:30–10:00 Why AEGIS – History, policy and strategy (*L. Maggioni, 20 min + 10*)

10:00–10:30 AEGIS – Technical framework: procedures, tools and progress (*J. Engels, 20 min + 10*)

10:30–11:00 *Coffee/Tea break*

##### 2. Selected country experiences with the implementation of AEGIS (Chair: V. Holubec)

*15 minutes presentations, each followed by 5 minutes of questions*

11:00–11:20 Estonia (*K. Annamaa*)

11:20–11:40 Slovenia (*J. Cvelbar and J. Šuštar Vozlič*)

11:40–12:00 Spain (*L. Guasch*)

12:00–12:20 Serbia (*M. Savic*)

12:20–12:40 The Netherlands (*Th. Van Hintum*)

12:40–14:00 *Lunch*

##### 3. Discussing AEGIS benefits (Chair: R. De Salvador)

*15 minutes presentations, each followed by 5 minutes of questions*

14:00–14:20 Can AEGIS increase access to genetic resources and improve use in research/breeding? (*F. Begemann*)

14:20–14:40 AQUAS or Quality System for AEGIS – Experiences and opportunities to enhance conservation quality (*Th. van Hintum*)

14:40–15:30 Open discussion on AEGIS benefits

15:30–16:00 *Coffee/Tea break*

##### 4. Discussing AEGIS constraints / problem areas (Chair: K. Annamaa)

16:00–16:20 Do quality requirements present an obstacle to join / implement AEGIS? (*M. Ordidge*)

16:20–16:40 Procedural complications - main obstacles and suggestions for improvement (*open discussion*)

16:40–17:00 Obstacles from National legislation (*M. Omrani*)

17:00–17:20 Integrating vegetatively propagated crops into AEGIS, using *Malus* as an example (*M. Lateur*)

17:20–17:50 Open discussion on AEGIS problem areas

20:00 *Social dinner*

**Tuesday, 11 December 2018**

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**5. Discussion Groups**

Each group with a fixed Chair and Rapporteur undergoes three rounds of discussion with rotating participants. Each participant can attend 3 groups for one hour each

- 08:30–08:45 Introduction to the discussion groups (*J. Engels*)
- 08:45–12:15 Discussion in parallel (seven groups, three rounds of 60 minutes)
1. How to technically handle vegetatively propagated crops? (*M. Lateur + M. Ordidge*)
  2. Selection and flagging procedures (*V. Holubec + W. Podyma*)
  3. AQUAS (current issues and suggestions for a realistic implementation) (*K. Annamaa + Th. Van Hintum*)
  4. Identifying funding/resources for AEGIS activities (*R. De Salvador + M. Savic*)
  5. Organizing AEGIS within and across countries (*E. Thörn + A. Didier*)
  6. Legal aspects impacting AEGIS operation (*G. Moore + A. Bedmar*)
  7. Identification of elements to strengthen AEGIS from the discussion so far (*F. Begemann + J. Cvelbar*)
- (09:45-10:15  
Coffee/Tea  
break)
- 12:15–12:45 Chair and rapporteurs prepare reports
- 12:45–14:00 Lunch

**6. Reporting by Discussion Groups and discussion (Chair: M. Lateur)**

*15 minutes Power Point presentations, each followed by 15 minutes of discussion*

- 14:00–15:30 Reports from Groups 1-3
- 15:30–16:00 Coffee/Tea break – Group picture
- 16:00–18:00 Reports from Groups 4-7
- No dinner organized*

**Wednesday, 12 December 2018**

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**7. Conclusion (Chair: E. Thörn)**

- 08:30–10:30 Identification of Action Points
- 10:30–11:00 Coffee/Tea break
- 11:00–12:00 Wrap-up of decisions made and agreement on Road Map
- 12:00–12:30 Concluding remarks of the meeting
- 12:30 Lunch
- 14:00 - Meeting of the Executive Committee (ExCo members only)  
- Excursion to national genebank (according to participants' availability and interest)

## Annex 2. List of participants

### Assessing current practices and procedures to strengthen AEGIS

10-12 December 2018, San Fernando de Henares, Madrid, Spain

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### Annex 3. Action points discussed and agreed at the workshop

The ECPGR Workshop “Assessing current practices and procedures to strengthen AEGIS”, sponsored by the German Federal Ministry for Food and Agriculture and organized in collaboration with the Instituto Nacional de Investigación y Tecnología Agraria y Alimentaria (INIA), was held at Centro Nacional de Capacitación Agraria (CENCA), San Fernando de Henares, Madrid from 10 to 12 December 2018. The 59 participants, including policy/decision-makers, ECPGR National Coordinators, Associate Member institutes of AEGIS, genebank curators, members of ECPGR Crop Working Groups and a representative from the Crop Trust, were invited based on expressions of interest received from a representative group of countries and institutes, wishing to learn from each others’ experiences with the establishment and operation of AEGIS. The Workshop was a follow-up to the agreement reached at the Steering Committee meeting in Thessaloniki in 2018, to hold a workshop on AEGIS before the end of 2018. The slow progress of AEGIS had been noted, mainly on the basis of the low number of accessions flagged in EURISCO as part of the European Collection.

The meeting was conducted in a very constructive and positive atmosphere which enabled the achievement of the following list of Action Points, together with the responsible person/entity and a deadline for the delivery, thus addressing the Workshop objectives.

Action points	Responsible members or bodies / Timeframe
<b>Improving functioning and understanding of AEGIS</b>	
1. Prepare a flow diagram describing the AEGIS implementation process in a country (signature of MoU by member country and Associate Members and all important actions deriving from this signature)	<i>Secretariat by end of March 2019</i>
2. Increase visibility of AEGIS Associate Members and of AEGIS material within holding institutions (i.e. AEGIS label to enhance status)	<i>National Programmes/Associate Members – ongoing activity</i>
3. Expand the AEGIS webpage for individual countries with more details on Associate Members (i.e. safety duplication information, participation in EVA, offers for services, etc.)	<i>Secretariat in liaison with Associate Members – expanded website by June 2019</i>
4. Provide to AMs a table for estimation of genebank operation costs	<i>Secretariat by end of January 2019</i>
5. Encourage Associate Members to express specific requests and offers for regeneration / safety duplication needs, etc. (via WGs or Secretariat)	<i>Secretariat sends encouragement to National Coordinators – spring 2019</i>
6. Focus/prioritize the use/evaluation of AEGIS material in genebank characterization plans, EVA network or other projects	<i>Associate Members/National Coordinators - ongoing</i>
7. National Programmes should consider translating relevant AEGIS documents into their national language for upload on the ECPGR website.	<i>National Programmes at their discretion - ongoing</i>

<b>Action points</b>	<b>Responsible members or bodies / Timeframe</b>
<b>Selecting and Flagging procedure</b>	
8. It is reconfirmed to use the “Revised simplified procedure” (either by Associate Member/National Coordinator), i.e.	
a. Accessions originating within the country (check old name of the country)	
b. Accessions collected or received from collecting missions outside the country and considered unique (after verification that legal status allows distribution with SMTA).	
c. In case another country X has already flagged accessions that originated in country Y and country Y also holds them and intends to take primary responsibility for their long-term conservation as part of the European Collection, country Y should proceed with flagging these accessions in EURISCO and concomitantly contact the NC of country X to recommend de-flagging by country X.	
d. Option of considering additional criteria such as passport data, characterization data, safety duplication, quality [at the discretion of the country].	<i>National Coordinators of AEGIS member countries ensure process is completed latest by the end of 2019</i>
<b>AQUAS – The AEGIS Quality System</b>	
9. All Associate Members should complete their genebank manuals based on AEGIS template (these are describing the current situation, not necessarily corresponding to the target standards)	<i>Associate Members with help of Secretariat six months after a training workshop</i>
10. Working Groups should complete the crop-specific standards using the AEGIS templates and the documents should be made widely available and visible	<i>Working Group Chairs in consultation with WG members and helped by Secretariat by the end of 2019</i>
11. AQUAS is made of a number of valid elements, but the monitoring step is missing and needs to be implemented:	
a. Peer review proof of concept to be tested (colleague experts visiting, discussing and learning from each other – not an auditing or policing exercise)	<i>Under coordination of CGN, first peer review cycle to be completed in early 2019</i>
b. SC-approved monitoring procedure to be kept on hold for future use	(-)
c. To trigger quality improvement of the genebanks, create on the ECPGR website a list of AEGIS genebanks that fulfil quality criteria (to be developed by group of experts), based on a dedicated monitoring exercise	<i>Germany to write a one-pager concept in 2019 to be submitted through the Secretariat to the SC for email consultation/approval</i>

<b>Action points</b>	<b>Responsible members or bodies / Timeframe</b>
d. Capacity building to be achieved through e.g. training workshops via grant scheme, information desk, bilateral assistance, training material, FAQs, etc.	<i>Secretariat as a hub to receive training requests – ongoing</i> <i>Peer review (CGN) and potential workshop – 2019</i> <i>Grant Scheme (applications to future calls by stakeholders) and other sources (voluntary contributions) – ongoing</i>
<b>Vegetatively propagated crops</b>	
12. Long-term safety back-up is an issue to be tackled. The fruit WGs should define a crop-specific safety duplication strategy, including the use of different conservation approaches, such as the possible contribution of targeted on-farm conservation. An ad hoc group should develop a cryo-conservation concept, raising this idea at the level of the global conservation strategies	<i>Malus/Pyrus WG to develop a concept for the establishment of an ad hoc group involving all relevant WGs - to be submitted to the SC for consideration, via Secretariat - 2019</i>
13. Phytosanitary issues remain critical for quarantine pests and diseases and may prevent the exchange of AEGIS material. This should not inhibit the process of flagging AEGIS accessions, as long as material is assumed to be free of quarantine pest and diseases. Capacity building could be useful on implementing preventive measures and detecting very early stage symptoms of quarantine pests and diseases during field genebank monitoring.	<i>Malus/Pyrus WG, in consultation with Prunus and Vitis WGs, to develop a one-page guideline to advise curators on how to proceed regarding flagging, conservation and distribution of AEGIS accessions subject to risk of infection - 2019</i>  <i>Fruit WGs to organize training workshop on preventive measures for quarantine pests and diseases– Phase X</i>
14. The medium-term AEGIS optimization strategy of fruit trees, including selection of accessions at European level (synonymy, “preferred name”, errors...) needs further elaboration by WGs’ crop experts. This will be much easier when accurate large scale harmonized SSR’s data will be available in a DB. Since newly propagated fruit trees need at least three to five years before producing fruits, it is recognized that some redundancy / replicates in field orchards have a high value for direct uses in research, breeding and for increasing public and policy makers awareness.	<i>Fruit WGs to develop optimization strategy organizing a workshop – Phase X</i>
<b>Legal matters</b>	
15. Prepare letter of intent for France joining AEGIS	<i>France in consultation with legal expert to complete draft for approval by the ECPGR SC by end of March 2019. Signature by French Ministry to follow in 2019</i>

<b>Action points</b>	<b>Responsible members or bodies / Timeframe</b>
16. Countries that have not yet joined the FAO International Treaty, are encouraged to do so in order to avoid complications related to national legislation when flagging accessions in AEGIS	<i>Ongoing</i>
17. AEGIS members that have not yet completed agreements with all the relevant Associate Members in their country, are invited to do so	<i>Secretariat to send reminders to National Coordinators – early 2019</i>
18. Set up a Task Force to clarify issues related to non-food/feed use of AEGIS such as ornamental and medicinal plant accessions	<i>Secretariat ask SC who would be interested to participate in the process – early 2019</i>
<b>Funding AEGIS</b>	
19. Explore options at national level (involvement of private or public sector, delegation of responsibilities for lobbying on AEGIS matters)	<i>National Coordinators, WG members and genebank managers – ongoing</i>
20. Explore options for projects with funding from EU and other international bodies	<i>Everyone - ongoing</i>
21. Within the framework of GenRes Bridge and the preparation of the envisaged EU agrobiodiversity strategy and the potential EU PGR Programme, we will have the opportunity to include AEGIS as the <i>ex situ</i> pillar and then seek funding or co-funding when the value of our system will be acknowledged by the EC	<i>PGR partners in GenRes Bridge project – within project timeframe (2019-2021)</i>
22. Write a letter to the ministries under advice from NCs, pointing out the results of this meeting and the value of AEGIS and its AMs as a tool contributing to agriculture and food security	<i>Secretariat to draft and circulate to workshop participants and then to SC for approval by spring 2019</i>



## Annex 4. Acronyms and abbreviations

ABS	Access and Benefit-Sharing
AEGIS	A European Genebank Integrated System
AM	Associate Member
AQUAS	AEGIS Quality System
CBD	Convention on Biological Diversity
CENCA	<i>Centro Nacional de Capacitación Agraria (Spain)</i>
CGIAR	Consultative Group on International Agricultural Research
CGN	Centre for Genetic Resources, the Netherlands
CIRAD	<i>Centre de coopération internationale en recherche agronomique pour le développement (France)</i>
CRB	<i>Centre de Ressources Biologiques (France)</i>
CTPS	<i>Comité Technique Permanent de la Sélection (France)</i>
CWR	Crop wild relative
EC	European Commission
ECCDB	European Central Crop Database
ECPGR	European Cooperative Programme for Plant Genetic Resources
EU	European Union
EURISCO	European Plant Genetic Resources Search Catalogue
EVA	European Evaluation Network
FAO	Food and Agriculture Organization of the United Nations
GEVES	<i>Groupe d'Etudes et de contrôle des Variétés et Semences (France)</i>
GPA	Global Plan of Action for the Conservation and Sustainable Utilization of Plant Genetic Resources for Food and Agriculture
GPA	Global Plan of Action for Plant Genetic Resources
HACCP	Hazard Analysis and Critical Control Points
INIA	<i>Instituto Nacional de Investigación y Tecnología Agraria y Alimentaria (Spain)</i>
INRA	<i>Institut National de la Recherche Agronomique (France)</i>
IRD	<i>Institut de recherche pour le développement (France)</i>
ISO	International Organization for Standardization
ITPGRFA	International Treaty on Plant Genetic Resources for Food and Agriculture
LR	Landrace
MAT	Mutually agreed terms
MLS	Multi-lateral system
MoU	Memorandum of Understanding
NGO	Non-governmental organization
NUS	Neglected and underutilized species
PGR	Plant genetic resources
PGRFA	Plant genetic resources for food and agriculture
PIC	Prior informed consent
QM	Quality management
SMTA	Standard Material Transfer Agreement
WG	Working Group