# AQUAS – quality management in AEGIS

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# AQUAS – QM in AEGIS

- **AQUAS rationale**
  - AEGIS – basis for collaboration between genebanks
    - reduce redundancies in terms of material and activities
  - collaboration based on trust
    - 'I don't have to do it if I can rely on you doing it well'
  - system needed to assure continuity and quality
    - basic quality management
      - describe and monitor processes
    - right norms and standards

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# AQUAS – QM in AEGIS

- **AQUAS principles**
  - quality management based on PDCA
    - plan–do–check–act
  - consensus
    - problem: consensus between who?
  - agreed minimum standards
    - generic and crop specific standards
  - capacity building
  - minimize bureaucracy
  - monitoring system
    - assure compliance

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# AQUAS – QM in AEGIS

- **quality management based on PDCA**
  - plan
    - record what you do and how you do it
      - AQUAS Genebank Manuals
  - do
    - follow the manual
    - record any deviations from the standard
  - check
    - check/monitor the above (independently)
  - act
    - improve what can/needs to be improved

# AQUAS – QM in AEGIS

- **AQUAS Genebank Manual**
  - self-assessment regarding facilities and procedures
    - available since 2010
  - structure

1 Germplasm Acquisition and Accessioning
   1.1 Germplasm Acquisition and Accessioning
   1.2 Germplasm Collecting

2 Ensuring Security
   2.1 Physical Security
      2.1.1 Safety Duplication
      2.1.2 Structure
      2.1.3 Security Equipment
      2.1.4 Institutional and Personnel Security
      2.1.5 Contingency Plans

3 Germplasm Maintenance
(here: seed - also available for vitro, cryo and field)
   3.1 Maintenance of Viability
      3.1.1 Initial seed viability

3.1.2 Seed Viability Monitoring
3.2 Maintaining Genetic Integrity
   3.2.1 Seed Containers and Sample Size
   3.2.2 Pollination Control
   3.2.3 Regeneration Procedures
   3.2.4 Seed Processing Procedures
   3.2.5 Genetically Modified Material

3.3 Ensuring Availability
   3.3.1 Policy Aspects
   3.3.2 Seed/Germplasm Stock Aspects
   3.3.3 Health Aspects
   3.3.4 Germplasm Supply

4 Providing Information
   4.1 Genebank Documentation System
   4.2 Information Exchange

# AQUAS – QM in AEGIS

- **AQUAS Genebank Manual**
  - **submitted by** (8 associate members /17 from these countries)
    - Czech Republic (9 associated members (2 shared GM's) /9)
    - Estonia (1 associated member /2)
    - Germany (3 associated members /3)
    - the Netherlands (1 associated member /2)
    - Switserland (1 associated member /1)

  - **not submitted by** (49 associate members from these countries)
    - Albania, Austria, Azerbaijan, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Denmark, Finland, France, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Macedonia, Montenegro, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Spain, Sweden, Turkey, United Kingdom

# AQUAS – QM in AEGIS

- **agreed minimum standards**
  - **generic operational standards**
    - FAO (2013) Genebank Standards for Plant Genetic Resources for Food and Agriculture
      - standards / context / technical aspects / references

  - **crop specific standards**
    - to be compiled and agreed by the Crop-WGs
    - standards agreed
      - *Allium* (in vitro & field)
      - *Avena* (seeds)
      - *Beta* (seeds)
      - Cucurbits (seeds)
      - Leafy Vegetables (seeds)
      - *Prunus* (field)
      - *Solanaceae* (seeds)
      - *Vitis* (field)
      - Wheat (seeds)

# AQUAS – QM in AEGIS

**CROP-SPECIFIC GENEBANK STANDARDS FOR ORTHODOX SEEDS**

Agreed by the Leafy Vegetables Working Group

March 2016

Note: the "FAO Genebank standards for orthodox seeds" listed in the first column correspond to Chapter 4, pp. 17-63 in: FAO. 2014. Genebank Standards for Plant Genetic Resources for Food and Agriculture. Rev. ed. Rome. (www.fao.org/d+ocrep/019/i3704e/i3704e.pdf)

| FAO Genebank standards for orthodox seeds | | Crop-specific genebank standards for orthodox seeds – Leafy vegetables (lettuce, spinach, chicory)<br>*No comment in this column means agreement with FAO standard* | Remarks<br>(reasons for deviating from FAO standards) |
|---|---|---|---|
| 4.1 | Standards for acquisition of germplasm | | |
| 4.1.1 | All seed samples added to the genebank collection have been acquired legally with relevant technical documentation. | | |
| 4.1.2 | Seed collecting should be made as close as possible to the time of maturation and prior to natural seed dispersal, avoiding potential genetic contamination, to ensure maximum seed quality. | | |
| 4.1.3 | To maximize seed quality, the period between seed collecting and transfer to a controlled drying environment should be within 3 to 5 days or as short as possible, bearing in mind that seeds should not be exposed to high temperatures and intense light and that some species may have immature seeds that require time after harvest to achieve embryo maturation. | | |
| 4.1.4 | All seed samples should be accompanied by at least a minimum of associated data as detailed in the FAO/Bioversity multi-crop passport descriptors. | | |
| 4.1.5 | The minimum number of plants from which seeds should be collected is between 30-60 plants, depending on the breeding system of the target species | For chicory, it depends on the species: for *Cichorium endivia* accessions (mainly autogamous), seeds from a minimum of 15-20 plants and for *C. intybus* accessions (mainly allogamous) seeds from 40-60 plants should be harvested. | In case of conservation actions to rescue threatened populations of small size or collections of wild species the minimum number of plants from which seeds are collected could be lower. |

# AQUAS – QM in AEGIS

- **capacity building**
  - help each other reach the required quality
    - investment in higher efficiency

  - eagerness to attend CB meetings is high
    - not a good sign *per se*
    - selection needs to be made

  - prioritisation
    - focus on genebanks / countries that are below standards but clearly want to get above standards
      - provide transparency (genebank manual, distribution data)
      - want to comply to the rules and standards (also on government level, e.g. ABS arrangements)

# AQUAS – QM in AEGIS

- monitoring system
  - based on record-keeping
  - in ISO systems: monitoring by accredited agencies
    - ISO 9001: annual external audit (plus internal audit)
  - in AEGIS: system only available on paper
    - "Record keeping, reporting and monitoring of the European Collection" published Jan. 2016
    - not implemented anywhere

# AQUAS – QM in AEGIS

- **monitoring system**
  - **assumptions**
    - most genebanks try the right thing / have nothing to hide
    - all genebanks can learn from each other
  - **proposed: genebank peer review**
    - 3 genebanks - each genebank: 1 expert
    - 3 experts review each other based on
      - previous information (self-assesment, other info)
      - review protocol
    - report is written and as much as possible made public
      - can be used in fund-raising for improvements (with ECPGR)
      - ECPGR can target capacity building

# AQUAS – QM in AEGIS

- **additional issue (not in AQUAS)**
  - continuity of AEGIS accessions
    - assurance is needed that the 'plug will not be pulled out'
      - imagine country saying 'nothing leaves the country'
    - since this continuity can not be guaranteed operational provisions could be made
      - safety duplicate collection (SDC) agreement could be changed to assure continued access

# AQUAS – QM in AEGIS

- **additional issue (not in AQUAS)**
  - continuity of AEGIS accessions
    - assuming the provider grants full access
      - PGR in safety duplicate is already publicly available
    - this material could be kept available if the provider can no longer

Current: `<host> will not use or distribute any seed material from the SDC to a third party, and only return it to the provider upon request.`

Alternative: `<host> will only use or distribute seed material from the SDC to a third party in case public access to the material can no longer be guaranteed by the provider.`

# AQUAS – QM in AEGIS

- **ECPGR / AEGIS needs quality assurance**
  - EURISCO lists 1.2 mio accessions (excl *Arabidopsis*)
    - how many are available under SMTA on request ?
    - how many will still exist in 50 years from now ?

  **if we don't improve this AEGIS is doomed to fail**

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# AQUAS – QM in AEGIS

## AEGIS is an Emperor without clothes

let's give the Emperor some new clothes

# Thank you for your attention !



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