

**The Netherlands:** the country is fully operational regarding AEGIS and several accessions have been included in the European Collection.

**Poland:** it is necessary to solve some internal problems, such as the need to improve the organization of the national collection (proper documentation, knowledge of seed availability, regeneration status and safety duplication) and also to formalize the AEGIS agreements for Associate Membership.

**Slovenia:** discussions are still taking place on which leafy vegetable accessions to include in the European Collection. It has still not been decided which criteria to use.

**UK:** there is the intention to find a national way forward, which may still take some time. Some UK collections are actually global, including donated material; therefore the criteria for proper selection need to be developed. The initial step will be to verify that accessions are available and safety-duplicated.

### **Recommendation(s)**

- It was agreed that there was no reason to continue working on the scenario proposed in Catania and that it would be better to wait for individual countries to follow the revised procedure.
- It was also agreed that the future role of the WG would be:
  - To provide feedback on national selections
  - To improve the composition of the European Collection
    - \* Check for duplicates among AEGIS accessions after integration of the national selections
    - \* Nominate additional MAAs among the remaining, non-selected accessions
    - \* Identify serious collection gaps (and explore possibilities to fill gaps)
    - \* Coordinate the removal of regeneration backlogs of unique material
    - \* Coordinate the acquisition of novel material.
- WG members were invited to encourage the National Coordinators to implement the mechanism leading to national selection of accessions for the European Collection. The WG will need to monitor the evolution of this process and will only start analysing the collection once a reasonable number of accessions have been included. When that stage is reached, selection criteria to be applied at the regional level will need to be discussed.

### **Genebank standards for leafy vegetables**

R. van Treuren introduced the discussion on crop-specific standards to be adopted by the Leafy Vegetables WG, as part of the AEGIS Quality System (AQUAS). He stressed that a set of policies, processes and procedures need to be followed by all AEGIS members in order to ensure appropriate quality of the activities. Transparency in genebanks' operations and adoption of procedures according to agreed minimum standards are fundamental for collaboration in AEGIS.

The Workplan of the WG devoted its initial focus on lettuce and spinach, promoting an inventory of genebank procedures among WG members and the development of a list with

agreed minimum standards. The recently revised FAO [Genebank Standards for Plant Genetic Resources for Food and Agriculture](#) were suggested for adoption by the WGs as part of AQUAS. The WG was therefore requested to evaluate whether the FAO standards were suitable for leafy vegetables and whether any additions/modifications were required. Data from eight members were collected before the meeting, regarding protocols currently in use for lettuce and spinach. These were the basis for a discussion on the potential standards which can be agreed for the Leafy Vegetables WG.

The following list indicates the FAO standards and the corresponding decision made by the Leafy Vegetables Working Group (LV) regarding the adoption of the same or a different standard:

### **Seed drying**

- Environmental temperature during drying (°C)
  - FAO (4.2.1.): 5-20°C
  - LV: Agreed
- Relative humidity during drying (%)
  - FAO (4.2.1.): 10-25%
  - LV: Agreed
- Target seed moisture content
  - FAO (4.2.1): Equilibrium
  - LV: Agreed

### **Seed storage**

- Time between seed harvesting and long-term seed storage (months)
  - FAO: No standard
  - LV: Target is within 12 months, but depending on the workload, longer time is acceptable. Also for temporary storage it is recommended to use optimal circumstances, i.e. cool and preferably air-tight or oxygen-free conditions.
- Minimum seed quantity for uptake in the collection (number of seeds)
  - FAO: No standard
  - LV: No standard
- Temperature (°C) during long-term storage (base collection)
  - FAO (4.2.3.):  $-18 \pm 3^{\circ}\text{C}$
  - LV: Agreed
- Temperature (°C) during medium-term storage (active collection)
  - FAO (4.2.4.): 5-10°C
  - LV: Agreed
- Temperature (°C) during short-term storage (active collection)
  - FAO (paragraph 37): Ambient (max. 25°C)
  - LV: Agreed
- Relative humidity during storage (%)
  - FAO (4.2.4):  $15 \pm 3$
  - LV: It depends on how the storage is arranged. It is not considered sensible to define an absolute %.

**Seed viability monitoring**

- Maximum period between receipt/regeneration of a seed sample and initial viability testing (months)
  - FAO (4.3.1.): Within 12 months after receipt of the sample at the genebank.
  - LV: Agreed with standard, but depending on the workload, a longer period is acceptable.
- Minimum initial germination for most seeds of cultivated crop species (%)
  - FAO (4.3.2.): >85%
  - LV: Aiming at 80%, but for special material lower percentages are also acceptable.
- Minimum initial germination for accessions or species that normally do not reach high levels (%)
  - FAO (4.3.2.): Lower values than 85% are acceptable
  - LV: Agreed
- Time interval between successive viability tests (years)
  - FAO (4.3.3.): Viability monitoring test intervals should be set at one-third of the time predicted for viability to fall to 85% of initial viability or lower depending on the species or specific accessions, but no longer than 40 years.
  - LV: The FAO standard is acceptable for spinach (long-lived species), but for lettuce (short-lived species) intervals of 10 years are recommended, unless internal experimental data prove that the period can be prolonged.  
*Background:* On one hand, lettuce has proved to maintain seed viability for longer time than previously thought, and on the other hand, viability testing is a very expensive task which needs to be performed as efficiently as possible.
- Viability threshold for the regeneration/re-collection of accessions (%)
  - FAO (4.3.4.): 85% or lower of initial viability, depending on the species or specific accessions
  - LV: Agreed
- Number of seeds used for viability testing
  - FAO: No standard
  - LV: 50 (as recommended minimum target)  
*Background:* Comparison tests with 50 or 200 seeds were made at IPK, Germany and there was no big difference in the results. It remains a fact that the confidence interval using 200 seeds is considerably smaller compared to the use of 50 seeds. Below 50 seeds the data seem unreliable. It could be possible to distinguish between homogeneous cultivars and other material. Less than 50 seeds would be acceptable for homogeneous cultivars, but not for other materials.

**Seed regeneration**

- Seed depletion threshold (minimum number or weight of remaining seeds)
  - FAO (4.4.1): Seed quantity lower than what is required for three sowings of a representative population of the accession
  - LV: Agreed
- Number of plants for the regeneration of cultivated material
  - FAO (4.4.2.): Sufficient number to maintain genetic integrity
  - LV: Agreed. The numbers used by the group are acceptable as a guideline. Lettuce: 10-15 plants with the possibility to make this number higher if necessary for seed increase or for highly heterogeneous samples, which may apply, for

instance, to certain landraces; or lower if it is known that it is an homogeneous accession. Spinach: minimum of 45-50 plants.

- Number of plants for the regeneration of wild species
  - FAO (4.4.2.): Sufficient number to maintain genetic integrity
  - LV: Agreed. The numbers used by the Group are acceptable as a guideline. Lettuce: 15 plants, but keeping in mind that the number should be higher for outcrossing species, ideally reaching 50 plants. Spinach: minimum of 45–50 plants, higher number if needed to increase the seed yield.
- Minimum number of plants used for seed harvesting
  - FAO (4.4.2.): Sufficient number to maintain genetic integrity
  - LV: At least half of the number of plants grown for regeneration, with the understanding that the number can be lower if the accessions would otherwise be lost.
- Regeneration environment for cultivated material
  - FAO (paragraph 67): No standard, the most species-specific favourable conditions
  - LV: Agreed
- Regeneration environment for wild species
  - FAO (paragraph 67): No standard, the most species-specific favourable conditions
  - LV: Agreed
- Protective measures to avoid contamination for outcrossing, wild species
  - FAO (4.4.2.): Adequate measures to protect genetic integrity
  - LV: Isolation in protected environment (cages, tunnels, nets, etc.)
- Vector used for insect-pollinated, wild species
  - FAO: No standard
  - LV: Lettuce: appropriate vector for outcrossing species (e.g. bumble bees, flies, etc. if grown under isolation)

#### Seed distribution

- Number of seeds per accession distributed to users
  - FAO (4.8.4): Minimum of 30-50 viable seeds for most species
  - LV: Agreed

#### Workplan

- In order to define the standards for chicory, P. Coquin agreed to circulate a simplified template, similar to the one used for lettuce and spinach, to the WG members and to collect information on the standards currently used in European genebanks (**task to be started in March 2014**).
- On the basis of the above exercise, the Chair will moderate a discussion in order to reach an agreement on the standards for chicory (**within June 2014**).
- For minor leafy vegetables it should be possible to define a few categories, identify to which category the various species belong and then propose the respective protocols and standards. C. Allender agreed to prepare a series of draft recommendations and circulate them by email for comments and endorsement (**task to be completed by the end of the year 2013**).