**Target**

Determination of germination of acquired, propagated or collection material.

**1) Selection of germination samples**

##### Three Types of germination determinations

##### Initial germination for acquired or propagated material (A)

This is the first determination of a sample to be included in the genebank.

Monitoring germination (H)

This means monitoring the germination of collection material over time. It is expected that the germination of seed stored at -20°C with an absolute moisture content between 3 and 7% will deteriorate only slowly.   
Within CGN, the guideline is to carry out the first repeat germination 25 years after inclusion of the relevant accession, followed by intervals of 5 or 10 years, depending on germination results. Wheat and barley are expected to have better storability than other crops, therefore intervals of 5 and 20 years respectively apply to these.  
An annual overview of all germination determinations to be carried out is made by the head of Documentation. This overview is generated from GENIS using the above germination intervals. The curators can use this advice to plan.

Duplicate germination

At least 5% of the samples are tested for a second time under code number (anonymously). For each crop, the numbers eligible for a second determination are determined at random. The reason for this check is to test the reproducibility of the results and to improve the germination protocols.   
For more information on duplicate germination determination, see PRT-CGN-PG-301 (Protocol germination determination).

**Group sampling**

When scheduling repeat germination tests, there is the option for curators to use group sampling. Here, accessions are grouped according to species and regeneration year, and from each group a minimum of 25% of the accessions are tested, starting with the quarter of accessions that showed the lowest scores in the previous germination test. The motivation for this is that it is expected that material of the same species regenerated under the same conditions and having undergone the same post-harvest procedures will show similar germination progression over time.  
For frequency of monitoring and group sampling, see PRT-CGN-PG-301 (Protocol for germination testing).

**2) Taking of germination samples**

Germination tests usually take place on 50 seeds, in some cases the germination is tested on 100 seeds. This is determined per crop and per type of germination test by the relevant curators and recorded in GENIS and in the overview of Overview methods viability testing (OVZ-CGN-PG-301).

A seed sample must meet the minimum quality requirements as stated in INS-CGN-PG-005. In case of visibly poor seed quality (brown discolouration, broken- or empty seeds), the number is re-cleaned.

Each germination sample is labelled with an accession or receipt number and a field number to avoid mix-ups with other samples.

**3) Implementation and assessment of germination**

Germination determinations are carried out according to protocol PRT-CGN-PG-301.   
The results of the germination determinations are entered in Excel. This file contains the accession numbers, the germination method used and, where appropriate, the germination percentages. Based on both the germination rate and a visual assessment of the seedlings, a final score is given. This final score will determine the further treatment of the sample.

The following scores can be given:

1. The seeds are below the minimum germination requirement (80% or 60%) and/or show strong signs of ageing and need to be multiplied as soon as possible.

3. The seeds are around the minimum germination requirement or are likely to fall below it soon and/or show moderate to severe signs of ageing; the seeds should be multiplied within a few years.

2. The seeds are still sufficiently germinating, but show slight signs of ageing and/or are heading towards the minimum germination requirement; it is advised to bring forward the next germination determination.

1. The germination rate is well above the minimum germination requirement. The seeds are very germinative and give nice strong seedlings.
2. Score given in a group sampling if all other accessions within the group scored 1.

If the result of a repeat germination (H) is insufficient (score 3 or 4), the germination is determined again. If the score is again insufficient, a multiplication is planned.

If the result of an initial germination test (A) is insufficient (score 3 or 4), a second germination test takes place. If the result remains below the agreed standard, the curator will look for a germination-breaking method, also whether the seed needs to be cleaned better. If neither of these has the desired result, then a decision can be made to multiply the seed again, still include the seed as aberrant material or destroy the seed and give the accession the status not-accessed. See PRT-CGN-PG-301 (Protocol germination determination) for more information.

If the result of a germination is sufficient (score 2), the advice is to test the germination again after 5 years. This applies to both repeat germination and initial germination.

**4) Recording results**

All germination results, except the duplicate germination results, are entered into GENIS. In the case of an initial germination, the results are also entered in the Multiplication Log (FOR-CGN-PG-002).

The 'Collection\_Management list', the overview quality and quantity of all accessions with status 'accessed', shows the germination result of all accessions. This overview is created regularly, or on request, by the head of Documentation and placed in the Collection Management directory on the network drive: N:commons Collection Management PGR.

**MEASURING POINT PROCESS EFFECTIVENESS**

7. Seed quality. The percentage of accessions in the base collection that meet minimum germination criteria according to the last performed determination. Standard: minimum 90%.

*Measurement point: annual analysis GENIS*