Code CGN-PSxxx

The seed microbiome and plant genetic resources

Question How should the seed microbiome be taken into account in genebank management?

Level HBO / MSc

Keywords Genebank management, Phenotypic variation, Seed microbiome, Variety improvement

Description The Centre for Genetic Resources, the Netherlands (CGN) maintains a collection of genetic resources of agricultural and horticultural crops, mainly in the form of seeds. This collection is used by the breeding sector to develop varieties with new phenotypic traits, for instance, varieties with improved resistance against pests and diseases or varieties with increased drought tolerance. Awareness is increasing that seeds are not only affecting the plant phenotype through their genetic constitution but also by means of micro-organisms that may be present on the inside or outside of seeds, referred to as the seed microbiome. This means that seed collections are not only rich sources of crop genetic diversity but also may harbour extensive variation in the seed microbiome. Currently, genebank management procedures are directed to the optimal conservation of seeds, but do these need modification considering the existence of the seed microbiome? This project aims to review available data regarding the seed microbiome and how this may impact genetic resources management.

Approach This project will start with a literature study, collecting the relevant papers on investigations of the seed microbiome. These will be used to review the effects of the seed microbiome and the magnitude thereof on plant phenotypic variation. Secondly, it will be investigated how the seed microbiome is, or can be, used in practice, e.g. for agricultural purposes, and how it is maintained for utilization, e.g. during seed propagation and under genebank storage conditions. These investigations will be performed through a literature survey but may also include an inventory among breeding companies and genebanks. Thirdly, it will be recommended how CGN should take into account the seed microbiome in its management practices. This project will be carried out in a cooperation between CGN and the Wageningen Seed Science Centre.

Result Report on the relevance of the seed microbiome and the impact on genebank management procedures

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