**ALA9.1 Management of genetic resources**

**Prerequisites**

Understanding of:

1. Marker systems
2. Different processes involved in conservation and exploitation of plant genetic resources
3. Application of genomic tools, in particular DNA markers, for taxonomic classification, acquisition of genetic resources, their maintenance, characterization and utilization

**Purpose**

Apply knowledge of genomic tools to management of genetic resources

**Background**

Gene banks host large numbers of accessions in their collections. Challenges include the efficient use of scarce financial resources to have a diversified representation within target species, avoiding the collecting and maintaining of duplicates, and ensuring the stability of accessions over time. Genomic resources, in particular molecular markers, have not been broadly used in this context. However, decreasing costs for DNA markers justify a thorough evaluation as to where their use might be beneficial.

**Tasks**

You are the curator of the maize germplasm collection at the plant introduction station in Ames, Iowa. Out of the 21,000 accessions, 19,000 are genetically heterogeneous populations from all over the world. At least for some accessions, it is known that germination ability decreases significantly, from 80 to 50%, within 10 years.

1. Describe how you would manage the maintenance of this collection (a) without, and (b) with genomic and biotechnological tools, including doubled haploids.
2. Provide a rationale for your considerations based on population genetic principles.
3. Draw conclusions on whether or not, and if yes, which genomic/biotechnology tools to use taking into consideration the limited financial resources at USDA.

**Tentative answers** (can differ, based on context / assumptions made)