**ALA11.1 Alternatives for line development in conjunction with gene stacking**

**Prerequisites**

Understanding of:

1. Breeding schemes for line development
2. Doubled haploid technology

**Purpose**

Provide understanding of consequences of using traditional selfing versus DH line production in the gene stacking procedure.

**Background**

It is not obvious, but DH line development in contrast to establishment of traditional lines in combination with gene stacking requires substantially fewer genotypes that have to be screened in order to find the target genotype.

**Tasks**

1. Assume a cross of two parental lines, each carrying three genes of interest. Provide a crossing scheme on how to combine all six genes into a single line.
2. How many generations, offspring, and marker data points are needed to fix six target genes in this scheme, when using traditional self pollination.
3. How many generations, offspring, and marker data points are needed to fix six target genes in this scheme, when using doubled haploid (DH) line production. For addressing 2 and 3, use the Lubberstedt and Frei (2012) publication
4. How is this affected if two of the genes are closely linked (1 cM), one gene each coming from each of the two parents ?
5. Provide a cost estimate for developing the target genotype using selfing versus DH line production.

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