Magic Beans
Disease Resistant Common Beans for Smallholder Farmers

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Overview and Achievements:

- Common bean, also called “the meat of the poor”, is an important food security crop in Africa and Latin America
- Angular leaf spot (ALS) is one of the most devastating common bean diseases, causing yield losses of up to 80%
- Here, we assembled a large collection of common bean lines with best resistance to ALS
- We found two resistance loci and established a toolbox that will help to transfer resistance to elite varieties
- The toolbox established will increase breeding efficiency for effective, pathogen-strain specific ALS resistance

Angular Leaf Spot Resistance Breeding Toolbox

Collection of resistant bean varieties

124 large seeded Andean varieties
\+ 128 small seeded Mesoamerican varieties
\+ 63 inter-genepool crosses
= 315 varieties in total

Test collection for ALS resistance

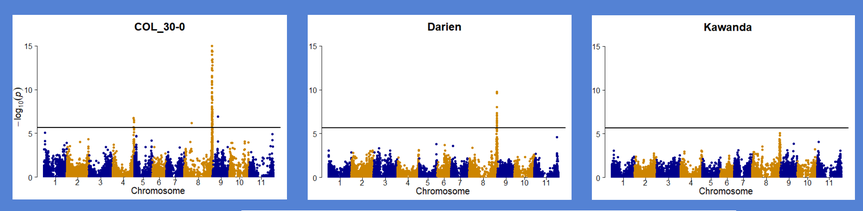
Field trials in Colombia and Uganda

Greenhouse trials with aggressive pathogen strains

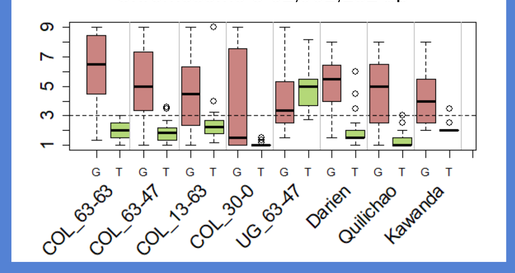
ALS scoring scale

Find ALS resistance genes

Combine data from resistance screens with genotypic data to find genetic locations involved in ALS reistance

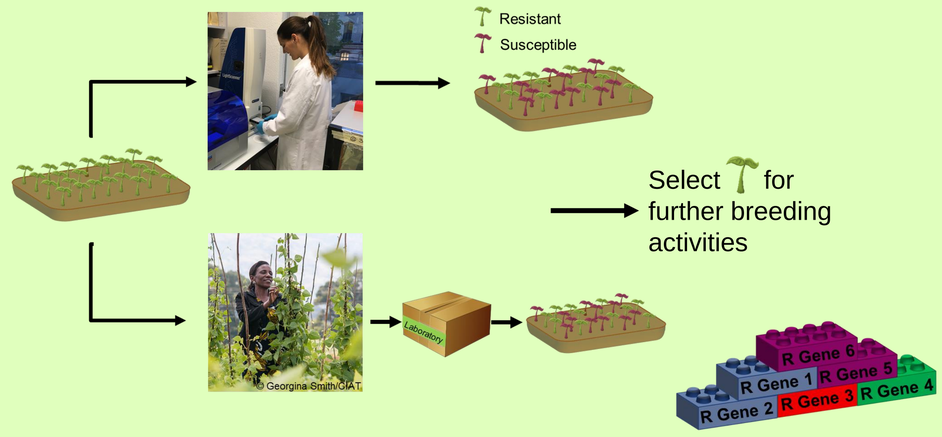


SNP associated with resistance in most trials
Chromosome 8 61,901,182 bp



Incorporation in breeding programs

Marker-asssisted selection to select and combine resistance genes



Whether a plant contains a certain resistance gene can now be tested within 3 hours in the lab instead of a 3 month-long field trial

Molecular markers associated with ALS resistance will be used in CIAT bean breeding programs to transfer ALS resistance into elite breeding varieties. These varieties will enhance yield stability for smallholder farmers in Latin America and Africa and therefore will have a positive effect on food security.