Title: The role of tomato domestication in modifying the quantitative genetic basis of Botrytis cinerea virulence

Background / Introduction:

* For generalist necrotrophs, virulence is a quantitative trait
* Applied goal to control common, economically costly pathogen
* Quantitative genetics of virulence in Botrytis
  + Jason’s GWAS
  + Known genes for virulence
* Multigenic basis of plant resistance to Botrytis
  + Genetics in Arabidopsis – Jason’s GWAS
  + Mutant analysis in Arabidopsis
* Domestication in pathogen resistance
  + Theory: selection against defense alleles in domestication & cultivation
  + Assumes: low resistance in all domesticated varieties
* Questions
  + Does domestication give us a strong hypothesis about susceptibility?
    - Does this differ depending on: pathogen genotype, host genotype
  + Genetic basis of virulence in Botrytis
    - Do the same loci confer virulence across host genotypes?

Materials & Methods

* Plant growth & choice of accessions
* Pathogen propagation & population of isolates
* Detached leaf assay
  + Whole-plant translatable
  + Lesion size as approximation of virulence
* Linear models
* Genome
* bigRR
  + JAC GWAS
* gene identification

Results

* variation in lesion size
  + domesticated lines more susceptible on average BUT overlap with wild
* genetic control of lesion size
  + due to plant, pathogen, and INTERACTION
* genes for lesion size
  + number of significant loci > threshold
    - phenotype-conditional loci (single host genotype)
    - total loci (sum across phenotypes)
    - domestication-conditional loci
  + quantitative – justifies study beyond single-pathogen level.
    - What is the highest MAF for our significant SNPs? 🡪 approximate minimum population to detect the low-hanging fruit
  + SNPs for previously-IDed pathogenesis genes not found in our GWAS list?
  + Unique for each plant host? // shared?

Discussion:

* Next steps:
  + condense loci into co-expression networks
  + Additional host species
    - Genetics of virulence conserved/ variable?
    - patterns of domestication