Soybean Rust Coordination Report

David Walker and Randy Nelson (USDA-ARS)

- Evaluating germplasm for resistance.
  - 79 accession and 14 checks re-evaluated in LA, AL, FL, GA and SC in 2009.
  - Williams *Rpp1* isoline, PI 416778, 567102B and PI 567104B showed resistance in all locations.
  - 10 accessions were at least moderately resistant in all locations.
  - The *Phakopsora pachyrhizi* population in Bossier City, LA was more virulent than in any other location.
  - PIs with single major *Rpp* genes develop low to moderate disease, it will be difficult to distinguish oligogenically inherited partial resistance and moderate resistance conditioned by single genes

David Walker and Randy Nelson (USDA-ARS)

- Retesting accession identified as susceptible in Ft. Detrick, finding some resistance in these accessions.
- Tested 70 *Glycine soja* lines for resistance. One was resistant in both reps.
- Tested 107 *G. max* x *G. tomentella* backcross lines. None resistant.
- Testing lines in field in Quincy for the USDA-ARS program and for others.

David Walker and Randy Nelson (USDA-ARS)

- Wants to acknowledge collaborators
- Roger Boerma, Donna Harris and Dan Phillips (U of Georgia).
- Emerson Shipe and John Mueller (Clemson)
- David Weaver and Ed Sikora (Auburn)
- Blair Buckley and Ray Schneider (LSU)
- David Wright and Jim Marois (U of Florida – Quincy)

Donna Harris, Bo-Keun Ha and Roger Boerma (University of Georgia)

- Studying lesion type x severity.
  - Testing RILs with different rust reactions in a population segregating *Rpp*?(Hyuuga).
  - Testing in fungicide treated and nontreated plots.
  - Good data from Quincy, FL in 2008.

Lines	Fungicide Effect (bu/acre)
RB+low severity	NS
RB+high severity	4.9
Tan+low severity	21.3
Tan+high severity	17.9

Donna Harris, Bo-Keun Ha and Roger Boerma (University of Georgia)

- Testing 38 crosses between susceptible cultivars and resistance PIs.
- Phenotyping for resistance in a greenhouse in Griffin, GA
- Testing populations with bulked segregatant analysis (BSA) with Cregan and Hyten using Illumina 1,536 SNPs.
- 21 population tested. Results indicate:
  - 13 have *Rpp3*/*Rpp*(?)Hyuuga.
  - 1 has *Rpp4*.
  - 7 have a putative unique gene.

Donna Harris, Bo-Keun Ha and Roger Boerma (University of Georgia)

- Mapped six canopy severity QTL (tolerance) in the cross Benning x PI 416937.
- Developed a melting curve SNP assay tightly linked to *Rpp*(?)Hyuuga.
- Released a rust resistant germplasm line.

Vince Pantalone
University of Tennessee

- Breeding the *Rpp*?(Hyuuga) gene into MG VI, V, and IV lines using SNP markers.
- Using the MG VI line G01-PR16 from Roger Boerma as the source of resistance.

Silvia Cianzio
Iowa State University

- Studying the genetic basis of rust resistance from PI 567104B
- Testing a population in Quincy, FL to determine resistance phenotypes.
- Plan to map resistance genes from this population.

Andrea Cardinal
North Carolina State University

- Studying resistance in lines from AVRDC, Brazil, and Uganda.
- Testing lines with collaborators in Argentina, Brazil, NC, GA, and FL.
- UG5 from Uganda has shown the greatest resistance of any line tested.

Brian Diers
University of Illinois

- Studied the basis of resistance from PI 594538A and PI 561356 (collaboration with Glen Hartman, Randy Nelson, Reid Frederick, and David Hyten).
- PI 594538A has a new allele at *Rpp1* named *Rpp1-b*. Provides good resistance to exotic rust strains
- PI 561356 found to likely also have the *Rpp1-b* allele.

Brian Diers
University of Illinois

- Conducting experiments to confirm 3 slow rusting QTL from PI 84674 in collaboration with Glen Hartman.
  - The QTL are associated with fewer tan lesions.
- Fine mapping *Rpp2* and *Rpp5*.
  - Goal is to identify markers close to the genes for use in marker-assisted selection and to develop resources for cloning the genes.

Brian Diers
University of Illinois

- Developing germplasm with *Rpp1* and *Rpp?* (Hyuuga).
  - Backcrossed both genes into a MG II line and a MG IV line.
  - BC4 lines developed with each.
  - *Rpp?*(Hyuuga) is in coupling linkage with *E1*. Hopefully have this linkage broken.

Thomas Carter; USDA-ARS and North Carolina State Univerity

- Collaborating with Roger Boerma in the testing of lines developed by southern breeders for whole-canopy rust ratings a Attapulgus, GA
- Many developed through USB diversity project coordinated by Randy Nelson and have diverse pedigrees.
- 700 diverse lines tested for rust resistance by Boerma.
- 34 lines retained for further testing in 2010.

Henry Nguyen, Tri Vunong
University of Missouri

- Studying the genetic of resistance in the Vietnamese accessions DT2000, CB U8352, GC 84058-18-4, Nhat Tien HLLS.
- Used a bulk segregant analysis (BSA) in a population developed from DT2000.
- Determined that DT2000 has a resistance allele at *Rpp3*, but possibly a recessive allele.

Glen Hartman
USDA-ARS and University of Illlinois

- Identified many resistant lines. Working with lines from Nigeria with resistance from UG5.
- Currently studying the genetic basis of resistance from UG5.
- Testing plants in greenhouse and with a detached leaf inoculation system
- Planning to release lines with rust resistance from UG5.

Glen Hartman
USDA-ARS and University of Illlinois

- Has a collection of unique cultures of rust and is characterizing the collection with markers and for virulence patterns.
- Testing material for several group and have capacity to screen more material if needed.

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