

SSR Markers for Resistance to Root-knot Nematodes

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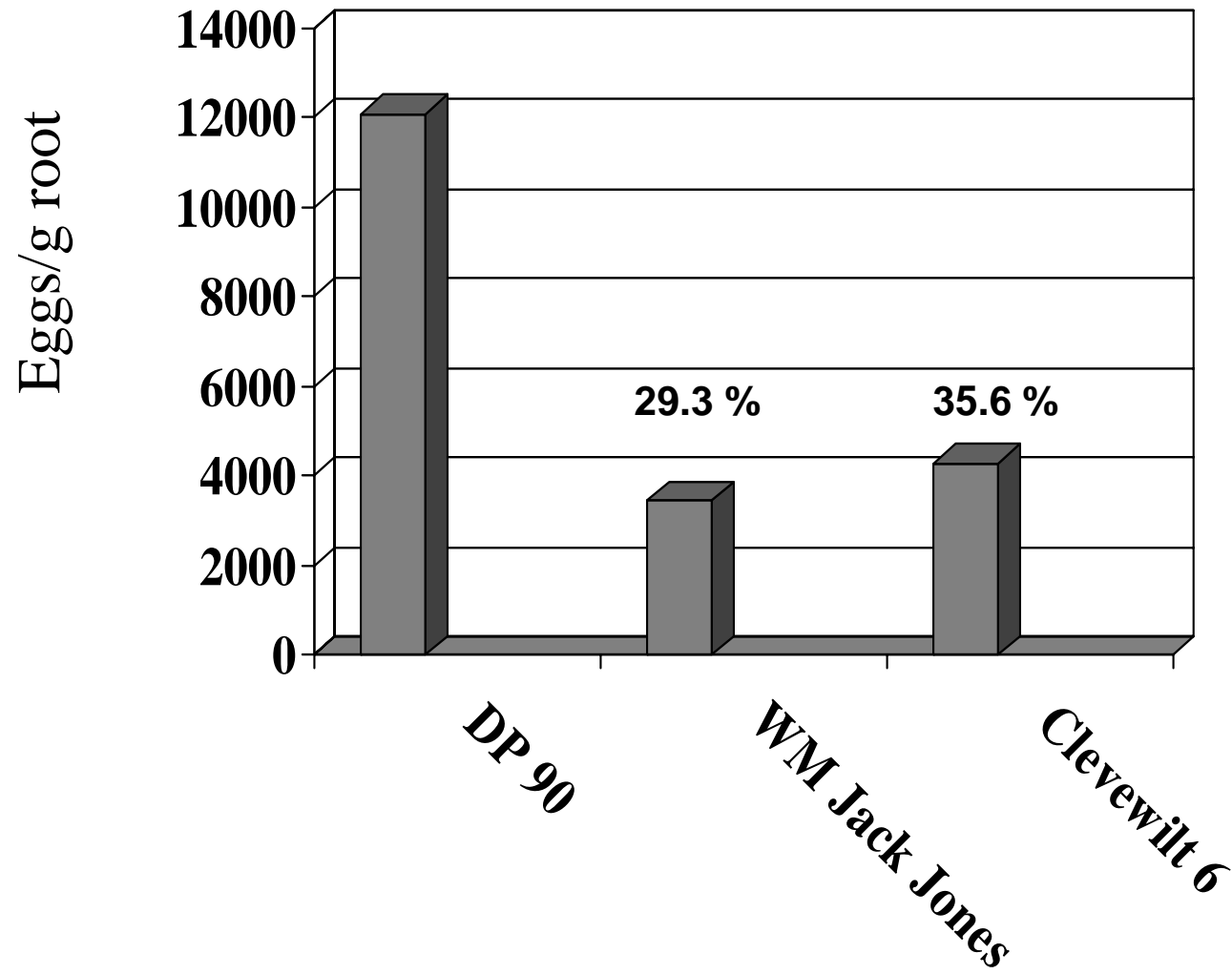
Germplasm

- *G. hirsutum* 'M315' x *G. barbadense* 'Tx110'
- Original RFLP map of cotton by was based on *G. hirsutum* x *G. barbadense* (Reinish et al. 1994)
- *Lineage of M315* - 1955 A. L. Smith crosses two moderately resistant *G. hirsutum* genotypes, 'Clevewilt 8-6' x 'Mexico Wild Jack Jones'
 - 1974 R. L. Shepherd releases Auburn 623 RNR, a highly resistant selection from the F9 generation of the cross, reports transgressive segregation
 - 1982 R. L. Shepherd releases Auburn 634 RNR, a BC₃F₄ selection from Auburn 56 x Auburn 62 RNR
 - 1988 R. L. Shepherd et al. release M315 RNR, a BC₂ selection from Deltpine 61 x Auburn 634 RNR
- 2004 McPherson et al. report resistance to root-knot in M315 inherited as two genes, one dominant and one additive

Initial Efforts to Identify Markers Linked to RK Resistance Loci

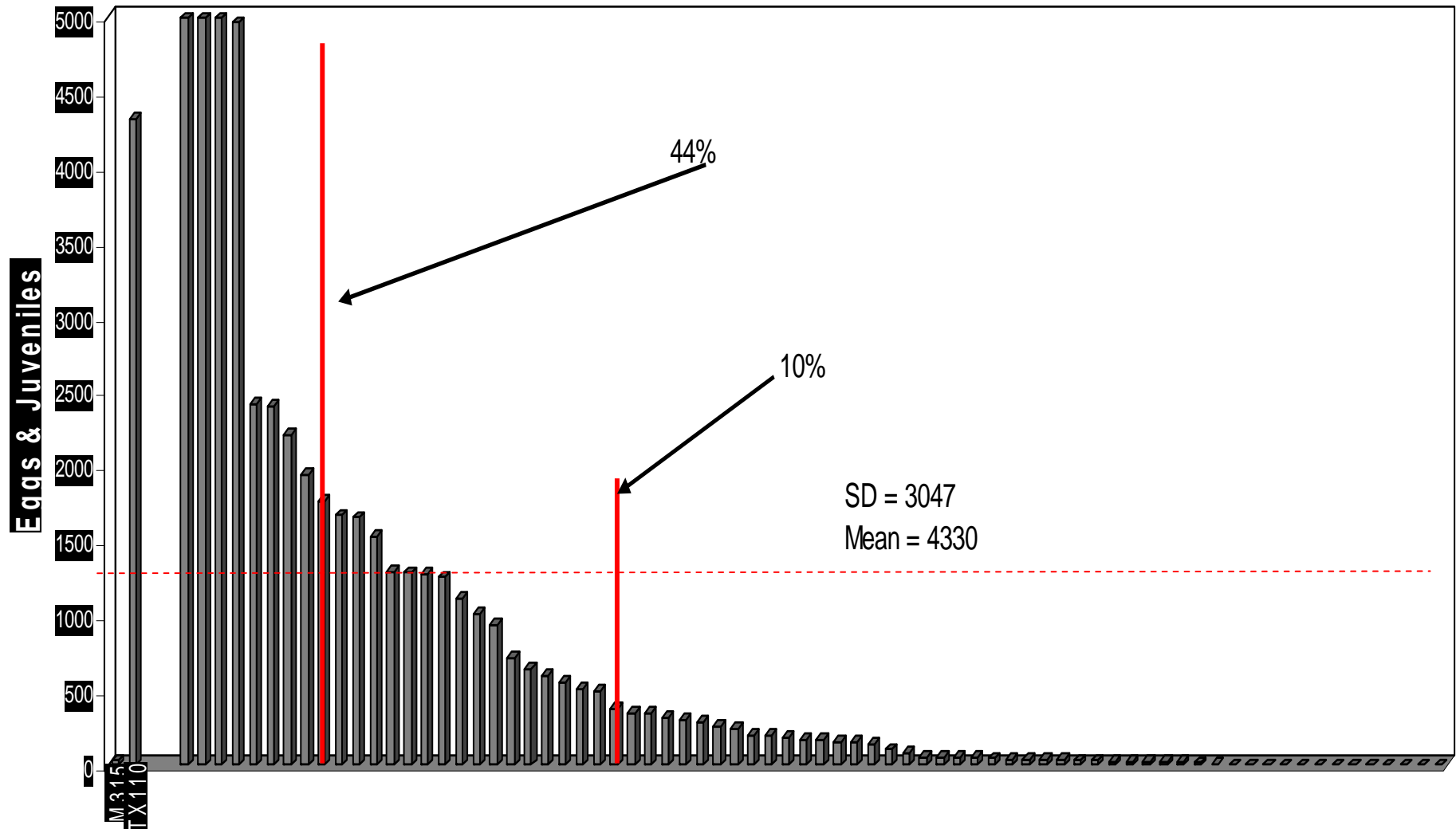
- D. Silvey screens ca 123 F2 from M315 X Tx110 for resistance phenotype
- Uses bulk segregant analysis to identify RFLP linked to resistance
- Initially screens 175 probes from map of *Reinish et al. 1994*
- Eventually identifies two RFLP loci with a loose linkage to resistance loci

Resistance in Wild Mexico Jack Jones and Clevewilt 6 to *M. incognita*



M. incognita resistance

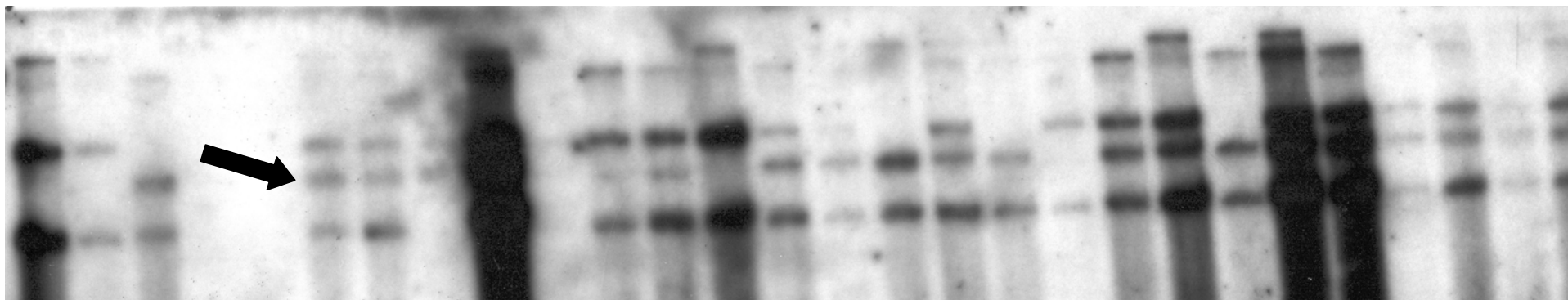
- F₂ data –M315 x Tx110



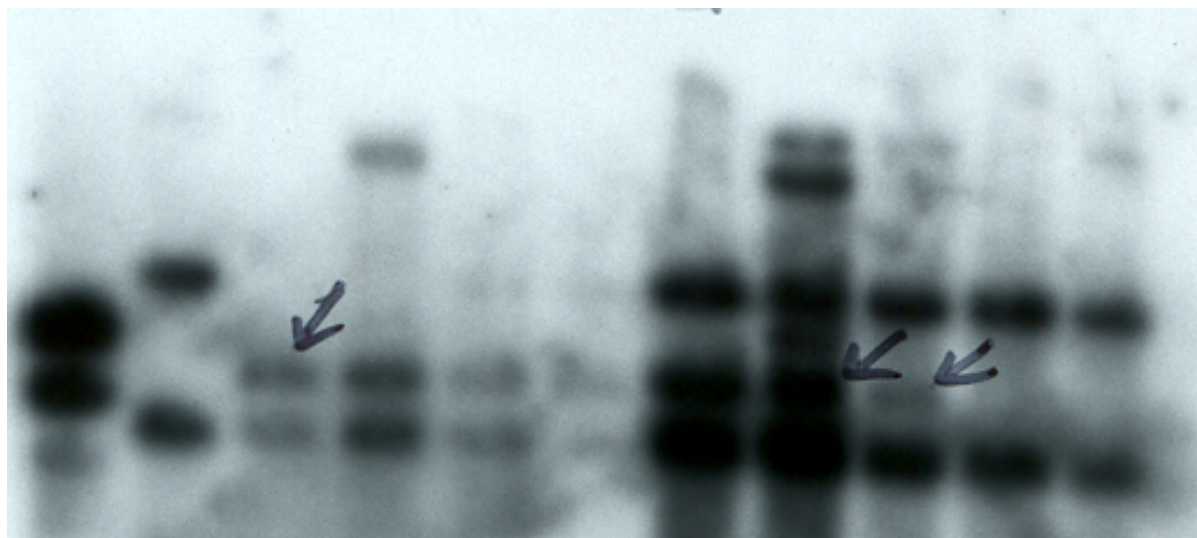
Locus A1214, LG A02 , 18.6 cM from the resistance locus

Tx 110
M315

F2 individuals



RFLP Locus pAR815, Chromosome14, 21.6 cM from resistance locus



Subsequent efforts

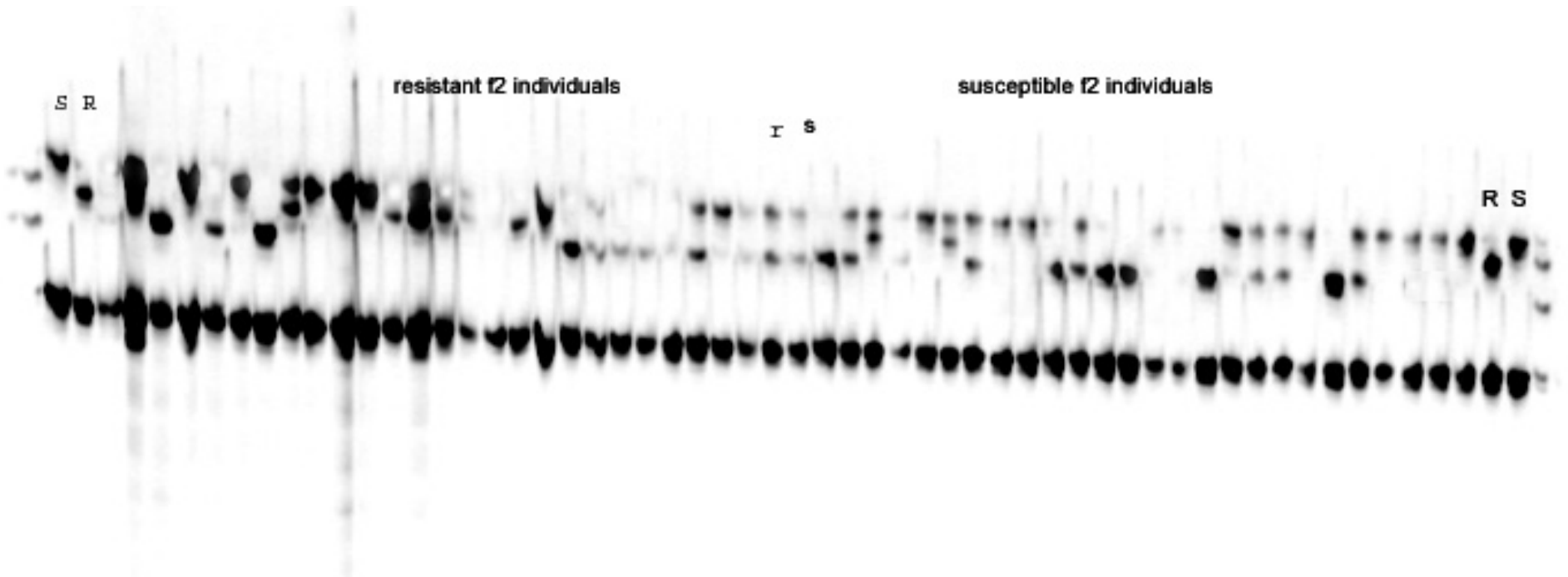
- D. Silvey obtains additional RFLP probes that map to linkage groups of interest
- No RFLP maps to resistance loci?
- Several RFLP patterns extremely difficult to read

SSR Markers – Edina Moresco

- Based on preliminary efforts with RFLP and newly published SSR map (Lecape et al., 2003) that is anchored to Reinish et al. RFLP map, the decision is made to screen SSR for linkage to resistance
- No SSR found linked to resistance, based on phenotypic data collected by D. Silvey
- Another F2 population screened for resistance to RK and used as a mapping population

Using New mapping population have identified on SSR loci tentatively linked to resistance – CIR 393 from Chromosome 7

Resistant individuals – 12/23 with S band, 11/23 with R band
Susceptible individuals – 19/24 with S band, 2/24 with R band



Additional Activities – Further Analysis of Inheritance of Resistance

- Numerous accessions of *G. hirsutum* reported as having at least moderate resistance to root-knot
 - Includes six accessions all from Yucatan identified as having some resistance by Robinson & Percival (1997)
- To determine number of alleles present, a diallel cross establish among 8 parents
 - Includes DP90 as susceptible and Cleve-wilt 8-6 as one of the resistant parents, along with the six resistant accessions identified by Robinson & Percival
- To date
 - All crosses achieved
 - F2 generation available for all combinations except for PI1174