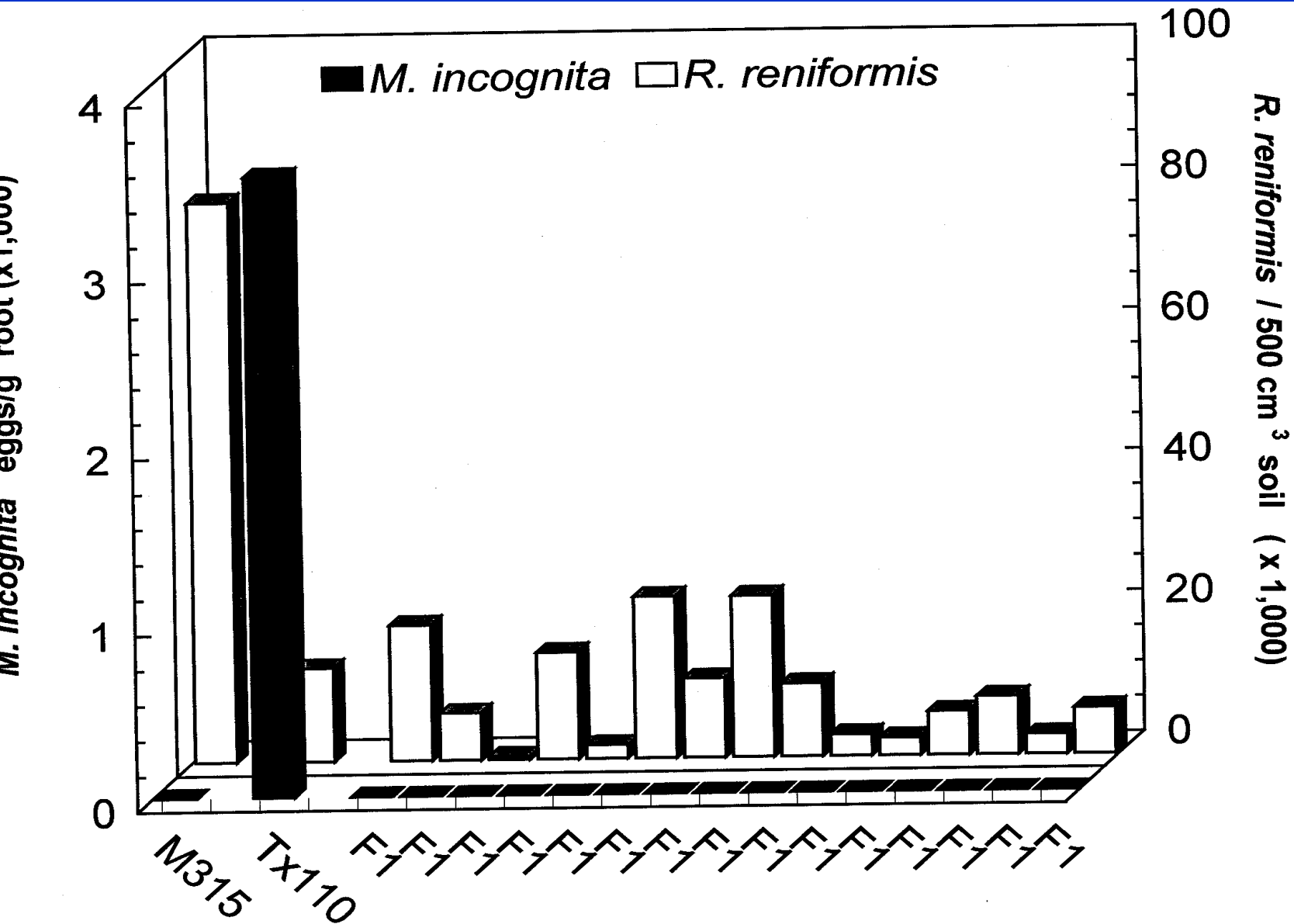


# Inheritance of Resistance to Root-knot

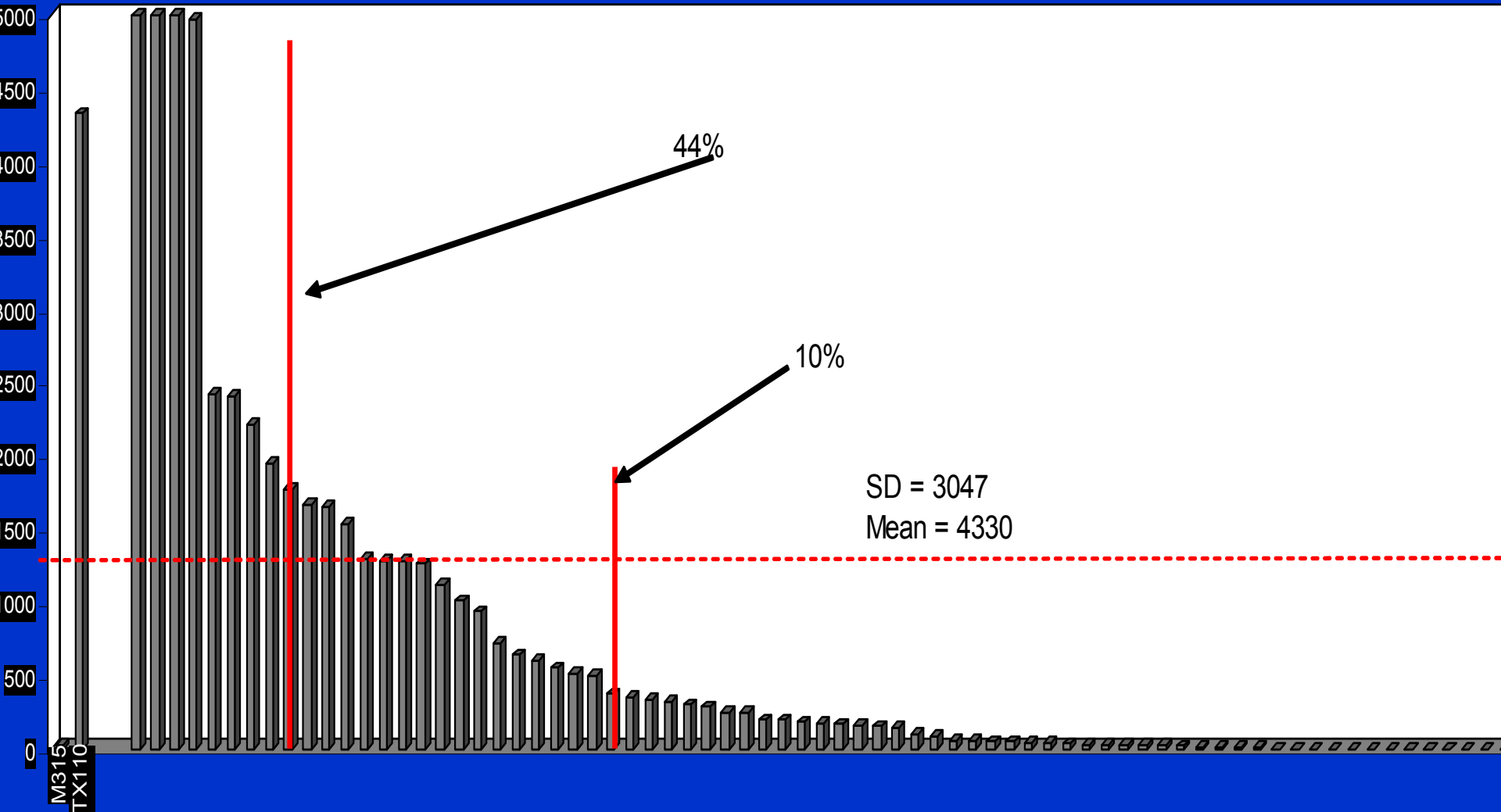
- Shepherd (1974) – resistance in Auburn 623 RNR probably multigenic and partially dominant
  - Derived from Clewilt 6 x Wild Mexico Jack Jones
- McPherson (1993) – degree of dominance varied among “M” lines, with M315 RNR & M25 RNR having one dominant and one additive gene. M19, M78, & M487 RNR have one dominant gene
  - All of which were derived from Auburn 623 via Auburn 634
- Zhou (1999) – resistance in M240 RNR segregates as two dominant genes

# F<sub>1</sub> from M315 x Tx110

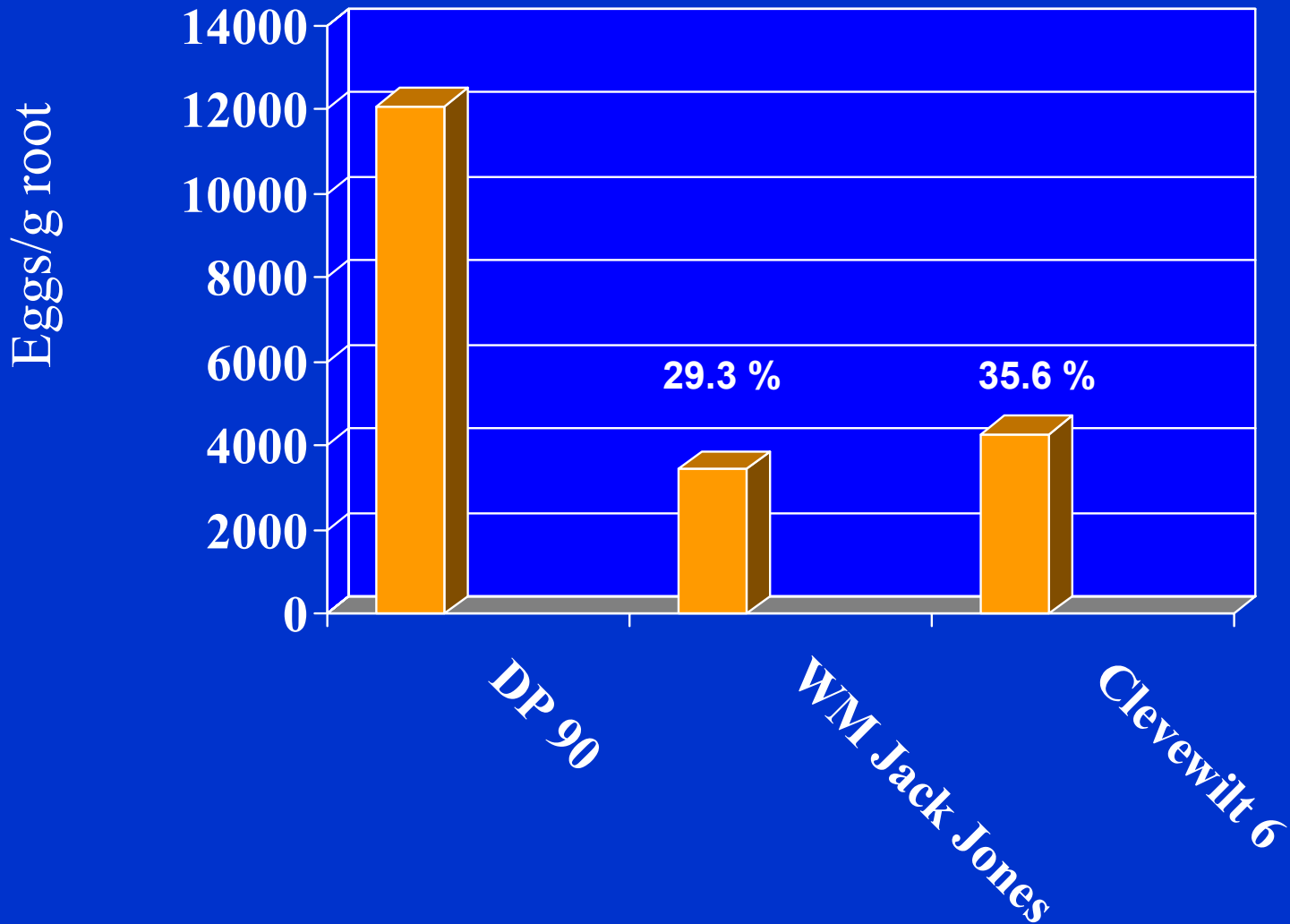


# *M. incognita* resistance

- F<sub>2</sub> data –M315 x Tx110



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



# *M. incognita* resistance

- Previous research has provided evidence of two major genes for resistance (McPherson, 1993)
  - One dominant gene and an additive gene

	15:1	13:3	3:1
44% - Tx110	0.009	10.67	19.75
10% - Tx110	52.63	1.137	0.198

Critical value = 3.84

# Inheritance of Resistance to Root-knot in Clevewilt 6 and Wild Mexico Jack Jones

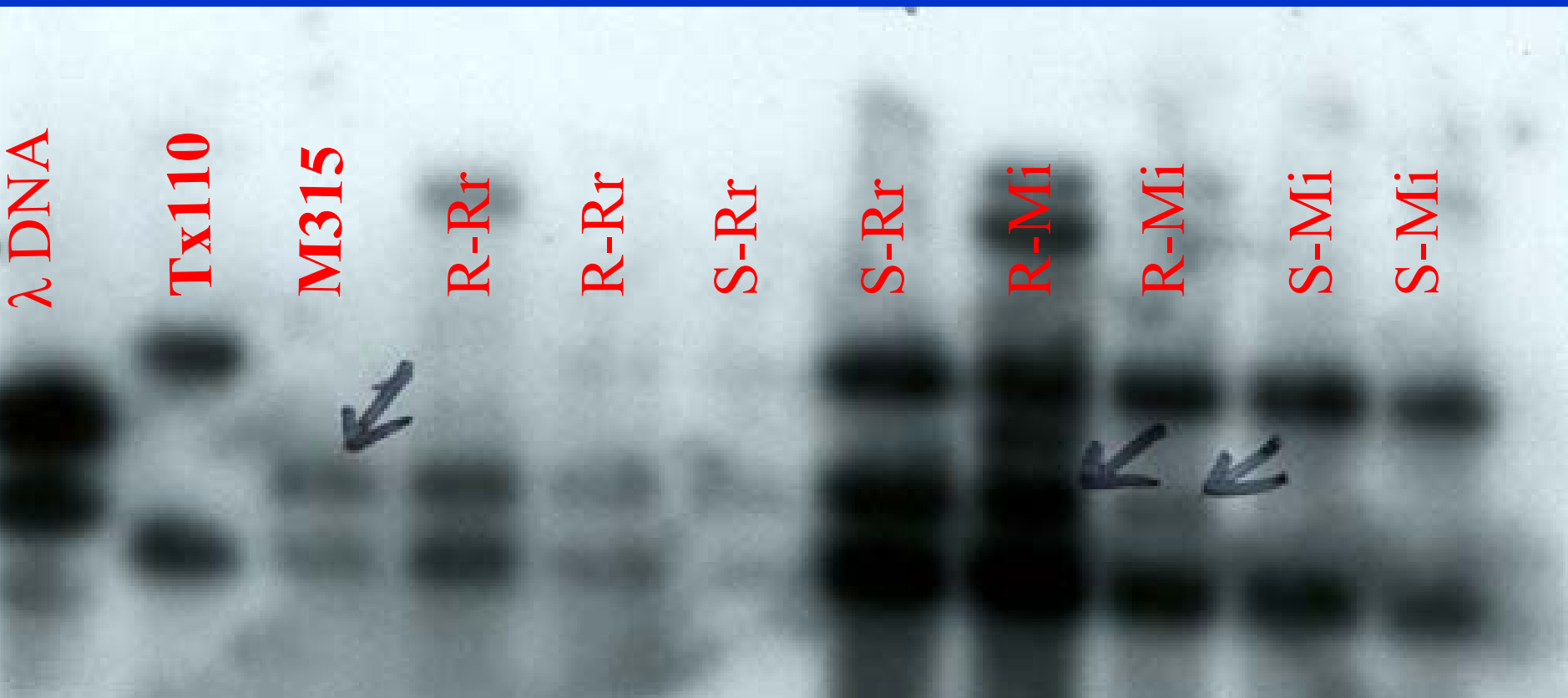
- Clevewilt x DP90 – waiting to harvest seed, will test F1 (September), produce F2 and screen for resistance (Spring)
- WM Jack Jones x DP90 – WM Jack Jones plants have not flowered

# Screening RFLP Loci

- Bulk segregant analysis (BSA) (Michelmore et al., 1991)
  - Allows quick and efficient screening
    - 192 of the 566 available RFLP loci were screened
  - BSA increases the confidence a probe is linked to the trait of interest

# Screening RFLP Loci

- Probe: pAR815 (800 bp)
- Location: c14, maps to 21.6 cM from resistance locus





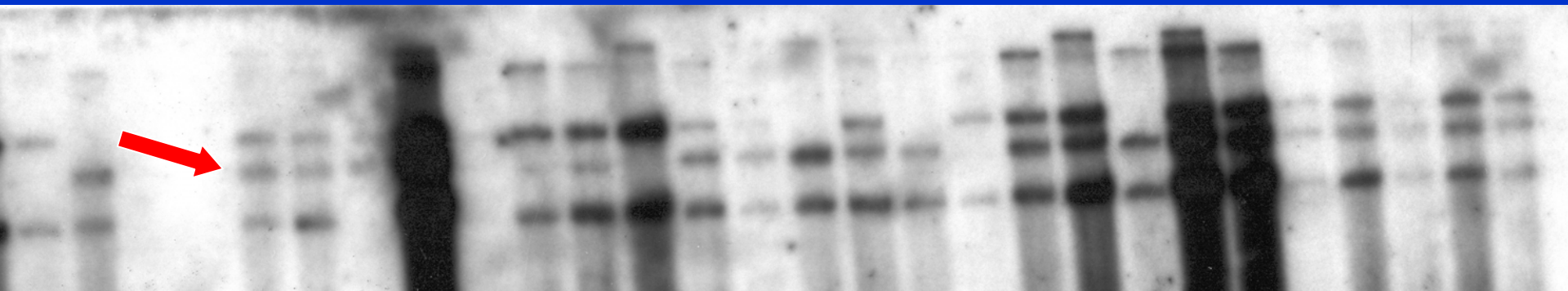
# Locus B1-3

Located on LG A02 at 18.6 cM from  
the resistance locus

Ex 110

M315

F2 individuals

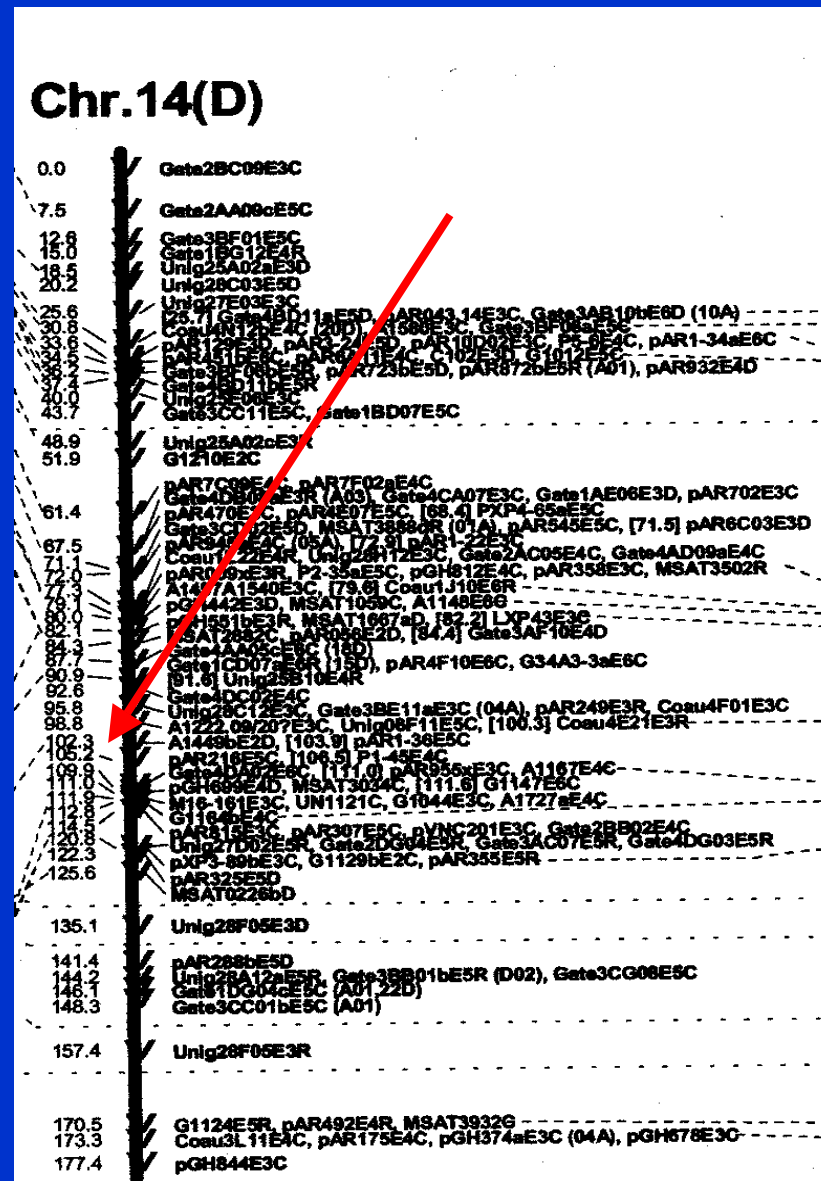


## Next – Markers for Resistance to Root-knot

- Have obtained additional RFLP probes from the two linkage groups of interest – will complete screening of these in August
- May obtain yet more RFLP probes from these linkage groups
- Will look for other markers – some SSR and AFLP markers are now on the RFLP map

# Example of linked loci

- Probe: pAR815 (800 bp), c14, at 21.6 cM

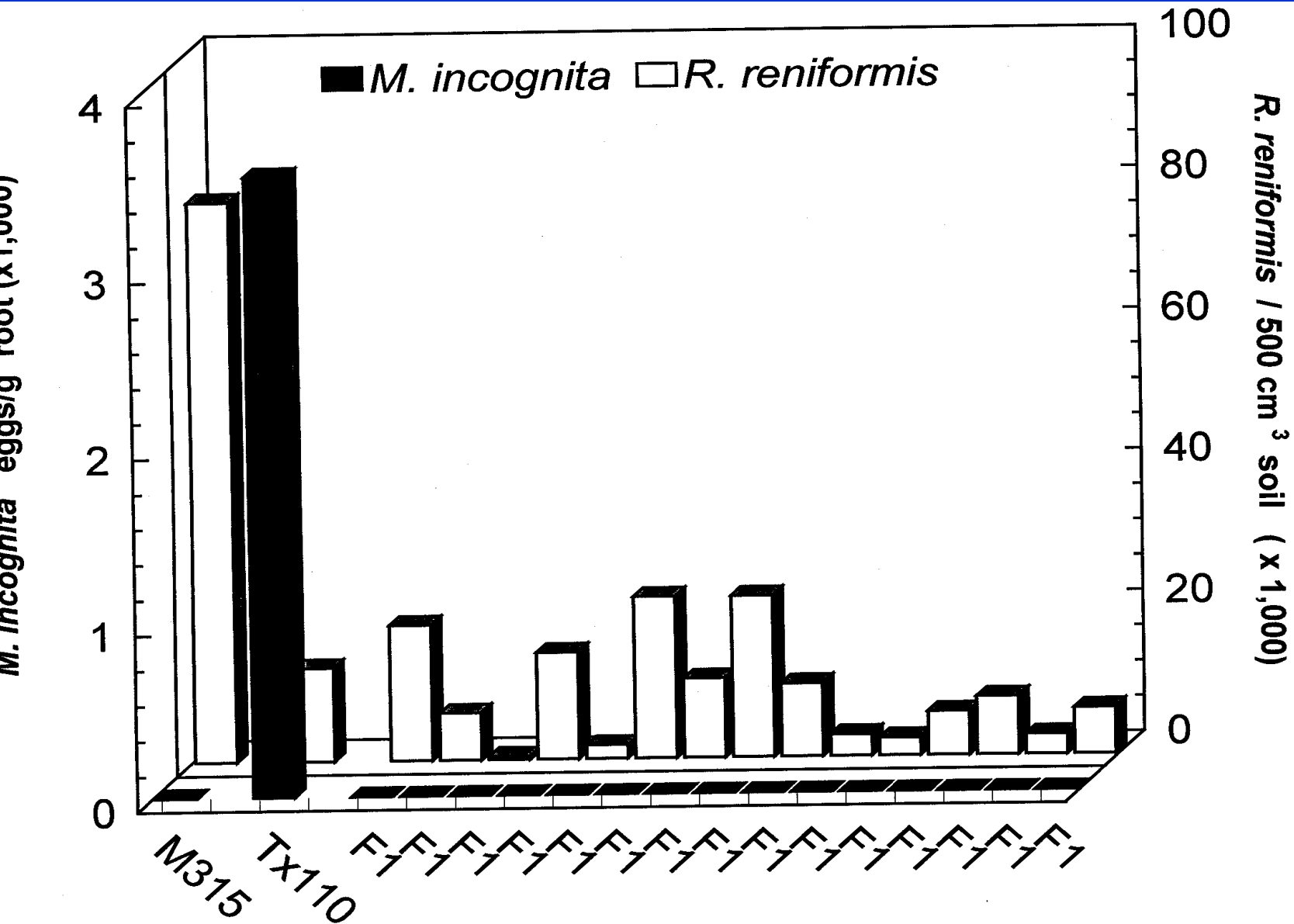


(Reinisch et al., 1994)

# Inheritance of Resistance to Reniform nematode

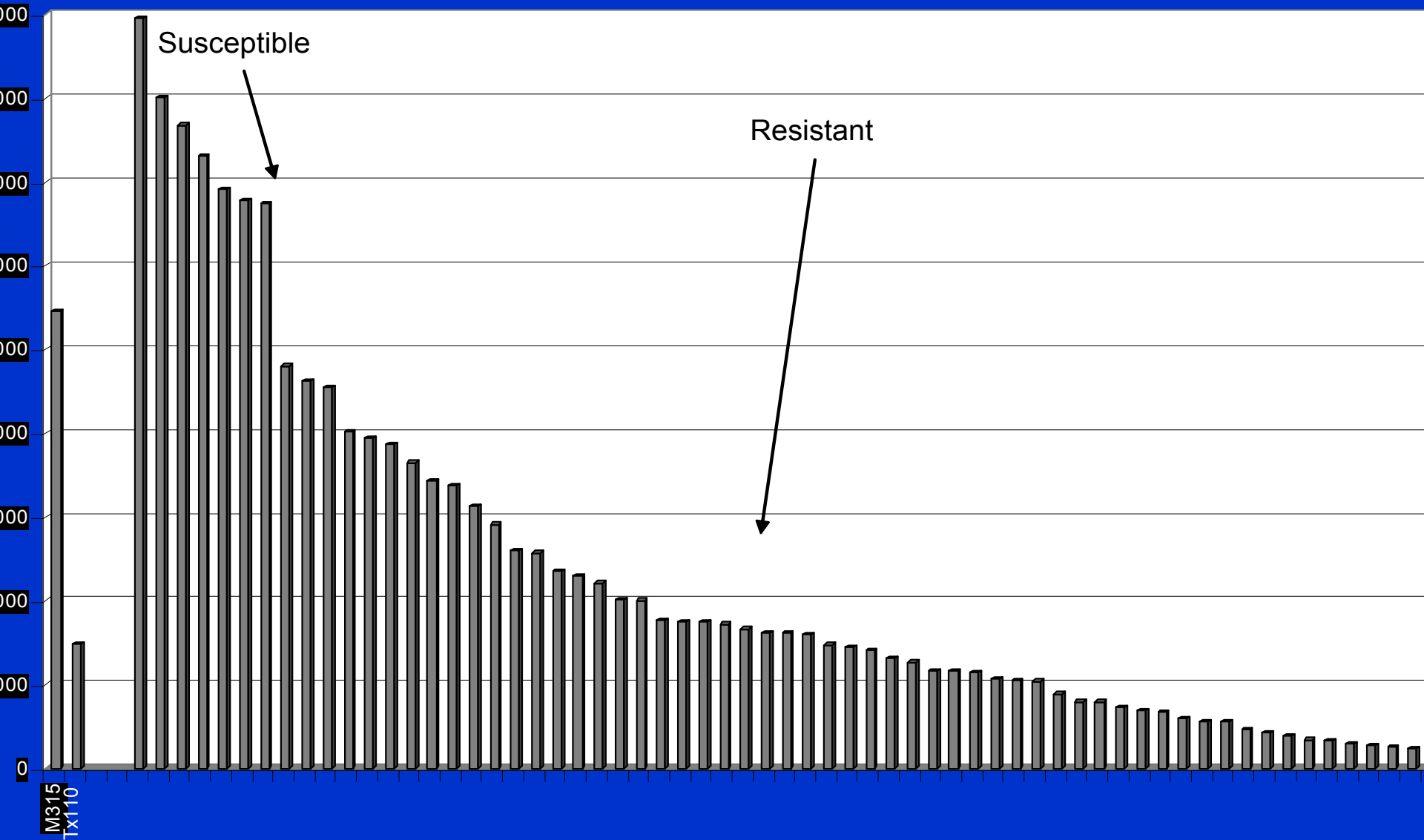
- Resistance of Tx110 originally reported by Yik & Birchfield (1984)
- Resistance confirmed by Starr et al., and by Robinson et al. in greenhouse, microplot and field tests.
- No previous data on inheritance of resistance

# F<sub>1</sub> from M315 x Tx110



# *R. reniformis* resistance

- F<sub>2</sub> data – M315 x Tx110



# Inheritance of Resistance to *R. reniformis* in *G. barbadense* 'Tx110'

- Reaction of F1 suggests that resistance must be at least partially dominant
- Resistance appears to be a quantitative trait controlled by multiple genes
- ~5 genes may be associated with resistance (C. Gill, Personal Communication)
- We are currently looking at level of resistance in five F4:5 lines

# Introgression of Resistance to Reniform from Tx100 into Root-knot Resistant *G. hirsutum*

- Two populations derived from original Tx110 X M315 exist
  - F3:4 Selected for Root-knot resistance in F3
  - F4:5 Selected for Reniform resistance in the F4
- Will no longer try to screen for resistance to each to both nematodes in each generation but will use alternating selection
- F4:5 being screened for reniform resistance, flower color, date of flowering, and leaf morphology



# RFLP Markers Linked to Resistance to Reniform

- No linkages found in first subset of 192 probes
- Have requested a set subset of probes to screen

# *R. reniformis* resistance

- F<sub>2</sub> data – M315 x Tx110

