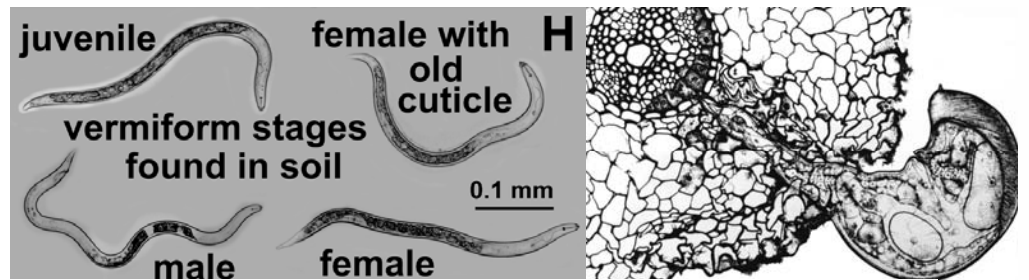
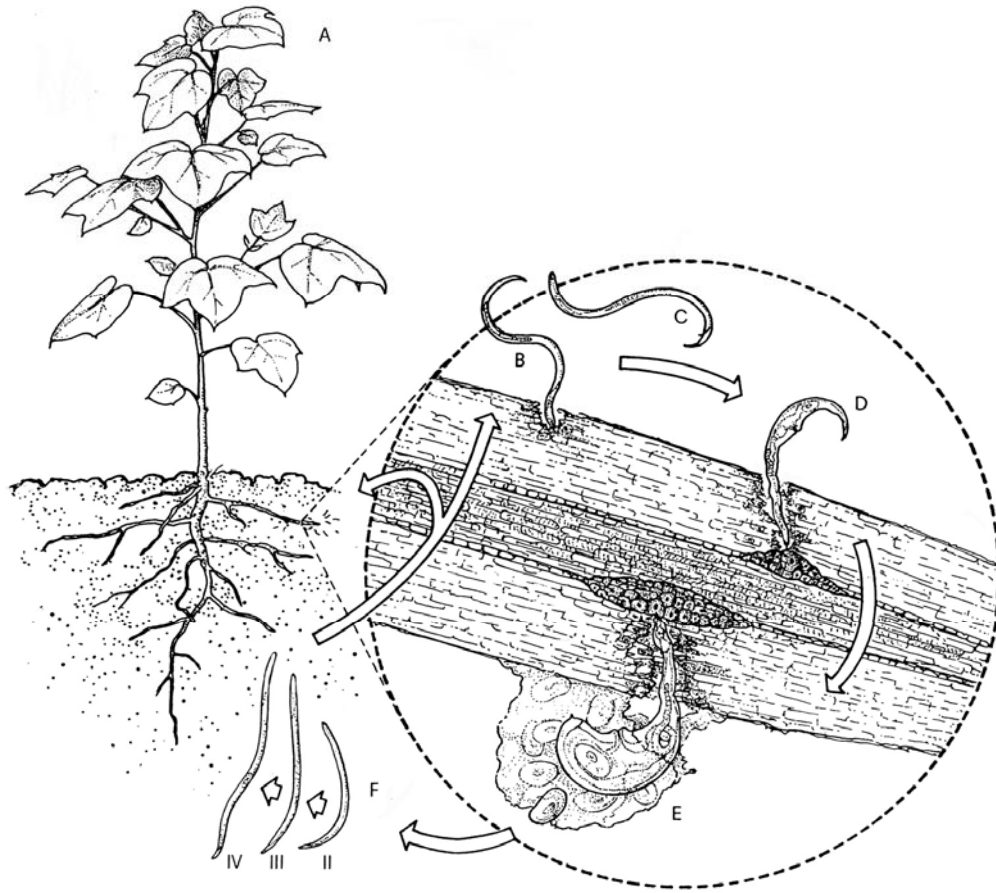
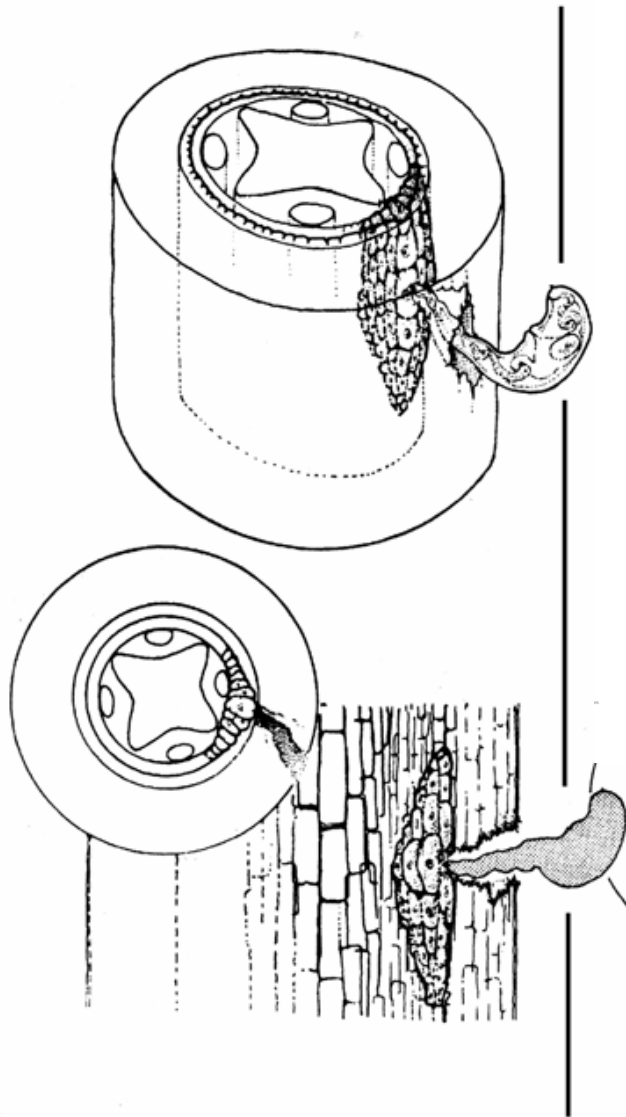
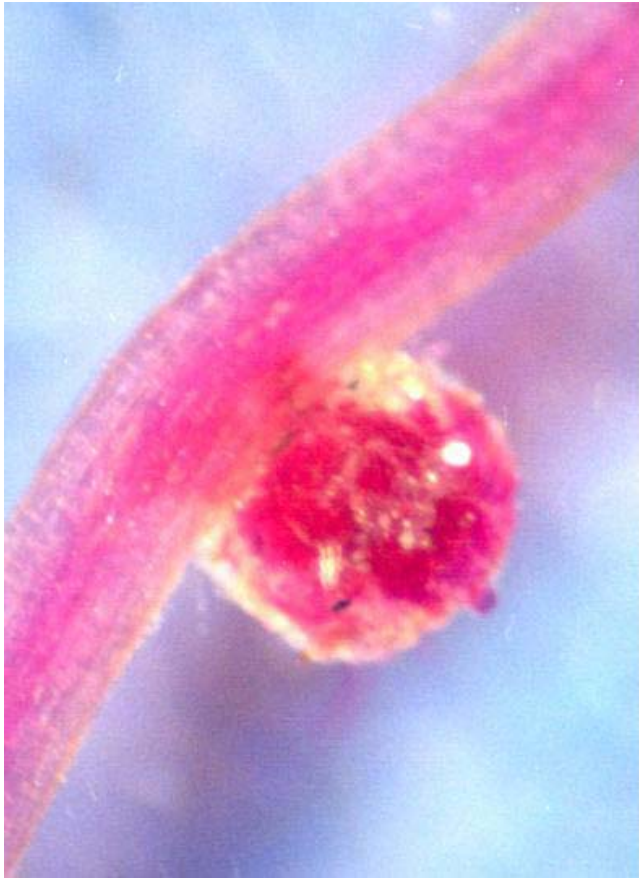


1st slide – Robinson et al.
Cotton Improvement
Friday, 8:45 a.m.
Marriott Grand Ballroom Bissonet

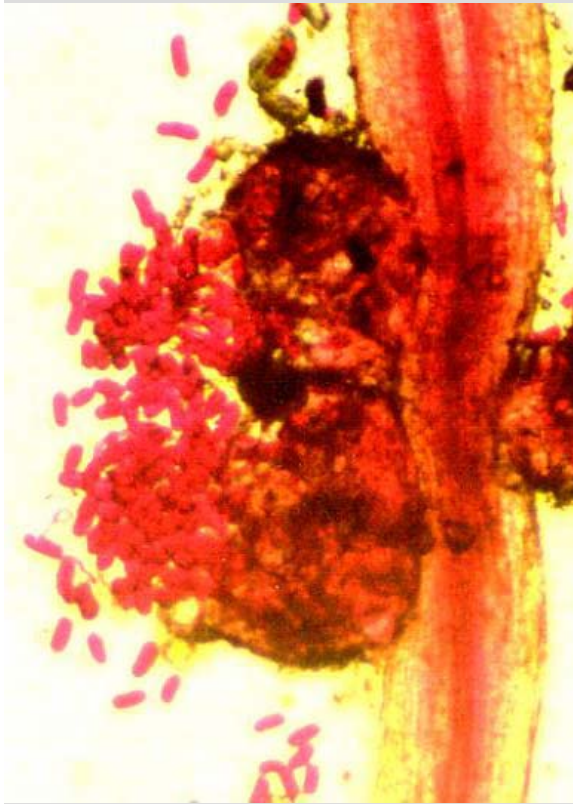
Rotylenchulus *reniformis*



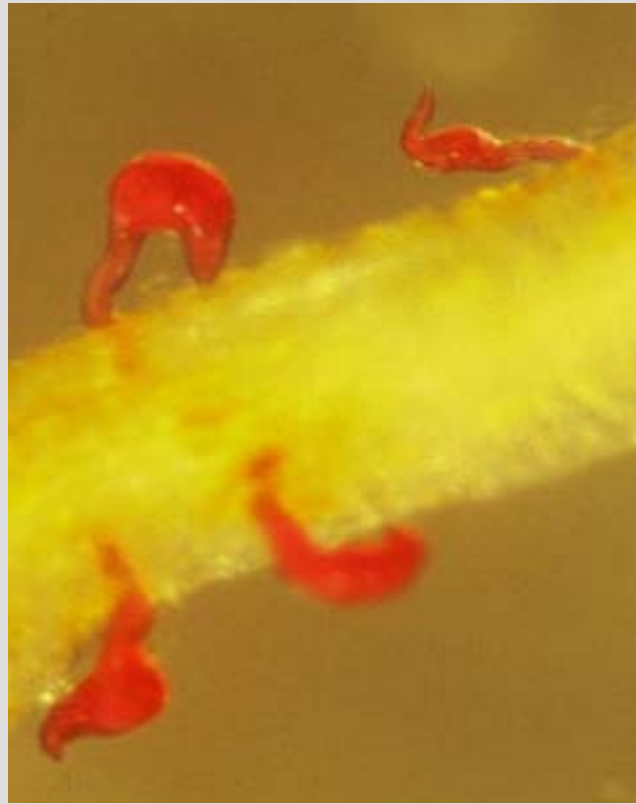


**Reniform with
sand stuck to
egg masses
on roots**





**Females
with eggs**



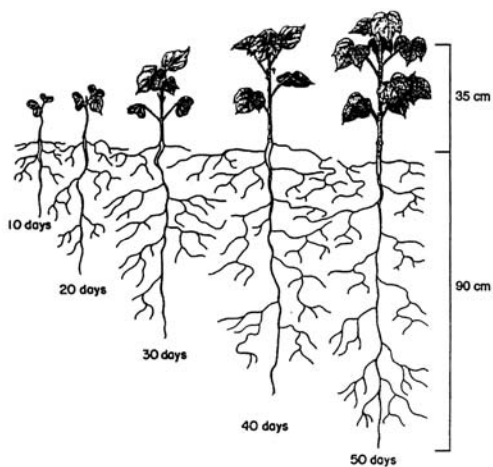
**Females with
eggs removed**



**Females
removed
and laid
on top of
the root**

Reniform nematode

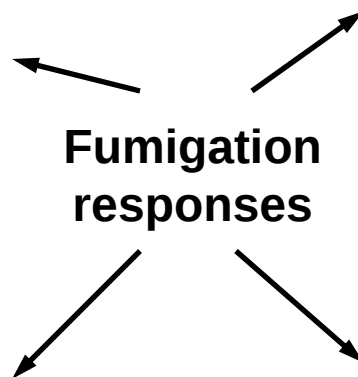
Alabama



Louisiana

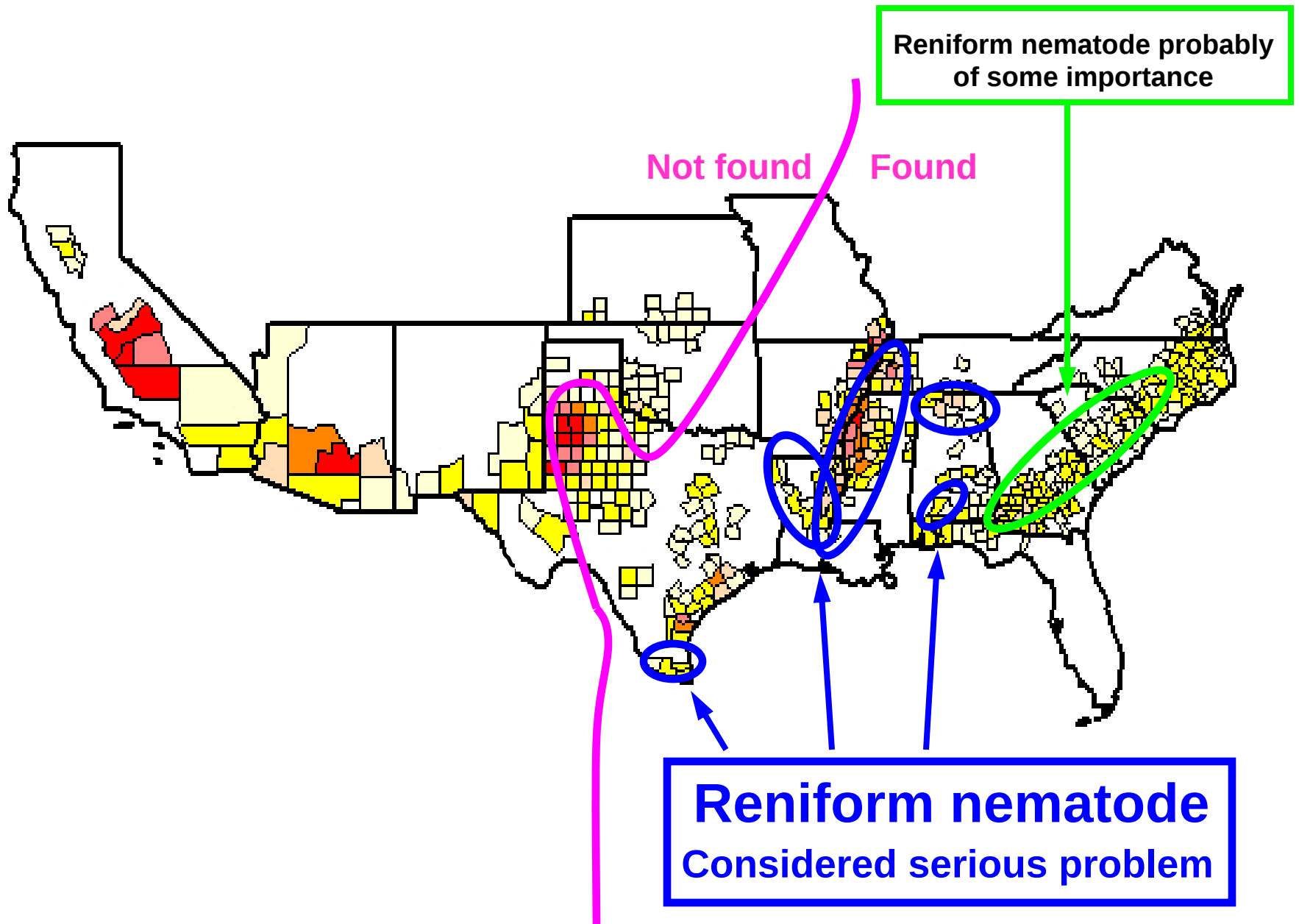


Texas



**Percentage of area considered
infested with *Rotylenchulus*
reniformis in each state**

Alabama	(12,000 ha)
Georgia	29.6
Louisiana	55.0
Mississippi	32.4
Texas	2.7



Cotton Production 2002

Status – Reniform Nematode Resistance in Cotton

Resistance category

Notes

Susceptible

Contemporary cultivars
Obsolete cultivars

Probably all
Probably all (5)

Tolerant

11 breeding lines

(3, 4)

Resistant

3 *G. hirsutum* accessions

Disconfirmed (1, 6)

G. barbadense TX-110, TX-1347, TX-1348

Confirmed (6, 7)

G. arboreum

Confirmed (1, 2, 5, 6)

G. herbaceum

Confirmed but weak (1, 6)

G. anomalum, raimondii, somalense, stocksii, thurberi (1)

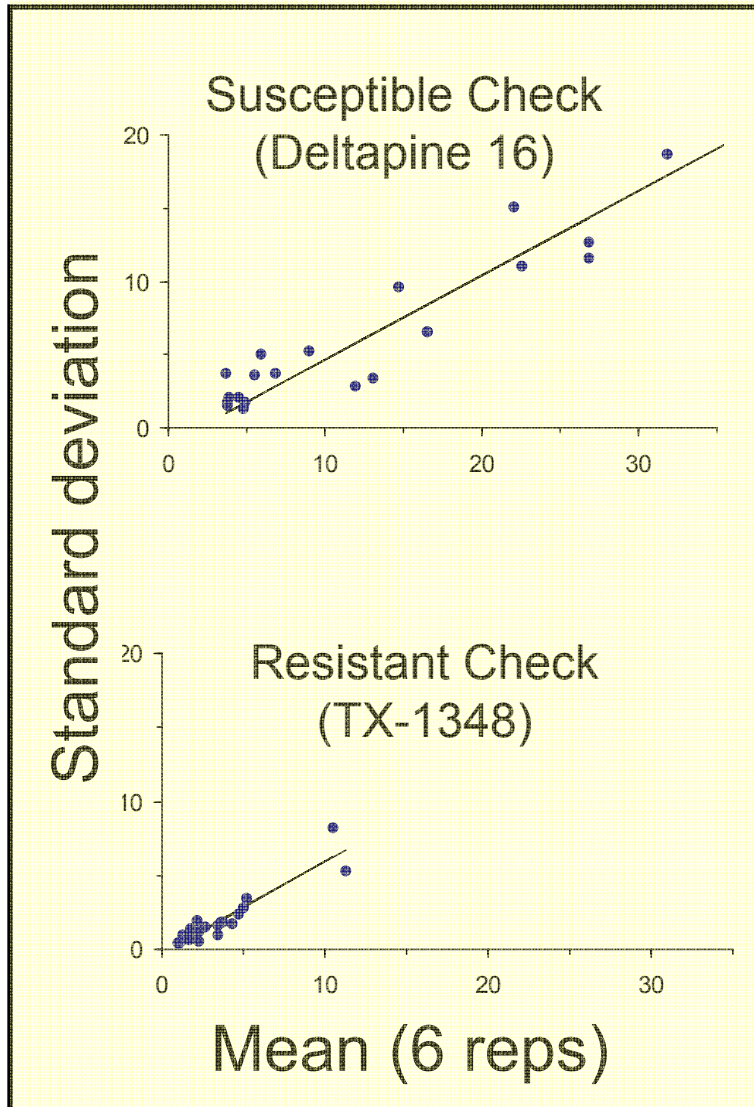
Immune *G. longicalyx*

(1, 5, 8)

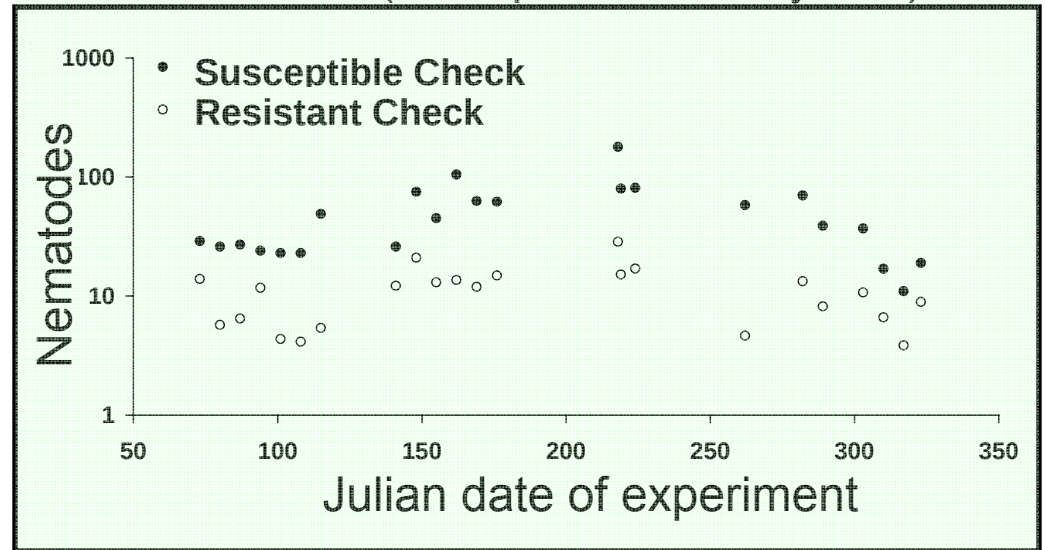
Investigators: 1 Yik and Birchfield; 2 Carter; 3 Jones; 4 Cook et al.; 5 Stewart;
6 Robinson et al.; 7 Starr & Smith; 8 Bell & Robinson



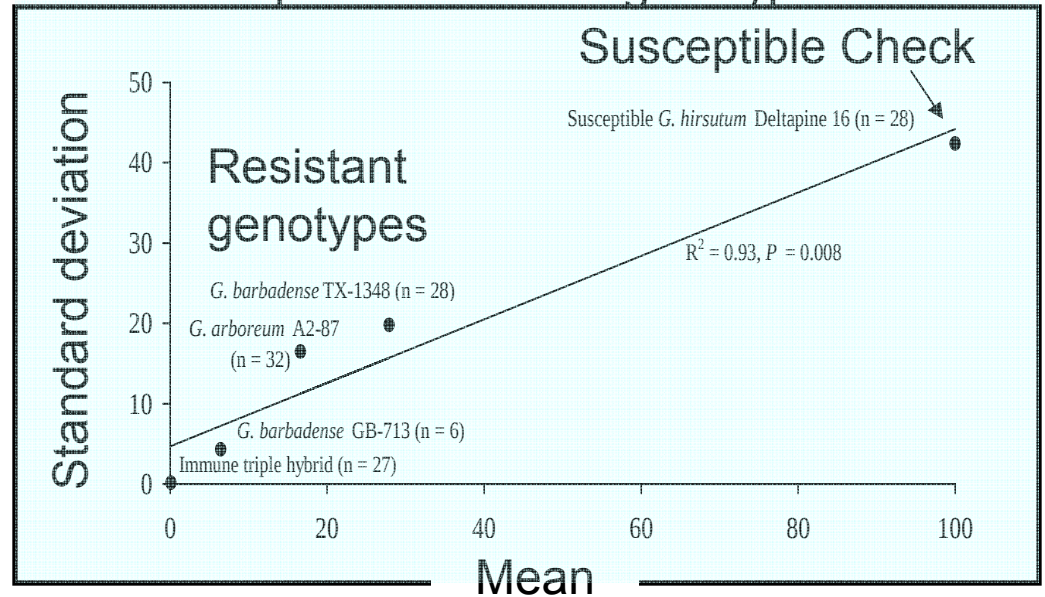
Poisson distribution

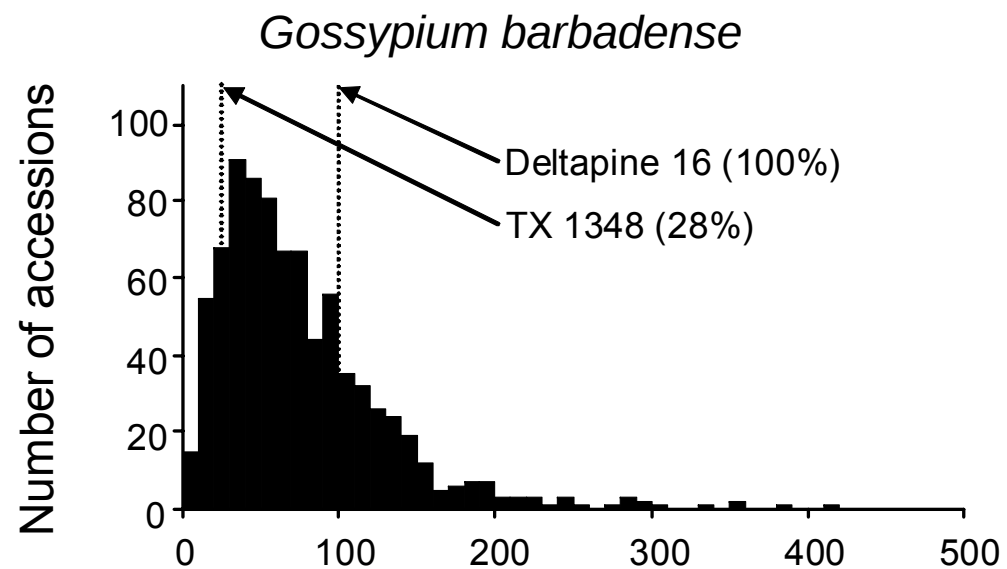
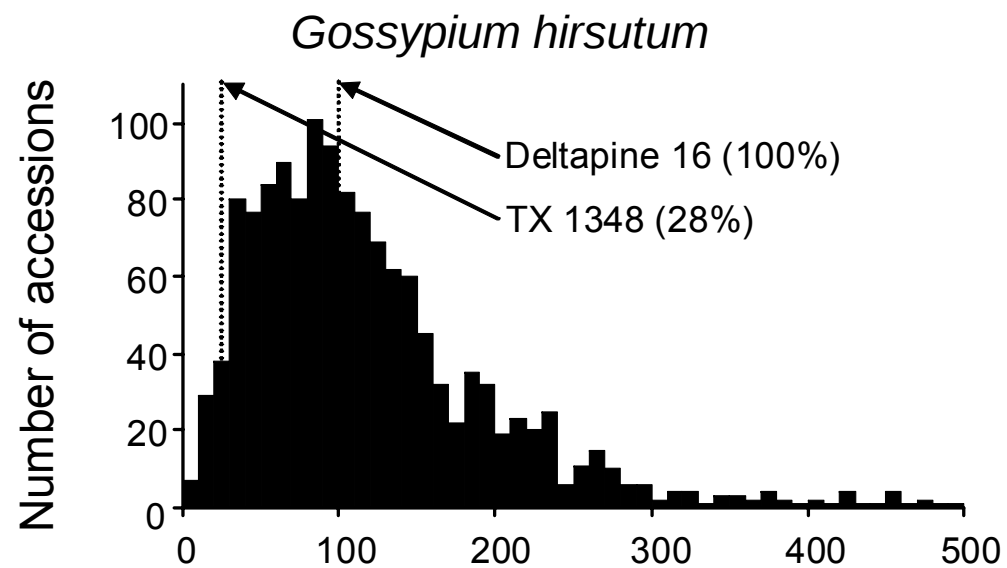


Experimental controls: greenhouse
seasonal effects (23 experiments; 3 years)



Some examples of resistant genotypes





Nematode reproduction (% of Deltapine 16)

Classification of accessions in greenhouse

Reniform nematode reproduction				
0 < TX-1348 < Deltapine 16 < ∞ OR				
Species	Possibly resistant	Probably susceptible	Susceptible	Not classified
<i>Gossypium hirsutum</i>	66 (47 retested)	650	703	447
<i>Gossypium barbadense</i>	105 (31 retested)	544	201	57

↑

Accessions retested in replicated growth chamber experiments

Resistant accessions in growth chamber experiments

Experiment 1

Experiment 2

Experiment 3

Experiment 4

Accession	Rr^{wx}		Accession	Rr^{wx}		Accession	Rr^{wx}		Accession	Rr^{wx}		Accession	Rr^{wx}	
	density	Mi^{xy}		density	Mi^{xy}		density	Mi^{xy}		density	Mi^{xy}		density	Mi^{xy}
	GH GC (% of DP-16)	gall rating (0-5)		GH GC (% of DP-16)	gall rating (0-5)		GH GC (% of DP-16)	gall rating (0-5)		GH GC (% of DP-16)	gall rating (0-5)		GH GC (% of DP-16)	gall rating (0-5)

Gossypium hirsutum

TX-71	13 85	2.0	TX-1167	16 137	1.5	TX-25	10 30 **	0.2 **
TX-79	16 39	3.7	TX-1403	1 93	3.4	TX-1414	8 48 **	2.1
TX-112	8 88	2.8				TX-1828	10 28 **	0.8 **
TX-390	16 175	3.1				TX-1860	10 26 **	0.5 **
TX-408	23 138	3.0				TX-1960	15 63 **	3.8
TX-459	11 90	1.6 *						

Gossypium barbadense

GB-13	15 9 *	2.8	GB-459	6 56	1.9	GB-126	10 24 **	2.9
GB-49	12 10 *	3.3	GB-485	12 19 **	2.8	GB-127	17 30 **	4.4
GB-207	34 27 *	2.3	GB-536	8 17 **	3.3	GB-171	14 8 **	2.2
GB-208	9 37	3.3	GB-581	10 24 **	2.5	GB-212	14 26 **	2.9
GB-210	18 26 *	3.8	GB-681	0 65	3.4	GB-833	4 27 **	2.7
GB-211	12 41	4.1	GB-706	1 60	2.8	GB-1045	14 35 **	2.2
GB-214	9 39	2.6	GB-713	3 3 **	3.2	GB-1081	4 23 **	4.1
GB-262	6 13 *	3.1	TX-110 ²	6 29 *	2.8	GB-1083	14 30 **	2.8
GB-264	6 9 *	3.3				GB-1113	10 24 **	3.9
TX-502 ²	12 22 *	2.5				GB-1141	7 30 **	2.5
						GB-1143	10 30 **	3.7
						GB-1145	14 34 **	3.4
						GB-1147	17 28 **	3.3

Susceptible control

DP-16	100	3.2	DP-16	100	3.0	DP-16	100	2.8
<i>Mi</i> -resistant control								
Aub-623	—	1.1 **	Aub-623	98	0.0 **	Aub-623	—	0.7 **
<i>Rr</i> -resistant controls								
TX-1348	13 **	—	TX-1348	20 **	3.5	TX-1348	13 **	—

TX-8	30 83	TX-1849	27 57
TX-9	25 75	TX-1854	22 78
TX-11	28 146	TX-1856	27 88
TX-244	31 125	TX-1857	19 111
TX-289	23 112	TX-1861	32 63
TX-464	18 82	TX-1864	19 78
TX-720	7 117	TX-1866	31 83
TX-748	29 32 *	TX-1868	15 88
TX-768	33 143	TX-1873	19 49
TX-1421	12 48	TX-1884	32 80
TX-1536	17 57	TX-2051	32 70
TX-1585	19 103	TX-2086	22 80
TX-1586	13 33 *	TX-2161	12 117
TX-1666	20 76	TX-2408	17 107
TX-1736	26 58	TX-2459	18 68
TX-1787	25 40 *	TX-2468	17 53
TX-1810	32 108	TX-2469	2 34 **

G. hirsutum

G. barbadense

Controls

Reniform nematode resistant

Root-knot nematode resistant

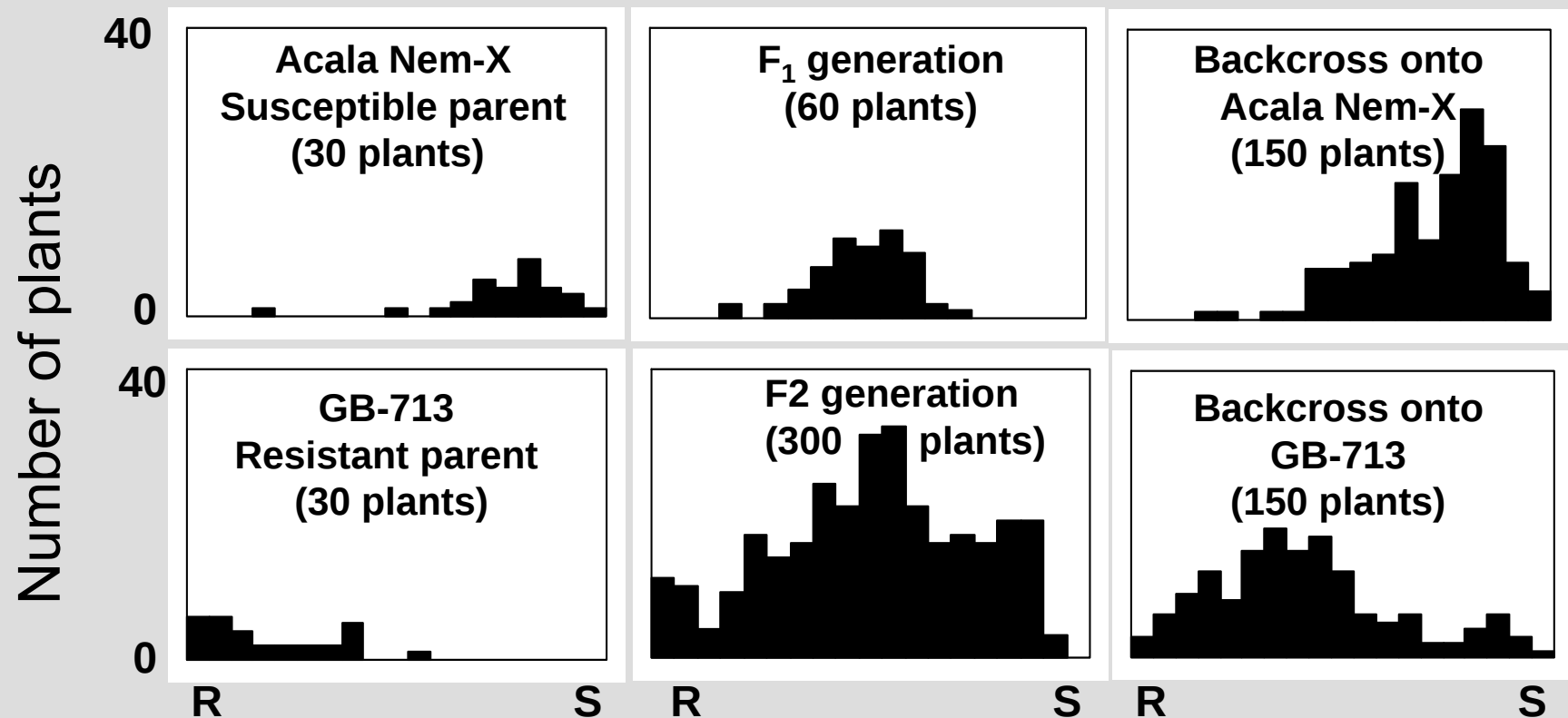
Reniform nematode-resistant accessions

(Accessions listed in increasing order of resistance)

	<i>G. hirsutum</i>	<i>G. barbadense</i>
Moderately resistant (< 34% Deltapine 16)	TX-2469 TX-1586 TX-748 TX-25 (+root-knot) TX-1828 (+root-knot) TX-1860 (+root-knot)	GB-127 GB-1083 GB-1141 GB-1143 TX-110 GB-1147 GB-207 GB-833 GB-210 GB-212 GB-126 GB-581 GB-1113 GB-1081 TX-502 GB-485 GB-536 GB-262 (TX-1348 confirmed)
Resistant (<10% Deltapine 16)	None	GB-49 GB-13 GB-274 GB-171 GB-713 (3%)

Crosses made with or among red accessions.

Inheritance of Reniform Nematode Resistance from GB-713 (720 plants in study)



Logarithm of nematodes per gram of soil
(R = resistant; S = susceptible; scales identical)

F2 progeny from crosses
between resistant accessions
of *G. hirsutum*

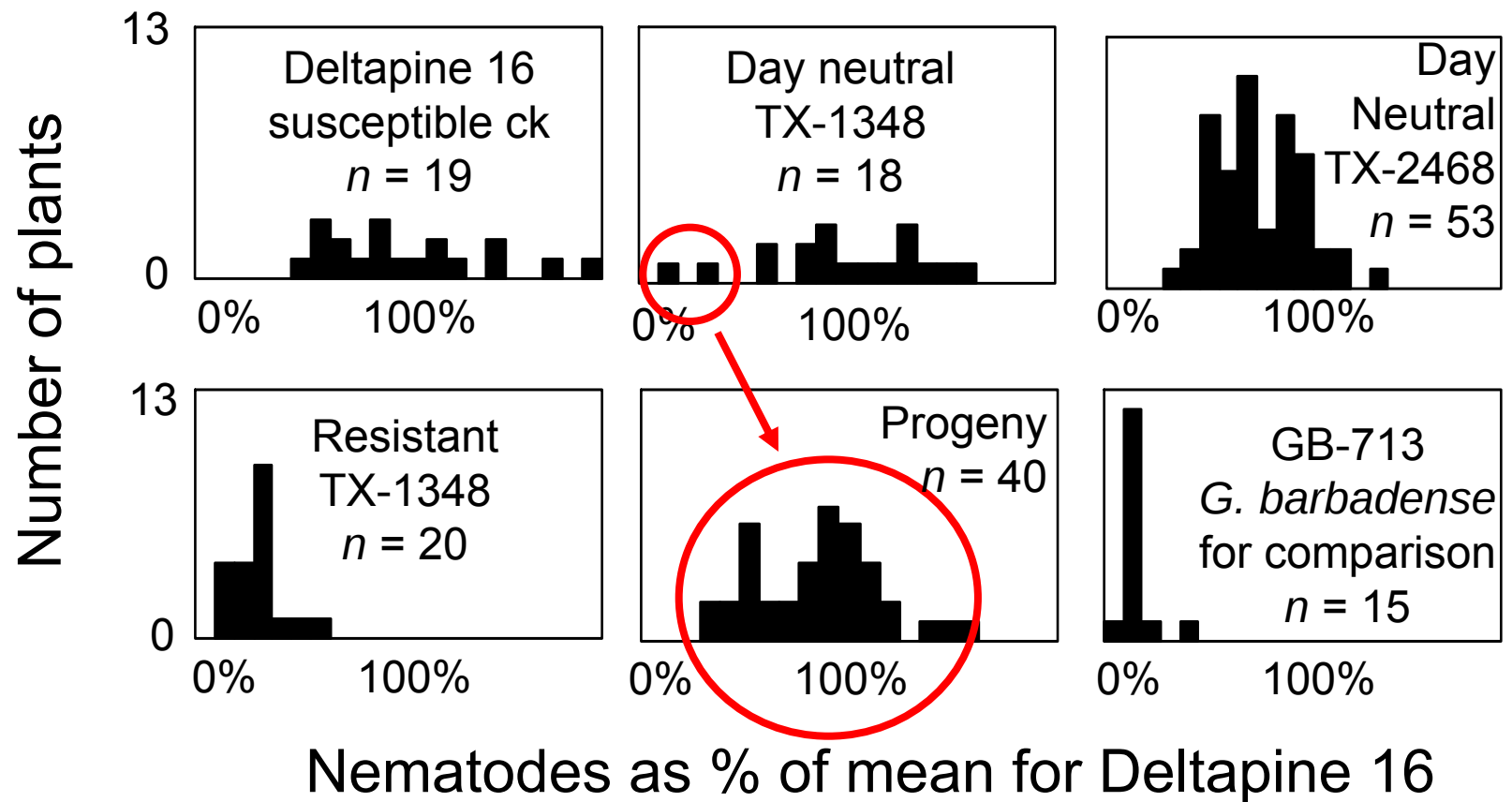
Susceptible control



F₂ generation from half diallel among moderately resistant *G. hirsutum*

Cross					No. of plants	
TX-25 →	20	Not yet tested	Not yet tested	10	Not yet tested	Tested
	0			0		Resistant
	0			0		Moderately resistant
TX-748 →	19	Not yet tested		41	14	Tested
	0			0	0	Resistant
	12			16	1	Moderately resistant
TX-1586 →	Not yet tested	Not yet tested		18		Tested
				4		Resistant (< 10% DP16)
				10		Moderately resistant
TX-1828 →	Not yet tested			10		Tested
				1		Resistant (< 10% DP16)
				6		Moderately resistant
TX-1860 →	40					Tested
	8					Resistant (< 10% DP16)
	19					Moderately resistant
TX-2469						

Evaluations of day neutral converted lines of reniform nematode resistant accessions



Alan Bridges
Ed Percival
Osman Gutierrez
Johnie Jenkins
Jack McCarty
Macon LaFoe
Clarence Watson
Forest Robinson